

IBM System/3 Model 6



The wide-carriage 2222 Printer equips this System/3 Model 6 for ledger card processing. Cards up to 11 by 14 inches can be inserted into the feed slot (center).

MANAGEMENT SUMMARY

On October 28, 1970, IBM announced the System/3 Model 6. Rather than just another version of the original System/3 (now called Model 10) that was introduced in July 1969, the Model 6 is strikingly different in its peripheral hardware, software, and applications.

The System/3 Model 6 announcement stressed that this single computer system can be used in two radically different ways. As "the office computer," IBM introduced the Model 6 as a low-cost stored-program computer, using disk drives for on-line file storage and featuring an Operator Keyboard Console for both data entry and system control. Ledger card processing is also offered as an option. All programming of standard business applications is to be done in the RPG II language.

As "the problem solver," IBM introduced the System/3 Model 6 as a fast arithmetic processor designed to permit ➤

The operator-centered design of this new model of the System/3 gives it great appeal to most current users of accounting machines or time-sharing terminals, but also severely limits its potential throughput. Programs can be written in either RPG II or conversational BASIC.

CHARACTERISTICS

MANUFACTURER: International Business Machines Corporation, 112 East Post Road, White Plains, N.Y. 10601.

MODEL: System/3 Model 6.

DATA FORMATS

BASIC UNIT: 8-bit byte. Each byte can represent 1 alphanumeric character, 1 BCD digit, or 8 binary bits.

FIXED-POINT OPERANDS: Can range from 1 to 16 digits for source fields and from 1 to 31 digits for result fields. Logical operands can range from 1 to 256 bytes.

FLOATING-POINT OPERANDS: No facilities for floating-point arithmetic are provided.

INSTRUCTIONS: 4, 5, or 6 bytes long in 2-address format; 3 or 4 bytes long in 1-address format; 3 bytes long in command format. (Each address can be represented by either a 2-byte direct address or a 1-byte "displacement.")

INTERNAL CODE: EBCDIC (Extended Binary-Coded Decimal Interchange Code).

MAIN STORAGE

STORAGE TYPE: Magnetic core.

CAPACITY: 8,192, 12,288, or 16,384 bytes.

CYCLE TIME: 1.52 microseconds per 1-byte access.

CHECKING: Parity bit with each byte is generated during writing and checked during reading.

STORAGE PROTECTION: None.

CENTRAL PROCESSOR

INDEX REGISTERS: None for use by programmer. Sixteen local storage registers are provided for use in base-displacement addressing, instruction execution, program control, and I/O control.

INDIRECT ADDRESSING: None.

INSTRUCTION REPERTOIRE: 28 instructions, including addition and subtraction of unpacked (1 digit per byte) decimal operands, but no multiply or divide. Also included are an edit instruction and addition, subtraction, and comparison of logical characters. ➤

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▷ engineers, scientists, and other technicians to utilize the system at the keyboard via the conversational BASIC language. An optional CRT display unit is offered for quick display of the results of calculations. The Model 6 also offers features to permit its use as a simple desk calculator.

IBM is reported to have sold some 1800 of the original System/3's (Model 10) in the first year of marketing. Yet it is probable that many more orders and installations had been forecasted. Many prospective users in small businesses apparently rejected the System/3 as their first computer because, featuring tab-oriented punched card processing, it differed so radically from their present methods of processing data with electronic accounting machines. These prospects probably prompted introduction of the keyboard-oriented System/3 Model 6.

The Model 6 offers these prospects full operator control of the system via the Operator Keyboard Console. Input data is directly entered at the keyboard, and printing can take place on conventional (non-magnetic) ledger cards. This equipment will seem familiar and comfortable to most small businessmen, as will the design approach used in setting up the applications.

Another reason for the introduction of the Model 6 is IBM's recognition of the fact that many small scientific and engineering firms have been spending their processing dollars with time-sharing firms. By providing the System/3 with a conversational BASIC compiler and an 85-cps serial printer, IBM will attempt to exploit the computational power of its System/3 by luring small companies away from the somewhat tarnished world of time-sharing and into the IBM fold for the first time.

The basic System/3 Model 6 configuration consists of a processing unit (with 8K, 12K, or 16K bytes of core storage), an Operator Keyboard Console, an 85-cps serial printer (available in unique, bidirectional printing models), and a disk storage subsystem of 2.45 to 9.83 million bytes. The processing unit, main memory, and disk storage units are the same as those offered with the original System/3 Model 10 (see Report 70C-491-01). The Operator Console is new, but the wire matrix print mechanism of the serial printers is the same as that used with the System/370's 3215 Console Printer-Keyboard. The basic System/3 Model 6 configuration requires only about 120 square feet of floor space.

System/3 Model 6 configurations can be expanded by adding a 5496 Data Recorder (for reading, punching, and printing of 96-column cards at 22 cards per minute), a 2265 Display Station, and a 1255 Magnetic Character Reader. Also, a Binary Synchronous Communications Adapter can be added to permit the system to serve as a programmable remote terminal (to another System/3 or to any larger computer in IBM's current product line).

▶ **ADDITION TIME:** For two 5-decimal-digit numbers: 26 microseconds.

OPTIONAL FEATURE: Command keys feature provides an additional set of eight keys which can be programmed to perform specific arithmetic operations in the Desk Calculator mode. (Eight Command Keys are standard equipment.)

Extra-cost features, called attachments, controls, or channels, must be added to the 5406 Processing Unit to accommodate each of the standard peripheral devices.

INPUT-OUTPUT CONTROL

CONFIGURATION RULES: Every System/3 Model 6 requires one 5406 Processing Unit, one 5444 Disk Storage Drive, and one Printer (either Model 5213 or Model 2222). In addition, a maximum of two 5444 Disk Storage Drives, one 5496 Data Recorder, one 1255 Magnetic Character Reader, and one 2265 Display Station can be connected. The 2265 Display Station and the 2222 Printer cannot be used in the same system.

SIMULTANEOUS I/O OPERATIONS: Input/output operations are overlapped with computing through a memory "cycle-stealing" technique.

MASS STORAGE

5444 DISK STORAGE DRIVE, MODELS 1, 2, & 3: Models 1 and 2 each consist of one removable single-disk cartridge and one fixed disk on a single drive, served by a single access mechanism with four vertically-aligned heads. Model 3 accommodates one removable single-disk cartridge only. A System/3 Model 6 can include one or two disk drives, housed in sliding drawers beneath the operator's work table. The following combinations of models and resulting capacities are available:

Drives	Models	Data Capacity
1	1	2,457,600 bytes
1	2	4,915,200 bytes
2	2 + 3	7,372,800 bytes
2	2 + 2	9,830,400 bytes

Model 1 has 100 data tracks on each recording surface, while Models 2 and 3 have 200 data tracks per surface. Each track consists of 24 sectors, and each sector can hold a 256-byte record.

For all models, average rotational delay is 20 milliseconds and data transfer rate is 199,000 bytes/second. Average head movement time is 153 milliseconds in Model 1 and 269 milliseconds in Models 2 and 3. A seek operation on one drive can be overlapped with a seek on another drive, but not with another read or write operation.

The removable 5444 Disk Cartridge weighs 6 pounds and is about 15 inches in diameter and 2.5 inches high. It stores 1.22 million bytes when used with the 5444 Model 1 Drive and 2.45 million bytes when used with the 5444 Model 2 or 3. Disk Cartridges are physically interchangeable between the System/3 Model 6 and the original System/3 Model 10.

INPUT-OUTPUT UNITS

OPERATOR KEYBOARD CONSOLE: An integrated input device that forms part of every System/3 Model 6 ▶

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▷ The Model 6 offers disk-based processing at lower entry costs than the original Model 10 system. The Model 6 has been deliberately restricted in size and I/O device flexibility in order to eventually force users with growing needs to upgrade to punched card processing and the larger configurations possible with the Model 10.

The System/3 Model 6 lacks the following features and capabilities of the System/3 Model 10:

- ✓ ● No line printers.
- ✓ ● No high-speed card processing.
- ✓ ● No expansion of core storage beyond 16K bytes.
- ✓ ● No assembler.
- ✓ ● No Application Customizer Service.

But the Model 6 introduces some significant new features:

- Low-cost serial printers with rated speeds of 85 cps.
- Ledger card processing, with optical reading of the ledger card identification number and last-line mark.
- 2265 Display Station.
- Conversational BASIC language.
- RPG II and BASIC capabilities on the same system.
- Low-cost disk entry system beginning at \$1,035 per month, including business-oriented software.

And finally, the principal overall limitations of the new System/3 Model 6 can be summed up as follows:

- In those business-oriented installations that do not include a 5496 Data Recorder, all data files stored on the relatively extensive disk files (up to 9.8 million characters) must be laboriously entered a character at a time via the keyboard. (Even using the optional Data Recorder, data input time is still relatively slow at 22 cards per minute).
- Line printing speeds are restricted to about 50 to 70 lines per minute, depending on the number of characters printed per line and on the printer model used. Overall system throughput, restricted by the operator's keying action on input and the serial printer on output, will be correspondingly low in most commercial installations.
- Commercial, RPG II-oriented users must learn a fairly involved system control language called OCL (Operation Control Language) for directing the execution of every program. Those users who also utilize the BASIC programming language must learn an entirely different control language to direct the preparation and execution of BASIC programs.
- RPG II and BASIC programs generate and use mutually incompatible disk-based data files. Also, ▷

▶ configuration. This device is the primary means of operator control over the system and, in basic systems that do not include the optional 5496 Data Recorder or 1255 Magnetic Character Reader, the Keyboard Console is the only means of entering programs and data.

Data is entered at the keyboard through three groups of keys: a typewriter-style alphanumeric keyboard, an adding-machine style 10-key numeric keyboard, and an 8- or 16-key command keyboard. Several other operator control keys are provided.

The eight standard Command Keys are pre-programmed to perform (in Desk Calculator Mode) such functions as add, subtract, multiply, divide, square root, and exponentiation. Eight additional Command Keys are optionally available and can be programmed as desired. The Command Keys have 20 registers associated with them for storing and accumulating Calculator operands and results.

The Operator Keyboard Console also contains a Switch Panel and an Indicator Panel. The Switch Panel is used for operator control of the entire system. The Indicator Panel not only provides normal system status indicators, but can also provide programmable indicators to guide the operator in performing fixed sequences of operations.

5213 PRINTER: An 85-character-per-second serial printer capable of printing a 64-character set across 132 print positions. The print mechanism is a 7-by-7 wire matrix similar to that used in the 3215 Console Printer of the IBM System/370. Characters are printed at 10 characters per inch, 6 lines per inch.

There are three models of the 5213 Printer: Model 1 moves its forms by a pin-feed platen, with single or double spacing controlled by the operator; Model 2 employs a tapeless vertical forms control carriage and has a high-speed skip feature; Model 3 is similar to Model 2, but adds the capability of bidirectional printing, eliminating non-productive "carriage-return" operations. The fact that the printing element can print while moving in either direction can lead to higher throughput speeds than with the unidirectional models. Throughput, measured in terms of lines per minute, will generally fall between 50 and 70 lpm.

2222 PRINTER: Uses the same basic print mechanism as the Model 5213 Printer and prints in serial mode at 85 characters per second. The Model 2222 features an extra-wide carriage (220 character positions per line) and a dual, pin-feed tractor (with vertical forms control on the primary tractor only). The Model 2222 has been especially designed to feed, identify, and print on large ledger cards (6 to 14 inches wide, 8 to 11 inches long).

Each ledger card is manually fed, optically identified by a binary-coded identification number printed along the right-hand margin, aligned to the next available print line by an optical sensing device, printed on (using print positions 80 to 220), and ejected for manual stacking. IBM states that this cycle will typically take about 4 seconds.

The ledger card's identification number is used to locate the corresponding disk-stored data record. This technique is much more flexible than that of storing a restricted amount of information on a magnetic stripe on the reverse side of a ledger card itself. ▶

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- ▷ BASIC data files cannot be sorted by the Disk Sort program unless they are first converted to the appropriate format.
- The System/3 Model 6 also carries over the same limitations as the Model 10, as outlined in Report 70C-491-01, except for the fact that a display-type output device has now been added.

With regard to compatibility, the new System/3 Model 6 uses basically the same RPG II and Disk Sort programs as the original Model 10. The only differences between the two RPG compilers are those based on the unique I/O devices used in each system. Disk cartridge files prepared by the RPG II or Sort programs of one system can be processed with no difficulty by the other.

IBM states that applications such as billing, inventory control, accounts receivable, and sales analysis are the "bread and butter" uses of the Model 6 in the RPG II-based, business-oriented environment. Under BASIC, IBM divides the typical application areas into engineering/scientific, financial (such as bond analysis, lease analysis, rate of return calculations, etc.), and general business (sales forecasting, cash flow analysis, overhead distribution, etc.). For installations using both RPG II and BASIC, almost any application is suitable for the System/3 Model 6, provided it does not require large data files and/or high-speed input/output.

IBM demonstrated 40 different Model 6 systems across the country on October 28, the day of announcement. First customer deliveries of BASIC-oriented systems will begin in December 1970, and the first RPG-based systems will be delivered in March 1971. Domestically produced Model 6 systems will be manufactured at the IBM plant in Boca Raton, Florida. Systems for the IBM World Trade Corporation will be manufactured in Vimercate, Italy.

In summary, the System/3 Model 6 seems well designed to appeal to first-time computer users. With both RPG II and BASIC available, the Model 6 is a highly flexible system, if not one of high throughput. Small companies will be able to more easily justify procurement of the Model 6 because of its multiple uses. This fact alone should contribute to rapid user acceptance. □

- ▶ There are two models of the 2222 Printer: Model 1 uses a uni-directional printing technique and Model 2 uses a bidirectional technique.

5496 DATA RECORDER: Serves as either an on-line reader of 96-column cards or an on-line card punch and print device. In either input or output mode, rated throughput is 22 cards per minute. Only data that is being punched can also be printed on the cards. The 5496 is an option in System/3 Model 6 configurations.

This device is the same Data Recorder that was announced with the original System/3 Model 10 as an off-line keypunch for 96-column card preparation. Report 70C-491-01 describes the IBM 96-column card and the 5496 Data Recorder. When connected to a System/3 Model 6, the 5496 Data Recorder can also be used in off-line mode as a buffered keypunch by setting a switch on the console.

2265 DISPLAY STATION: Serves as an optional rapid output device, displaying up to 15 lines of 64 characters per line on the face of a CRT display screen. Solid-line characters are displayed in green on a gray background. A character brightness control is provided. This unit is basically the same as the single-station Model 2265 unit used with the System/360 and System/370 computers.

The 2265 Display Station cannot be used in the same system with a 2222 Printer. As supported by BASIC, the 2265 requires the Command Keys option on the Processing Unit. As supported by RPG II, the 2265 requires a 12K- or 16K-byte Processing Unit.

1255 MAGNETIC CHARACTER READER: Performs on-line reading of MICR-encoded documents at either 500 or 750 documents per minute, and sorts them into 6 or 12 stackers, depending on model. Connects to a System/3 via the optional Serial I/O Channel. The 1255 requires use of a Processing Unit with at least 12K bytes of core storage. It is not supported by RPG II or BASIC, but functions only with a stand-alone, separately priced utility routine which gathers the MICR input data on disk and records it on the printer.

There are three models: Model 1 reads and sorts up to 500 documents per minute into 6 stackers; Models 2 and 3 read and sort up to 750 documents per minute, but Model 3 provides 6 additional stackers. Document size can range from 2.5 to 4.25 inches in width, 5.75 to 8.875 inches in length, and 0.003 to 0.007 inches in thickness. The 1255 is also usable for off-line sorting.

COMMUNICATION CONTROL

BINARY SYNCHRONOUS COMMUNICATIONS ADAPTER (BSCA): Enables a System/3 Model 6 computer to communicate with any of the following IBM computers:

- Another similarly-equipped System/3 with the RPG II Telecommunications Feature.
- A 360/20 equipped with a BSCA.
- A 360/25 equipped with an Integrated Communications Adapter and BSC features.
- A System/360 or System/370 equipped with a 2701 or 2703 control unit containing the appropriate BSC adapter and features, and supported by DOS or OS BTAM.

Transmission is in half-duplex binary synchronous mode over a switched, leased, or private line. Either ASCII or EBCDIC transmission code can be used. Transmission over a non-switched data link can occur at 600, 1200, 2000, 2400, 4800, 19,200, 40,800 or 50,000 bits per second. When switched lines are used, transmission speed is limited to 600, 1200, or 2000 bits per second. ▶

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The optional 2265 Display Station complements the basic 5213 Printer by serving as a high-speed output device for the System/3 Model 6.

- Several optional features are available to enhance the capabilities of the BSCA. The Text Transparency feature permits transmission and reception of data in 8-bit binary image form as well as in EBCDIC code. The Station Selection feature enables the BSCA-equipped System/3 to operate as one of a number of IBM BSC terminals on a multipoint line. The Internal Clock feature generates timing signals for use with modems that lack a clocking facility. The Auto Call feature enables the System/3 to dial and initiate a call to a remote BSC terminal under program control.

The System/3 BSCA is supported by the separately-priced RPG II Telecommunications software.

SOFTWARE

SYSTEM CONTROL PROGRAMMING (SCP): These programs perform the system control functions that are basic to an RPG II-oriented System/3 Model 6 installation. They are supplied with the system at no additional charge. (All other System/3 software components are classed as Program Products and are separately priced.)

All SCP Programs can function with the minimum System/3 Model 6 configuration: 5406 Processing Unit with 8K bytes of core storage, one 5444 Disk Storage Drive, and one printer. The SCP programs are scheduled for first delivery in March 1971, three months after the first, BASIC-oriented System/3 Model 6 computers are delivered.

It should be noted that every program executed on a System/3 Model 6 requires a set of Operation Control Language (OCL) statements to provide the system with information about the job to be run (such as what program to load, what files to use, what date to use, etc.). OCL for the System/3 Model 6 is called conversational OCL because the operator keys in the control statements one at a time in response to queries (in the form of "keywords") from the system. (IBM indicates that it will also be possible to enter OCL statements via the optional 5496 Data Recorder.)

There are three sequences of OCL statements to be learned by the System/3 Model 6 operators: **LOAD**, for running a job whose OCL statements are not catalogued; **BUILD**, for cataloging OCL statements into a library; and **CALL**, for running a job whose OCL statements have been previously catalogued. Both the **LOAD** and the **BUILD** sequences contain a string of 20 keywords which must be individually responded to by the operator. The **CALL** sequence contains only four queries requiring operator response.

SYSTEM MANAGEMENT PROGRAMS: Generate and maintain a disk-resident system capable of compiling, generating, and executing user programs. These SCP programs consist of a supervisor and a scheduler which provide the user with selective program loading from disk, program roll-in/roll-out capability, I/O control, and execution of programs from catalogued OCL procedures. The operator must intervene at the end of each job to re-initiate the next job for execution. ►

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► **LIBRARY MAINTENANCE PROGRAM:** Permits the user to generate, maintain, and service the system disk and the source and object program libraries. The libraries can reside on any drive, but the system disk must reside on either the fixed or removable disk of Drive 1. Functions include library add, delete, display, and copy.

COPY/DUMP PROGRAM: Provides the user with the capability of copying his disk files onto another disk drive or printing them on the printer. Printing can be specified to occur between certain limits, and any portions of the original file can be deleted.

UTILITY PROGRAMS: Permit the user to prepare and maintain his disk files. The programs provided include Disk Initialization, Alternate Track Assignment, Alternate Track Rebuild, File and Volume Display, and File Delete.

RPG II (REPORT PROGRAM GENERATOR): This is the only programming language provided for business-oriented users of the System/3 Model 6. (The BASIC language is strongly oriented toward engineering and other mathematical applications.)

The RPG II programmer, using five different types of preprinted specification sheets, prepares a set of specifications that describe the form of the input data, the calculations to be performed, and the format of the desired output. These specifications are then keyed into the system and compiled by the RPG compiler, producing a machine-language program ready for execution.

The RPG II language is an extended version of earlier IBM RPG languages. It provides the facilities of System/360 RPG plus about 30 useful extensions, including automatic overlay, AND/OR relationships, square root operation code, indexing, array manipulation, and three types of file organization: sequential, indexed, and direct.

The RPG II compiler operates under control of the System Control Programming (SCP) software. Minimum system size for compilation and execution includes one 5406 Processing Unit with 8K bytes of core storage, a 5444 Model 1 Disk Storage Drive, and a 5213 or 2222 Printer. RPG II programs will also support the 5496 Data Recorder, and object programs will support the 2265 Display Station. The 1255 Magnetic Character Reader is not supported.

System/3 Model 6 RPG II is source-language-compatible with Disk RPG II for the original System/3 Model 10 except for differences originating from different I/O devices. Data files are similarly compatible. Conversely, data files created by RPG II and BASIC programs are not compatible and cannot be interchanged.

IBM has supplied the following sample RPG II compilation time, using the minimum system described above (with the 5213 Model 3 Printer): to compile 100 source statements, including 300 lines of listing and no object program overlays—11 minutes.

RPG II is scheduled for first customer delivery in March 1971. Support of the 2222 Printer (with ledger card control) is scheduled for September 1971, coinciding with the first delivery of the 2222 Printer.

RPG II TELECOMMUNICATIONS FEATURE: Provides the capability to compile programs for sending or receiving data via the Binary Synchronous Communications Adapter (BSCA) over a data communications network. A sixth RPG specification sheet is used to define the data transmission aspect of the RPG program. This feature operates under control of the System Control Programming (SCP) software. It is scheduled for availability in March 1971. It requires the minimum-sized System/3 Model 6 configuration, plus the RPG II Program Product. The functions and specifications of the System/3 Model 6 Telecommunications Feature are identical to those for the System/3 Model 10.

BASIC: System/3 BASIC is a conversational, stand-alone computing system designed for mathematical problem solving. The System/3 BASIC programming language is fully compatible with the BASIC language co-developed by GE and Dartmouth College and currently used with most time-sharing systems.

Programs and data files are created at the keyboard in a conversational mode. (The 5496 Data Recorder can also be used to load source programs into the system.) There are four types of lines that can be entered: BASIC source program statements, data-file lines, comment lines, and system commands. All statements are checked for proper syntax as they are entered.

The system commands specify an immediate system action, such as saving a program or data file, executing a program, modifying a work file, etc. These system commands constitute a control language that is entirely different from the OCL statements used to control the System/3 when operating under the System Control Programming software.

Debugging aids are provided to assist in checking programs at execution time. Also, a number of utility functions are provided to perform such support functions as system generation, disk initialization, disk copy, etc.

BASIC also provides another mode of service, called the Desk Calculator mode, utilizing the console's Command Keys rather than any detailed programming language. Operating in this mode, the user can add, subtract, multiply, divide, compute powers and roots, and use built-in logarithmic and trigonometric functions.

BASIC is a stand-alone computing system. However, it can co-reside on the same system disk cartridge as the SCP software. In such co-residence situations, control can be easily transferred back and forth between the two operating systems.

Data and program files are prepared in a manner unique to the BASIC system. Thus, an RPG-prepared object program cannot use the data files prepared by a BASIC program, and vice versa. These incompatible disk files can be made compatible by converting them with the Data Interchange Utility (DIU), one of the optionally available "Conversational Utilities."

The minimum System/3 Model 6 configuration will support the use of BASIC. Fully expanded configurations can also be used to advantage. Both the 5213 and 2222 Printers are supported, as well as the 5496 Data Recorder and the 2265 Display Station. ►

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► Object programs run in 64K bytes of virtual memory, implemented through software paging. Using this paging concept, source programs can contain up to 990 BASIC statements. IBM estimates that programs will be compiled from disk at about 1,000 statements per minute, once all the statements have been entered and verified. Compilation listing will be performed at about 80 to 100 lines per minute, depending on the printer used.

BASIC will be available for first delivery in December 1970 in conjunction with the first deliveries of the hardware.

CONVERSATIONAL UTILITY PROGRAMS: There are three optionally available disk-resident utility programs for use under the SCP software: Keyboard Data Entry, Keyboard Source Entry, and Data Interchange Utility.

Keyboard Data Entry allows the operator to use the System/3 console keyboard as a key-to-disk data entry station. Data files can be prepared and organized for direct usage by RPG II and Disk Sort programs. Ten batch and ten final totals can be utilized.

Keyboard Source Entry enables the user to key RPG II source statements or other procedures directly into the source program library on disk. Compilation can then take place from disk.

Data Interchange Utility permits the user to convert RPG-produced data files into BASIC data files, and vice versa.

The Conversational Utility Programs are scheduled for first delivery in March 1971.

DISK SORT: Sorts disk files into either ascending or descending sequence. Accepts files organized in sequential, indexed, or direct fashion. Can perform a full-record sort, a tag sort (yielding a file of 3-byte record addresses arranged in the desired sequence), or a "tagalong" sort (yielding a sequenced file of records containing only the key fields and data fields specified by the user).

The functions and syntax of specification sheets for the System/3 Model 6 Disk Sort program are identical to those used with the System/3 Model 10 Disk Sort. Output data files created by the Model 6 Disk Sort can be processed by the Model 10 Disk Sort, and vice versa.

The Disk Sort Functions under control of the SCP software. It requires the minimum 8K-byte System/3 Processing Unit, one 5444 Disk Storage Drive, and one printer. It is scheduled for first delivery in March 1971.

1255 MAGNETIC CHARACTER READER UTILITY: Controls the reading and sorting of MICR-encoded documents, accumulates appropriate totals, and places

selected data from the documents on disk and/or printer files. It requires a 12K-byte System/3 Processing Unit and functions under control of the SCP software. It is scheduled for first delivery in March 1971.

PRICING

MINIMUM SYSTEM: Consists of 8K Processing Unit, 5213 Model 1 Printer, and 5444 Model 1 Disk Storage Drive (2.45 million bytes). Monthly rental \$975. Purchase price, \$46,450. Adding RPG II, Conversational Utilities, and Disk Sort would raise the monthly rental by \$60 for the commercial user. Adding BASIC for mathematical processing raises the monthly rental by \$110. Using the 5213 Model 2 Printer with vertical forms control increases the monthly rental by \$40 and the purchase price by \$1,800.

MINIMUM LEDGER CARD SYSTEM: Consists of 8K Processing Unit, 2222 Model 1 Printer, and 5444 Model 1 Disk Storage Drive. Monthly rental, \$1,165. Purchase price, \$56,750.

TYPICAL COMMERCIAL CARD SYSTEM: Consists of 12K Processing Unit, 5496 Data Recorder, 5213 Model 3 Printer, and 5444 Model 2 Disk Storage Drive (4.90 million bytes). Monthly rental, \$1,520. Purchase price, \$67,640. Substitution of a 16K-byte Processing Unit in this configuration raises the monthly rental by \$115 and the purchase price by \$700. Adding the Binary Synchronous Communications Adapter (plus the required Processing Unit Expansion feature) raises the rental by \$300 to \$405 and the purchase price by \$14,710 to \$19,855, depending upon the optional features selected.

SOFTWARE: Monthly rentals for the System/3 Model 6 software facilities ("Program Products") are as follows: RPG II, \$35; BASIC, \$110; Conversational Utility Programs, \$15; Disk Sort, \$10; RPG II Telecommunications Feature, \$35; 1255 Magnetic Character Reader Utility, \$80.

SUPPORT: IBM Systems Engineering assistance is available to System/3 users at a basic charge of \$22 per hour.

EDUCATION: Two-day introductory courses are offered at no charge. Various other System/3 courses are available at costs averaging about \$40 per student per day.

CONTRACT TERMS: The standard IBM rental contract includes equipment maintenance and entitles the customer to up to 176 hours of billable time per month. Time used in excess of that amount is billed, for most System/3 components, at an extra-use of 10% of the basic hourly rate (i.e., 10% of 1/176 of the monthly rental for each hour of extra use). ■

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EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
PROCESSOR AND MAIN STORAGE				
5406	Processing Unit			
	Model B2; 8,192 bytes	28,745	125	590
	Model B3; 12,288 bytes	34,545	130	705
	Model B4; 16,384 bytes	35,245	130	820
1550	Command Keys (9-16)	980	0.50	20
5732	Processing Unit Expansion	1,725	6	35
PERIPHERAL EQUIPMENT				
5444	Disk Storage Drive			
	Model 1; 2.46 million bytes	8,075	47	155
	Model 2; 4.92 million bytes	9,700	47	255
	Model 3; 2.46 million bytes	8,075	47	155
5440	Disk Cartridge	175	—	Purchase Only
6378	Second Disk Attachment (required on 5406 for a 5444 Mod. 3 or a second 5444 Mod. 2)	2,375	5	45
5213	Printer			
	Model 1; pin-feed platen	6,200	48	160
	Model 2; vertical forms control	8,000	65	200
	Model 3; vertical forms control, bi-directional printing	8,200	75	250
3901	Printer Attachment (required on 5406 for 5213 Mod. 1)	3,420	19	70
3902	Printer Attachment (required on 5406 for 5213 Mod. 2)	3,430	19	70
3903	Printer Attachment (required on 5406 for 5213 Mod. 3)	3,430	19	70
2222	Printer (with ledger card device)			
	Model 1; unidirectional printing	16,500	105	350
	Model 2; bidirectional printing	16,700	115	385
7951	Printer Attachment (required on 5406 for 2222 Mod. 1)	3,430	19	70
7952	Printer Attachment (required on 5406 for 2222 Mod. 2)	3,430	19	70
5496	Data Recorder	7,600	54	155
3210	Data Recorder Attachment (required on 5406)	1,960	2	40
7501	System/3 Attachment (required on 5496)	2,205	11	45
2265	Display Station	5,430	40	170
7960	Display Station Attachment (required on 5406)	3,675	1.50	75
1255	Magnetic Character Reader (requires #5732 on 5406 Processing Unit)			
	Model 1; 500 dpm, 6 stackers	38,645	210	805
	Model 2; 750 dpm, 6 stackers	44,260	335	980
	Model 3; 750 dpm, 12 stackers	60,240	440	1,300
6303	System/3 Adapter (required on 1255)	5,820	4	121
7081	Serial I/O Channel (required on 5406 for connection of 1255)	7,350	5	150
3215	Dash Symbol Transmission Feature (for 1255)	35	NC	50 (1)
4380	51-Column Card Sorting Feature (for 1255)	720	NC	15
7060	Self-Checking Number Feature (for 1255)	2,330	2.50	49
COMMUNICATIONS EQUIPMENT				
2074	Binary Synchronous Communications Adapter (requires #5732 on 5406 Processing Unit)	12,985	65	265
1315	Auto Call Feature (for #2074)	1,960	1	40
4703	Internal Clock Feature (for #2074)	1,225	1	25
7477	Station Selection Feature (for #2074)	980	1	20
7850	Text Transparency Feature (for #2074)	980	1	20

* Rental prices include equipment maintenance.
(1) One-time charge.

IBM System/3 EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
PROCESSOR AND MAIN STORAGE				
5410	Processing Unit (for non-disk systems)			
	Mod. A2; 8,192 bytes	15,200	27	310
	Mod. A3; 12,288 bytes	20,100	29	410
	Mod. A4; 16,384 bytes	22,575	29	525
	Mod. A5; 24,576 bytes	37,000	30	755
	Mod. A6; 32,768 bytes	48,275	30	985
5410	Processing Unit (for disk systems)			
	Mod. A12; 8,192 bytes	21,325	73	435
	Mod. A13; 12,288 bytes	26,225	75	535
	Mod. A14; 16,384 bytes	28,700	75	650
	Mod. A15; 24,576 bytes	43,125	76	880
	Mod. A16; 32,768 bytes	54,400	76	1,110
3500	Dual Program Feature (for 5410)	5,400	1	110
5732	Processing Unit Expansion Feature (for 5410)	1,725	3	35
PERIPHERAL EQUIPMENT				
5444	Disk Storage Drive			
	Mod. 1; 2.46 million bytes	8,075	47	155
	Mod. 2; 4.92 million bytes	9,700	47	255
	Mod. 3; 2.46 million bytes	8,075	47	155
5440	Disk Cartridge (for 5444 drives)	175	Time & Mat'l.	Purchase Only
6378	Second Disk Attachment (required on 5410 for a 5444 Mod. 3 or a second 5444 Mod. 2)	2,375	5	45
5424	Multi-Function Card Unit			
	Mod. A1; reads 250 cpm, punches and prints 60 cpm	9,450	140	270
	Mod. A2; reads 500 cpm, punches and prints 120 cpm	12,575	200	405
4100	MFCU Attachment (required on 5410 for 5424 Mod. A1)	4,200	14	80
4101	MFCU Attachment (required on 5410 for 5424 Mod. A2)	5,325	14	95
5203	Printer			
	Mod. 1; 100 lpm, 96 positions	10,600	67	230
	Mod. 2; 200 lpm, 96 positions	11,775	76	280
3475	Dual Feed Carriage Feature (for 5203)	3,675	20	75
4730	Interchangeable Chain Cartridge (for 5203)	3,675	1	75
5558	24 Additional Print Positions (for 5203)	1,500	2	50
5560	36 Additional Print Positions (for 5203)	2,250	2	75
8639	Universal Character Set Attachment (for 5203)	300	1	10
3970	Printer Attachment (required on 5410 for 5203 Mod. 1)	2,925	10	55
3971	Printer Attachment (required on 5410 for 5203 Mod. 2)	2,925	10	55
3480	Dual Feed Carriage Control (required on 5410 for #3475 on 5203)	1,225	1	25
8642	Universal Character Set Control (required on 5410 for #8639 on 5203)	450	1	15
5471	Printer-Keyboard	4,700	32	100
4110	Printer-Keyboard Attachment (required on 5410)	2,800	5	50
5475	Data Entry Keyboard	2,250	7	40
4120	Data Entry Keyboard Attachment (required on 5410)	2,525	1	45
1255	Magnetic Character Reader	38,645	210	805
6303	System/3 Adapter (required on 1255)	5,820	4	121
7081	Serial I/O Channel (required on 5410 for connection of 1255)	7,350	5	150
3215	Dash Symbol Transmission Feature (for 1255)	35	—	50 (1)
4380	51-Column Card Sorting Feature (for 1255)	720	—	15
7060	Self-Checking Number Feature (for 1255)	2,330	2.50	49
5486	Card Sorter			
	Mod. 1; 1000 cpm	4,425	38	85
	Mod. 2; 1500 cpm	5,075	58	115
5496	Data Recorder	7,600	54	155
COMMUNICATIONS EQUIPMENT				
2074	Binary Synchronous Communications Adapter (requires #5732 on 5410 Processing Unit)	12,985	65	265
1315	Auto Call Feature (for #2074)	1,960	1	40
4703	Internal Clock Feature (for #2074)	1,225	1	25
7477	Station Selection Feature (for #2074)	980	1	20
7850	Text Transparency Feature (for #2074)	980	1	20

* Rental prices include equipment maintenance.
(1) One-time charge.

IBM System/3

NEW PRODUCT ANNOUNCEMENT

5203 PRINTER, MODEL 3: This new horizontal-train printer, introduced on October 28, 1970, provides printed output from a System/3 at 300 lines per minute with the standard 48-character set. This represents a 50 percent increase over the highest printing speed previously available.

Additional interchangeable train cartridges can be used to increase the character set from 48 characters to as many as 120, with corresponding reductions in printing speed. The standard 96 print positions can be expanded to 120 or 132. Vertical format is under program control; there is no carriage control tape. The new printer can be used with current System/3 software and user programs without change. Customer deliveries are scheduled to begin in July 1971.

Because many System/3 applications are severely print-bound, the new printer's higher speeds should lead to a significant increase in throughput in most installations—probably more than enough to justify the price increase of \$195 per month (including CPU attachment) over the 200-lpm 5203 Model 2. Even so, throughput in many applications will still be limited by the 300-lpm speed of the new printer.

1255 MAGNETIC CHARACTER READER, MODELS 2 & 3: These two new models offer a speed of 750 six-inch documents per minute—a 50 percent increase over the 500-dpm 1255 Model 1—and a choice of 6 or 12 stackers (in Model 2 or 3, respectively). The optional Self-Checking Number, 51-Column Card Sorting, and Dash Symbol Transmission features are available for both models. Model 3 can also be equipped with a new optional feature, High-Order Zero and Blank Selection, which can save sorting time. The new models, like the 1255 Model 1, are connected to the System/3 Processing Unit via the System/3 Adapter (#6303) and the Serial I/O Channel. All models of the 1255 can now be used with an IBM 2770 Data Communication System, a System/360 (Models 20, 25, 30, 40, and 50) or a System/370 (Models 145 and 155), as well as with the System/3.

	<u>Purchase Price</u>	<u>Monthly Maint.</u>	<u>Rental (1-year lease)</u>
5203 Printer, Model 3 (300 lpm)	\$17,400	\$127	\$435
4740 Interchangeable Train Cartridge, Additional	2,910	33	110
3972 Printer Attachment (required on 5410 Processing Unit)	4,525	13	95
1255 Magnetic Character Reader:			
Model 2; 750 dpm, 6 stackers	44,260	335	980
Model 3; 750 dpm, 12 stackers	60,240	440	1,300
4520 High-Order Zero and Blank Selection Feature (for 1255 Model 3 only)	1,440	5	30