Inforex System 9000

MANAGEMENT SUMMARY

The System 9000 is based on a concept referred to by Inforex as Distributed Information Processing, a technique that provides user departments with the data entry and file management tools necessary for solving business problems. The system includes a Datapoint-developed processor with 256K bytes of memory which supports up to 180 megabytes of disk storage, a 9-track magnetic tape transport unit, a 300-lpm band printer, and up to 24 workstations and matrix character printers.

The Universal Workstation is a multipurpose interactive terminal from which users can perform any system function. It features a movable 55-key alphanumeric keyboard (which functions as an IBM 029-style keyboard during UDE data entry), an 11-key-calculator-style numeric pad, and 10 programmable function and control keys.

Users can add processors and peripherals in a modular fashion through a local networking system, ULTRANET. ULTRANET Expansion Processors may function as file management, application, or communications processors. As many as 255 processors can be linked by a coaxial cable bus which may extend up to four miles with signal amplification. Users have common access to data files, peripher- ➢

The System 9000 Distributed Information Processing System allows users to expand a local system or to grow into a local area network by adding a unit at a time. The system components that are shown here, starting from the foreground, are the system processor, Universal Workstation, matrix printer, disk storage systems, tape transport unit, and band printer.

The System 9000 is a distributed processing system that provides software modules for batch and transaction-oriented data entry, file management with the associative index method called CONFIRM, multiuser Cobol, and local networking. It is designed for end-user departments.

MODELS: The two packaged systems are the Model 9300 and the Model 9400.
CONFIGURATION: The basic system consists of a 256K-byte processor, a Multiport Workstation Interface for the attachment of up to eight workstations and peripherals, a 20- or 120-megabyte disk storage system, and an optional 9-track transport unit.
COMPETITION: Four-Phase Systems Series IV, and Nixdorf 600 Series.
PRICE: A basic configuration that includes a 248K-byte processor, 20 megabytes of disk storage, a 160-cps printer, and 8 workstations costs $52,755.

CHARACTERISTICS

VENDOR: Inforex, Inc., 186 Middlesex Turnpike, Burlington, Massachusetts 01803. Telephone (617) 272-6470.

DATE OF ANNOUNCEMENT: May 1981.

DATE OF FIRST DELIVERY: August 1981.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Inforex.

CONFIGURATION

The System 9000 may be customized and expanded according to individual user needs. The basic system includes a 256K-byte processor which supports all utilities and customer applications for attached workstations and peripherals. A Multiport Workstation Interface connects the processor with up to eight workstations. Two additional workstation interfaces may be added. Up to 24 local or remote workstations are available per processor. Disk storage capacity can range from 20 to 180 megabytes per processor. Users may add a 9-track tape transport unit for 800- or 1600-bpi recording. One 160-cps matrix printer can be attached to the system processor and to each workstation. For report generation, a 300-lpm band printer is available. Batch or interactive communications protocols are also provided.

ULTRANET, Inforex's local area networking system, allows users to add application, file management, and communications processors as required. Up to 255 processors can be linked into one large computer system. ULTRANET is fully compatible with Datapoint Corporation's ARCNET.

Inforex offers two packaged systems. The Model 9300 basic configuration consists of a processor, a disk controller, one ➢

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als, and communications, and resource sharing is transparent to the user. Since processors are treated as independent units, different tasks can be run concurrently.

COMPETITIVE POSITION

The Inforex 9000 competes with the Four-Phase Systems Series IV (now called the 4000 Series) and the Nixdorf 600 Series Distributed Processing Systems. The Inforex 9000 provides batch and interactive data entry, file management, local processing, data communications, local area networking, mailing list creation, and system maintenance capabilities. The Nixdorf 600 Series can perform data entry, local file processing, local data base inquiry and updating, and batch and interactive communications. The Four-Phase Systems Series IV provides file management, system maintenance, data entry, word processing, diagnostics, and office automation functions. The Inforex system allows different tasks to be run concurrently, while the Nixdorf allows multiple concurrent tasks.

The Inforex 9000 is designed for use by operational end-user departments such as production scheduling, shipping, receiving, purchasing, lease management, order entry, inventory control, and personnel. The Nixdorf 600 Series' three models are aimed at small, remote offices, applications requiring multiple concurrent operations and installations in which large volumes of information must be locally stored, interrogated, and maintained.

ADVANTAGES AND RESTRICTIONS

System 9000 communications software provides a full range of commonly used batch and interactive protocols. A Synchronous Communications Adaptor, compatible with industry-standard modems, is a buffered synchronous interface between any System 9000, workstation, or disk to any synchronous device. Batch and interactive communications to a variety of mainframes including IBM, CDC, Honeywell, UNIVAC, and Burroughs are also possible, including emulation of remote job entry terminals (RJE). Within an ULTRANET system, the adaptor is attached directly to a Communications Processor to allow it to act as an IBM 3271 Communications Controller transmitting up to 9600 baud in 3270 mode. The Communications Processor permits every applications processor to communicate with a remotely located computer or another ULTRANET System. Workstations can act as remote job entry terminals to the central system and can access the central database through user-written programs.

The System 9000 features three software products that are bundled in the system: INFOBASE, an information management system which automatically provides for development use of data file inquiry and updating, and file management and report generation programs; Universal Data Entry (UDE), a batch-oriented data entry package; and Multi-User Cobol, an ANSI-standard language with extended features for interactive or batch programming and application concurrency.

fixed 10-megabyte disk and one removable 10-megabyte disk, and a workstation interface. Optional disk storage expansion units available in 20- or 40-megabyte increments may be added up to a maximum of 160 megabytes. The Model 9400 basic configuration includes the processor, a Large System Storage Unit with disk controller and two 60-megabyte removable disk packs, and a workstation interface. Total storage capacity can be increased to 180 megabytes by adding an optional 60-megabyte expansion unit.

TRANSMISSION SPECIFICATIONS

Inforex furnishes a buffered synchronous interface, the Synchronous Communications Adaptor, for high-speed data transfer between compatible processing devices. The adaptor transmits data from the System 9000, any member workstation, or disk to any synchronous device and can provide batch and interactive communications to a wide variety of vendor mainframes including IBM, Burroughs, UNIVAC, CDC, and Honeywell. It transmits and receives at rates of up to 9600 baud. Compatible with standard synchronous modems, the adaptor also features an Automatic Calling Unit interface for program-controlled origination. The adaptor can be attached to the ULTRANET Expansion or Communications Processor enabling it to operate in a program-controlled, binary synchronous mode as a 3271 communications controller for multipoint or point-to-point 3270 communications.

The Communications Processor manages all 3270 communications for ULTRANET systems with substantial data transmission needs. It permits every applications processor to communicate with a remotely located computer or another ULTRANET system. The processor comes with 120K bytes of user available memory expandable to 248K bytes of user available memory and is connected to the ULTRANET system by a Buslink Interface Module and standard coaxial cable.

It acts as an IBM 3271 Communications Controller transmitting up to 9600 bps in 3270 mode. The communications processor can emulate IBM 3780 terminals over leased or dialed telephone lines to communicate directly with central computer systems. The System 9000 transmits files to the central system, and spools the returning files for processing or printing. It can update a data base stored on the mainframe directly, or can transfer programs to the mainframe for compiling and execution. Workstations can act as remote job entry terminals to the central system or other Inforex systems between System 9000s.

SOFTWARE

UNIVERSAL DATA ENTRY (UDE): The Universal Data Entry Software supports batch-oriented data entry with screen formats, menu-driven applications incorporating basic edits and validation checks, and a data entry procedure language (PRELUDE) for application customization. After operators sign on with the proper identification and password, the users may select functions from a menu or may access data directly according to their levels of experience. Data being entered can go through more than 20 sophisticated editing and verification steps.

The UDE package provides operators with a number of capabilities. Six balance accumulators add or subtract the contents of amount fields to or from a specified accumulator. Operators can view the contents of accumulators, original data in verify mode, current field attributes, transferred file status, available disk space, error records, date and time, and transfer queue entries. The system has the ability to page forward and backward and return back to the next keyable record after a backward search. User files can be updated in the search mode and a search may be specified for a single character or a string of continuous characters.

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USER EXPERIENCE

In order to complete this section of this report, attempts were made to obtain customer references from Inforex. Because such references were not received by us before our publication deadline, we were not able to conduct a user survey. □

PRELUDE, the procedure editing language for UDE, edits and processes keyed data beyond the basic capabilities in UDE. PRELUDE programs are composed of procedural-type statements using mnemonic verbs like ADD, END, MOV AND WRT to specify actions to be taken on keyed field entries. Once a PRELUDE program is written it is compiled and linked to a specified screen format. Once a procedure has been compiled and assigned to a screen format, PRELUDE instructions are executed automatically whenever data entry operations are performed. PRELUDE adds the ability to perform full arithmetic operations on whole numbers, transfer data, conditional testing, conditional branching and table/range operations. PRELUDE makes available a 32-character, user-defined message area plus 12 and 40 position save areas. The UDE operator statistics file is automatically updated by the system during entry, verify, and modify modes.

Selected data transfer is possible including disk-to-tape, tape-to-disk, disk-to-disk, tape-to-printer, and disk-to-printer concurrent with data entry.

INFOBASE: INFOBASE, the System 9000 file management application module, permits users to create file management application programs, enter access, and manipulate data and generate ad hoc reports without writing a program. It is a data dictionary-based system in which the user defines fields, keys, files, and auxiliary data base documentation for use with groups of files. INFOBASE generates the application code through a four-step process: data field and file definition, screen formats creation, search key definition, and automatic program generation.

In data field and file definition, users define each item by name and characteristics. The user creates or modifies the screen format with field labels, key-in positions, screen titles, miscellaneous screen text, field edits, and verification displays. Up to nine consecutively numbered screens can be used in each program. Up to 40 data fields may be displayed per screen. Each character position in the key-in area is represented by an underscore. The last three lines of the screen are reserved for operator messages. The compiled, edited screen design is stored in the data dictionary to be recalled, modified, and reused as needed. Screen format can be printed as hard copy while the design is going on. After the screen format is defined, INFOBASE automatically generates applications source code which can be modified by the user to further customize the application. Applications programs provide three different message prompts: general prompts to advise the operator of field specifications, error messages, and help prompts whenever a question mark is entered. Each message can have up to 99 lines of 70 characters.

MULTIKEY CONFIRM ACCESS: For file inquiry and review, the user can specify standard ISAM keys or Inforex's CONFIRM access method.

CONFIRM works like a query language applying information that is known or partially described against data files to review and extract information. CONFIRM builds one index for an unlimited number of keys so records may be located by their access key or by multiple keys, class of items, field content, or partial information. Record fields to be changed are accessed randomly by number on the screen. New data is written over the old only after it has been verified. Full prompting is displayed in modification mode. Any data review screen image may be printed directly on the system printer.

An INFOBASE array definition facilitates creating and updating files containing repeated rows of data. Data edits for each field can be specified in the data dictionary and applied whenever records are entered, added, or modified. Every INFOBASE-generated field maintenance program has a self-contained facility for producing formatted listings of user data files for ad hoc reports. INFOBASE automatically handles formatting, page breaks, headings, column headings, and printer displays for reports. Clearance to review, enter, and modify files and records may be assigned by function, operator, and data element.

COBOL: Inforex's Multi-User Cobol is a subset of the 1968 ANSI Cobol standard with extensions compatible with ANSI 1974 STANDARDS. It will run packaged software programs with minor modifications. Cobol applications can be executed in either a batch mode or interactively, and any combination of jobs can run simultaneously. Extensions provide for interactive screen formatting, including aids for record manipulation, cursor positioning, field attribute definitions, validation of entered data, general prompts, and error messages. Programs contain up to 65,000 bytes of object code with 15,500 bytes of working storage.

COMPONENTS

PROCESSOR: The System 9000 processor is a desktop terminal with a processor, a CRT display, and a typewriter-style keyboard. The 256K-byte processor (248K-byte user available) has a 600-nanosecond memory cycle speed and an enhanced instruction set. It supports up to 180 megabytes of disk storage plus a 9-track magnetic tape transport unit. Up to eight workstations and peripherals can be connected via a Multiport Workstation Interface. Two additional adaptors (able to support eight devices each) may be added. System Processors are equipped with cassette tape drives which may be used for diagnostics and program loading.

The Processor's CRT displays 96 characters on a 7-by-3.5 inch screen and features a 5-by-7 dot matrix for high legibility and a writing rate of up to 50,000 characters per second. The 55-key alphanumeric keyboard comes in a standard typewriter layout with an 11-key numeric pad and five system control keys.

The Ultranet Expansion Processor is identical to the system processor but it does not accommodate cassette tapes. It may function as an applications processor, a file management processor, or a communications processor (128K byte—120K user available). Up to 255 processors plus associated peripherals can be connected in a single ULTRANET system.

WORKSTATION: The Universal Workstation is a desktop terminal with an interactive video display and keyboard. The video display screen measures 5.4 by 8.9 inches and generates 1920 characters from a 7-by-9 dot matrix (enlarging to 9-by-12 to accommodate descenders) against an easy-to-read highcontrast amber phosphor. There are 16 key-controlled increments of screen brightness. The workstation uses a 96-character ASCII set and foreign or special character sets are loaded from the system processor. The screen's refresh rate is 50 or 60 times per second synchronized to line frequency.

The multipurpose keyboard features a standard 55-key alphanumeric typewriter layout with multiple key rollover, an 11-key-calculator-style numeric keyboard, 10 program-

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mable function and control keys, and nine off-line diagnostics. It emulates the IBM 029 keypunch-style keyboard when the UDE software is used.

Any workstation can be used to perform any system function and can either be linked directly to the System 9000 processor or be connected over standard telephone lines.

MULTIPORT WORKSTATION INTERFACE: The Multiport Workstation Interface links any System 9000 processor or ULTRANET Expansion Processor with up to eight external devices such as workstations, printers, and modems. Local external devices are connected directly to the interface and remotely located devices are connected via modems and telephone lines. The RS-232-C-compatible interface attaches directly to the processor via an I/O bus and draws power from the processor. Transmit and receive baud rates range from 110 to 9600 and may be set independently. Up to three interfaces may be attached to each processor.

DISK STORAGE: Disk storage can be tailored to any size from a minimum of 20 megabytes up to 180 megabytes per disk controller. The Model 9074 Disk Storage System is for small to medium System 9000 configurations and can be used in standalone batch processing applications or as part of a common system data base. The Model 9090 Large System Storage Unit is a mass storage system intended to be used as part of the common data base for large time-sharing configurations. Expansion units can be attached to the disk controller for incremental growth as required.

The Model 9074 Disk Storage System includes a disk controller and two 10-megabyte disks, one fixed and one removable. Optional 20- and 40-megabyte expansion units can be added up to a maximum of 160 megabytes of storage per processor. The 20-megabyte expansion unit includes both a fixed and removable disk. The 40-megabyte increment incorporates two 20-megabyte expansion units in a single cabinet. Average and maximum access times are 35 and 60 milliseconds, respectively. Buffer memory size is 4K bytes. The disks record 200 tracks per inch and provide a total of 10,027,008 bytes.

The Model 9090 Large System Storage Unit consists of a controller and two 60-megabyte removable disk packs. An optional 60-megabyte expansion unit housed in its own cabinet may be attached to the controller for a maximum of 180 megabytes of storage. The storage unit combines the disk spindle and drive motor in single assembly and features an electronic system for final head positioning and an air-cleaning system. Average access time is 30 milliseconds and maximum access time is 55 milliseconds. The disks contain 60,211,200 bytes, and buffer memory size is 16K bytes.

MAGNETIC TAPE: Optional 9-track tape transport units support 800- and 1600-bpi recording at a speed of 25 inches per second. The tape transport units use standard magnetic tape reels of 10.5 inches in diameter. Storage capacity is 5.7 megabytes.

PRINTERS: For local reports, users may attach one serial matrix printer to each workstation and one parallel matrix printer to the system processor. The 132-column printers use a 9-by-9 dot matrix and a 96-character ASCII set. A 300-lpm band printer is also available. It uses a 64- or 96-character ASCII set and prints up to 132 columns with horizontal spacing of 6 or 8 lines per inch.

ULTRANET: ULTRANET, Inforex's local area networking system, allows users to expand installed System 9000 configurations by adding processors and components a unit at a time. The ULTRANET Expansion Processor provides 248K bytes of user memory and offers the same characteristics as the original system processor. It does not accommodate cassette tapes. Within an ULTRANET configuration, at least one processor acts as a file management processor dedicated to storing and retrieving the common data files of the ULTRANET. That processor supports up to 180 megabytes of disk storage. The other processors act as additional file management processors, or applications processors dedicated to batch or transaction-oriented applications program execution and development, or as communications processors managing concurrent communications for the ULTRANET system. Up to three Multiport Workstation Interfaces may be attached directly to the applications processor. Any workstation can enter data, execute programs, and communicate from the common ULTRANET system data base or from its designated local database. Workstations and applications processors can be dedicated to specific tasks or programs. Since each processor operates independently, different tasks can be run concurrently.

Processors within the ULTRANET are linked by a high-speed Buslink composed of Buslink Interface Modules, Active Hubs, Passive Hubs, and standard coaxial cable. The Buslink Interface Module attaches directly to the original processor and to each expansion processor. It accepts only messages directed towards that particular processor and is completely transparent to the user. Passive and Active Hubs interconnect processors in a network. The Passive Hub links up to four ULTRANET system members and the Active Hub links up to 16 Buslink Interface Modules or other Active Hubs.

Up to 255 processors plus disks, workstations, and printers can be joined in a single ULTRANET system. The Buslink's coaxial cable can connect processors located as far away as four miles with signal amplification. Different ULTRANET systems can communicate with each other through a telecommunications link.

PRICING

System components are available for purchase or on a one-year lease. Prime shift maintenance for 9 hours/day, 5 days/week is standard; coverage for second and third shifts, six or seven days, and holidays is also available.

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EQUIPMENT PRICES

	Purchase ($)	Monthly Rental ($)	Maint. ($)
Basic Configuration:			
256K-byte processor and 20-megabyte disk storage	34,000	1,697	341
160-cps printer	2,795	130	42
Eight workstations	15,960	600	144
Beginning ULTRANET System Basic Configuration:			
256K-byte processor and 20-megabyte disk storage; 9700 ULTRANET started package (two expansion processors plus Buslink Interface Module, workstations interface and co-axial cable and connectors, 160-cps printer and eight workstations.	92,085	4,029	765

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The System 9000 Distributed Information Processing System allows users to expand a local system or to grow into a local area network by adding a unit at a time. The system components that are shown here, starting from the foreground, are the system processor, Universal Workstation, matrix printer, disk storage systems, tape transport unit, and band printer.

A distributed processing system that provides software modules for batch and transaction-oriented data entry, file management with the associative index method called CONFIRM, multi-user Cobol, and local networking.

The basic system consists of a 256K-byte processor, a Multiport Workstation Interface for the attachment of up to eight workstations and peripherals, a 20- or 120-megabyte disk storage system, and an optional 9-track transport unit.

A basic configuration that includes a 248K-byte processor, 20 megabytes of disk storage, a 160-cps printer, and 8 workstations costs $52,755.

MANAGEMENT SUMMARY

Inforex introduced the System 9000 as its first new product after the firm's acquisition by Datapoint Corporation in September, 1981. The System 9000 is based on a concept referred to by Inforex as Distributed Information Processing, a technique that provides user departments with the data entry and file management tools necessary for solving business problems.

The System 9000 combines batch and interactive data entry, file management, local processing, data communications, and local area networking capabilities. It is designed for use by operational end-user departments such as production scheduling, shipping, receiving, purchasing, lease management, order entry, inventory control, and personnel. Mailing list creation and maintenance can also be accommodated by the system.

The system includes a Datapoint-developed processor with 256K bytes of memory which supports up to 180 megabytes of disk storage, a 9-track magnetic tape transport unit, a 300-lpm band printer, and up to 24 workstations and matrix character printers.

CHARACTERISTICS

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CONFIGURATION

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Inforex offers two packaged systems. The Model 9300 basic configuration consists of a processor, a disk controller, one fixed 10-megabyte disk and one removable 10-megabyte disk, and a workstation interface. Optional disk storage expansion units available in 20- or 40-megabyte increments may be added up to a maximum of 160 megabytes. The Model 9400 basic configuration includes the processor, a Large System Storage Unit with disk controller and two 60-megabyte removable disk packs, and a workstation interface. Total storage capacity can be increased to 180 megabytes by adding an optional 60-megabyte expansion unit.

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USER EXPERIENCE

In September 1982, Datapro telephoned four users of the Inforex 9000 system whose names were supplied by the vendor. Their responses represented a total of 31 keystations that had been in operation from three to six months. Three of the respondents had purchased the equipment and one had leased it from the manufacturer.

The Data Processing Manager of a manufacturing company located in the southwest that builds components for jet engines praised several features of the system, particularly the capability of the user "to access the

TRANSMISSION SPECIFICATIONS

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database for a year's worth of manufacturing data" and the on-line technical support in which an Inforex representative from the Dallas offices accesses the system whenever problems arise. He also remarked that the software modifications performed by Inforex "were tailor-made to our application."

He also commented, "In a harsh environment such as ours, the terminals are susceptible to static electricity in-house and from other people's equipment. A user almost has to shield the terminals."

The three other users were EDP officers in the U.S. Navy. Two of the users reported difficulties with the software, and one cited problems in maintaining records of the transfers made from disk to tape. He said, "We don't get hardcopy or a summary report that lets us know positively that everything was transferred from disk to tape."

None of the respondents intended to replace the equipment within the next twelve months and all of them indicated a willingness to recommend the Inforex 9000 System to other potential users.□

whenever data entry operations are performed. PRELUDE adds the ability to perform full arithmetic operations on whole numbers, transfer data, conditional testing, conditional branching and table/range operations. PRELUDE makes available a 32-character, user-defined message area plus 12 and 40 position save areas. The UDE operator statistics file is automatically updated by the system during entry, verify, and modify modes.

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CONFIRM works like a query language applying information that is known or partially described against data files to review and extract information. CONFIRM builds one index for an unlimited number of keys so records may be located by their access key or by multiple keys, class of items, field content, or partial information. Record fields to be changed are accessed randomly by number on the screen. New data is written over the old only after it has been verified. Full prompting is displayed in modification mode. Any data review screen image may be printed directly on the system printer.

An INFOBASE array definition facilitates creating and updating files containing repeated rows of data. Data edits for each field can be specified in the data dictionary and applied whenever records are entered, added or modified. Every INFOBASE-generated field maintenance program has a self-contained facility for producing formatted listings of user data files for ad hoc reports. INFOBASE automatically handles formatting, page breaks, headings, column headings, and printer displays for reports. Clearance to review, enter and modify files and records may be assigned by function, operator and data element.

COBOL: Inforex's Multi-User Cobol is a subset of the 1968 ANSI Cobol standard with extensions compatible with ANSI 1974 STANDARDS. It will run packaged software programs with minor modifications. Cobol applications can be executed in either a batch mode or interactively, and any combination of jobs can run simultaneously. Extensions provide for interactive screen formatting, including aids for record manipulation, cursor positioning, field attribute definitions, validation of entered data, general prompts and error messages. Programs contain up to 65,000 bytes of object code with 15,500 bytes of working storage.

COMPONENTS

PROCESSOR: The System 9000 processor is a desktop terminal with a processor, a CRT display, and a typewriter-style keyboard. The 256K-byte processor (248K-byte user available) has a 600-nanosecond memory cycle speed and an enhanced instruction set. It supports up to 180 megabytes of disk storage plus a 9-track magnetic tape transport unit. Up to eight workstations and peripherals can be connected via a Multiport Workstation Interface. Two additional adaptors (able to support 8 devices each) may be added. System Processors are equipped with cassette tape drives which may be used for diagnostics and program loading.

The Processor's CRT displays 96-characters on a 7 by 3.5-inch screen and features a 5 by 7 dot matrix for high legibility and a writing rate of up to 50,000 characters per second. The 55-key alphanumeric keyboard comes in a standard typewriter layout with an 11-key numeric pad and five system control keys.

The Ultranet Expansion Processor is identical to the system processor but it does not accommodate cassette tapes. It may function as an applications processor, a file management processor, or a communications processor (128K byte—120K user available). Up to 255 processors plus associated peripherals can be connected in a single ULTRANET system.

WORKSTATION: The Universal Workstation is a desktop terminal with an interactive video display and keyboard. The video display screen measures 5.4 by 8.9 inches and generates 1920 characters from a 7 x 9 dot matrix (enlarging to 9 x 12 to accommodate descenders) against an easy-to-read high-contrast amber phosphor. There are 16 key-controlled increments of screen brightness. The workstation uses a 96-character ASCII set and foreign or special character sets are loaded from the system processor. The screen's refresh rate is 50 or 60 times per second synchronized to line frequency.

Inforex 9000

The multipurpose keyboard features a standard 55-key alphanumeric typewriter layout with multiple key rollover, an 11-key-calculator-style numeric keyboard, ten programmable function and control keys, and nine off-line diagnostics. It emulates the IBM 029 keypunch-style keyboard when the UDE software is used.

Any workstation can be used to perform any system function and can either be linked directly to the System 9000 processor or be connected over standard telephone lines.

MULTIPORT WORKSTATION INTERFACE: The Multiport Workstation Interface links any System 9000 processor or ULTRANET Expansion Processor with up to eight external devices such as workstations, printers, and modems. Local external devices are connected directly to the interface and remotely located devices are connected via modems and telephone lines. The RS-232C-compatible interface attaches directly to the processor via an I/O bus and draws power from the processor. Transmit and receive baud rates range from 110 to 9600 and may be set independently. Up to three interfaces may be attached to each processor.

DISK STORAGE: Disk storage can be tailored to any size from a minimum of 20 megabytes up to 180 megabytes per disk controller. The Model 9074 Disk Storage System is for small to medium System 9000 configurations and can be used in standalone batch processing applications or as part of a common system data base. The Model 9090 Large System Storage Unit is a mass storage system intended to be used as part of the common data base for large time-sharing configurations. Expansion units can be attached to the disk controller for incremental growth as required.

The Model 9074 Disk Storage System includes a disk controller and two 10-megabyte disks, one fixed and one removable. Optional 20- and 40-megabyte expansion units can be added up to a maximum of 160 megabytes of storage per processor. The 20-megabyte expansion unit includes both a fixed and removable disk. The 40-megabyte increment incorporates two 20-megabyte expansion units in a single cabinet. Average and maximum access times are 35 and 60 milliseconds, respectively. Buffer memory size is 4K bytes. The disks record 200 tracks per inch and provide a total of 10,027,008 bytes.

The Model 9090 Large System Storage Unit consists of a controller and two 60-megabyte removable disk packs. An optional 60-megabyte expansion unit housed in its own cabinet may be attached to the controller for a maximum of 180 megabytes of storage. The storage unit combines the disk spindle and drive motor in single assembly and features an electronic system for final head positioning and an air-cleaning system. Average access time is 30 milliseconds and maximum access time is 55 milliseconds. The disks contain 60,211,200 bytes, and buffer memory size is 16K bytes.

MAGNETIC TAPE: Optional 9-track tape transport units support 800- and 1600-bpi recording at a speed of 25 inches per second. The tape transport units use standard magnetic tape reels of 10.5 inches in diameter. Storage capacity is 5.7 megabytes.

PRINTERS: For local reports, users may attach one serial matrix printer to each workstation and one parallel matrix printer to the system processor. The 132-column printers use a 9 by 9 dot matrix and a 96-character ASCII set. A 300-lpm band printer is also available. It uses a 64- or 96-character ASCII set and prints up to 132 columns with horizontal spacing of 6 or 8 lines per inch.

ULTRANET: ULTRANET, Inforex's local area networking system, allows users to expand installed System 9000 configurations by adding processors and components a unit at a time. The ULTRANET Expansion Processor provides 248K bytes of user memory and offers the same characteristics as the original system processor. It does not accommodate cassette tapes. Within an ULTRANET configuration, at least one processor acts as a file management processor dedicated to storing and retrieving the common data files of the ULTRANET. That processor supports up to 180 megabytes of disk storage. The other processors act as additional file managment processors, or applications processors dedicated to batch or transaction-oriented applications program execution and development, or as communications processors managing concurrent communications for the ULTRANET system. Up to three Multiport Workstation Interfaces may be attached directly to the applications processor. Any workstation can enter data, execute programs, and communicate from the common ULTRANET system data base or from its designated local database. Workstations and applications processors can be dedicated to specific tasks or progams. Since each processor operates independently, different tasks can be run concurrently.

Processors within the ULTRANET are linked by a high-speed Buslink composed of Buslink Interface Modules, Active Hubs, Passive Hubs, and standard coaxial cable. The Buslink Interface Module attaches directly to the original processor and to each expansion processor. It accepts only messages directed towards that particular processor and is completely transparent to the user. Passive and Active Hubs interconnect processors in a network. The Passive Hub links up to four ULTRANET system members and the Active Hub links up to 16 Buslink Interface Modules or other Active Hubs.

Up to 255 processors plus disks, workstations and printers can be joined in a single ULTRANET system. The Buslink's coaxial cable can connect processors located as far away as four miles with signal amplification. Different ULTRANET systems can communicate with each other through a telecommunications link.

PRICING

System components are available for purchase or on a one-year lease. Prime shift maintenance for 9 hours/day, 5 days/week is standard; coverage for second and third shifts, six or seven days, and holidays is also available.

	Monthly Rental	Purchase	Maint.
Basic Configuration:			
256K-byte processor and 20-megabyte disk storage	$1,697	$34,000	$341
160-cps printer	130	2,795	42
8 workstations	600	15,960	144
	2,427	52,755	527
Beginning ULTRANET System:			
Basic Configuration (256K-byte processor and 20-megabyte disk storage)	1,697	44,630	341
9700 ULTRANET starter package (2 expansion processors plus Buslink Interface Module, workstation interface and coaxial cable and connectors)	1,602	28,700	242
160-cps printer	130	2,795	38
8 workstations	600	15,960	144
	4,029	92,085	765 ■

Inforex 9000

MANAGEMENT SUMMARY

The System 9000, introduced in May 1981, is the first new product brought out by Inforex since it was acquired by Datapoint Corporation last September. The new system is based on a concept Inforex calls Distributed Information Processing which combines distributed data processing, data entry, file management, and sophisticated software capabilities. It is designed for use by operational end user departments, such as production scheduling, shipping, receiving, and inventory control.

The system includes a Datapoint-developed processor with 248K bytes of memory which supports up to 180 megabytes of disk storage, a 9-track magnetic tape transport unit, a 300-lpm band printer, and up to 24 workstations and matrix character printers.

The Universal Workstation is a multipurpose interactive terminal from which users can perform any system function. It features a 55-key alphanumeric keyboard which can also function as an IBM 029-style keyboard for data entry, an 11-key-calculator-style numeric pad, and ten programmable function and control keys. The terminal's CRT has a 24-line by 80-column display and uses a 5 by 7 dot matrix. Each workstation supports a 160-cps serial matrix printer.

The System 9000 Distributed Information Processing System offers its users the capability to expand by adding a unit at a time. System components shown above from foreground to background are the system processor. Universal Workstations, matrix printer, disk storage systems, tape transport unit, and band printer.

A distributed processing system designed for use by end user departments.

The system supports a 248K-byte processor, up to 24 display terminals, up to 25 printers, 20 to 180 megabytes of disk storage, and a 9-track tape unit.

Software is provided for source and volume data entry, file management, multi-user COBOL programming, and local networking.

A basic configuration which includes a 248K-byte processor, 20 megabytes of disk storage, a 160-cps printer, and 8 workstations may be purchased for $63,455.

CHARACTERISTICS

VENDOR: Inforex, Inc., 186 Middlesex Turnpike, Burlington, Massachusetts 01803. Telephone (617) 272-6470.

DATE OF ANNOUNCEMENT: May 1981.

DATE OF FIRST DELIVERY: August 1981.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Datapoint Corporation.

CONFIGURATION

The System 9000 may be customized and expanded according to individual user needs. The basic system includes a 248K-byte processor which supports all utilities and customer applications for attached workstations and peripherals. A Multiport Workstation Interface connects the processor with up to eight workstations. Two additional workstation interfaces may be added to allow up to 24 local or remote workstations per processor. Disk storage capacity can range from 20 to 180 megabytes per processor. Users may add a 9-track tape transport unit for 800- or 1600-bpi recording. One 160-cps matrix printer can be attached to the system processor and to each workstation for a maximum of 25. For report generation, a 300-lpm band printer is available. Batch or interactive communications protocols are also provided. All software is bundled with the basic configuration.

ULTRANET, Inforex's local networking system, allows users to add application, file management, and communications processors as required. Up to 255 processors can be linked into one large computer system.

Inforex offers two packaged systems. The Model 9300 basic configuration consists of a processor, a disk controller, one fixed 10-megabyte disk and one removable 10-megabyte disk, and a workstation interface. Optional disk storage expansion units available in 20- or 40-megabyte increments may be added up to a maximum of 160 megabytes. The Model 9400 basic configuration includes the processor, a Large System Storage Unit with disk controller and two 60-megabyte removable disk packs, and a workstation interface. Total

Inforex 9000

Inforex gives users the capability to add processors and peripherals in a modular fashion through its local networking system, ULTRANET. ULTRANET Expansion Processors may function as file management, application, or communications processors. As many as 255 processors can be linked by a coaxial cable bus which may extend up to four miles with signal amplification. Users have common access to data files, peripherals, and communications and resource sharing is transparent to the user. Since processors are treated as independent units, different tasks can be run concurrently.

System 9000 communications software provides a full range of commonly used batch and interactive protocols. A Synchronous Communications Adaptor, compatible with industry standard modems, is a buffered synchronous interface between any System 9000, workstation, or disk to any bisynchronous device. Batch and interactive communications to a variety of mainframes are also possible. Within an ULTRANET system, the adaptor attaches directly to a Communications Processor to allow it to act as an IBM 3271 Communications Controller transmitting up to 9600 baud in 3270 mode. The Communications Processor permits every applications processor to communicate with a remotely located computer or another ULTRANET System. Workstations can act as remote job entry terminals to the central system and can access the central database through user-written programs.

The System 9000 features three software products: INFOBASE, an information management system which automatically provides for file inquiry and updating, and file management and report generation programs; Universal Data Entry (UDE), a source and volume data entry package; and Multi-User COBOL, an ANSI-standard language with extended features for interactive or batch programming and application concurrency.

First deliveries of the System 9000 were scheduled for August.□

storage capacity can be increased to 180 megabytes by adding an optional 60-megabyte expansion unit.

TRANSMISSION SPECIFICATIONS

Inforex furnishes a buffered synchronous interface, the Synchronous Communications Adaptor, for high-speed data transfer between compatible processing devices. The adaptor transmits data from the System 9000, any member workstation, or disk to any bisynchronous device and can provide batch and interactive communications to a wide variety of IBM and other vendor mainframes. It transmits and receives at rates of up to 9600 baud with modem-supplied timing. Compatible with standard synchronous modems, the adaptor also features an Automatic Calling Unit interface for program-controlled origination and answering for calls. The adaptor can be attached to the ULTRANET Expansion or Communications Processor enabling it to operate in a program-controlled, binary synchronous mode as a 3271 communications controller for multipoint or point-to-point 3270 communications.

The Communications Processor manages all 3270 communications for ULTRANET systems with substantial data transmission needs. It permits every applications processor to communicate with a remotely located computer or another ULTRANET system. The processor comes with 120K bytes of memory expandable to 248K bytes and is connected to the ULTRANET system by a Buslink Interface Module and a standard coaxial cable.

It acts as an IBM 3271 Communications Controller transmitting up to 9600 bps in 3270 mode. The communications processor can emulate IBM 3780 terminals over leased or dialed telephone lines to communicate directly with central computer systems. The System 9000 transmits files to the central system, and spools the returning files for processing or printing. It can update a data base stored on the mainframe directly, or can transfer programs to the mainframe for compiling and execution. Workstations can act as remote job entry terminals to the central system or other Inforex systems. The processor uses Infopoll software for communications between System 9000's.

ULTRANET, Inforex's local networking system, allows users to expand installed System 9000 configurations by adding processors and components a unit at a time. The ULTRANET Expansion Processor provides 248K bytes of memory and offers the same characteristics as the original system processor. It does not accommodate cassette tapes. Within an ULTRANET configuration, at least one processor acts as a file management processor dedicated to storing and retrieving the common data files of the ULTRANET. That processor supports up to 180 megabytes of disk storage. The other processors act as either applications processors dedicated to batch or transaction-oriented applications program execution and development or as communications processors managing concurrent communications for the ULTRANET system. Up to three Multiport Workstation Interfaces may be attached directly to the expansion processor to connect up to 24 external devices. Any workstation can enter data, execute programs, and communicate from the common ULTRANET data base. Workstations and applications processors can be dedicated to specific tasks or programs. Since each processor operates independently, different tasks can be run concurrently.

Processors within the ULTRANET are linked by a high-speed Buslink composed of Buslink Interface Modules, Active Hubs, Passive Hubs, and standard coaxial cable. The Buslink Interface Module attaches directly to the original processor and to each expansion processor to which it assigns a unique address. It accepts only messages directed towards that particular address and is completely transparent to the user. Passive and Active Hubs interconnect processors in a network. The Passive Hub links up to four ULTRANET system members and the Active Hub links up to 16 Buslink Interface Modules or other Active Hubs.

Up to 255 processors plus disks, workstations and printers can be joined in a single ULTRANET system. The Buslink's coaxial cable can connect processors located as far away as four miles with signal amplification. Different ULTRANET systems can communicate with each other through a telecommunications link.

SOFTWARE

COBOL: Inforex's Multi-User COBOL is a subset of the 1968 ANSI COBOL standard with extensions compatible with ANSI 1974 standards. It will run packaged software programs with minor modifications. COBOL applications can be executed in either a batch mode or interactively and any combination of jobs can run simultaneously. Extensions provide for interactive screen formatting, including aids for record manipulation, cursor positioning, field attribute definitions, validation of entered data, general prompts and

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error messages. Indexed sequential accessing and the ability to use precompiled programs are additional features. Programs contain up to 65,000 bytes of object code with 15,500 bytes of working storage. A program about 1000 statements long will compile in about five minutes.

UNIVERSAL DATA ENTRY (UDE): The Universal Data Entry software supports both source and volume data entry. After the operator signs on with the proper identification and password, the user may select functions from a menu or may access data directly according to his or her level of experience. Self-explanatory screen layouts guide the operator through individual data entry steps. A screen format generation program provides the capability to create, store, and maintain formats. Eight sub-records can be displayed on each screen. Screen layouts provide 960 characters for user data and a 640-character prompt area.

Data being entered can go through more than 20 sophisticated editing and verification steps. Standard editing functions include Alpha only, numeric only, must enter and must fill. Error checking features include range checking, table look-up and validation, table generation, and check digit validation. Errors can be corrected immediately or flagged for later correction.

The UDE package provides operators with a number of capabilities. Six balance accumulators add or subtract the contents of amount fields to or from a specified accumulator. Operators can view the contents of accumulators, original data in verify mode, current field attributes, transferred file status, available disk space, error records, date and time, and transfer queue entries. The system has the ability to page forward and backward and return back to the next keyable record after a backward search. User files can be updated in the search mode and a search may be specified for a single character or a string of continuous characters. Documents can be keyed left to right, top to bottom, and data can be arranged into the proper sequence for mainframe use. The preformatting function restructures data during transfer operations and the blocking feature groups multiple records into one segment on tape of up to 4096 characters to reduce tape I/O processing time.

The operator statistics file is automatically updated by the system during entry, verify, and modify modes. Information is maintained on file name and number, format name, operator ID, terminal number, function and status, date and time started, elapsed time, document count, record count, keystroke count and error count.

Selected data transfer is possible including disk-to-tape, tape-to-disk, disk-to-disk, tape-to-printer, disk-to-printer concurrent with data entry.

INFOBASE: INFOBASE, the System 9000 information management application module, permits users to enter, format, access, and manipulate data and generate reports without writing a program. It is a data dictionary-based system which defines fields, keys, files and auxiliary data base documentation for use with groups of files. INFOBASE follows a four-step process to create applications for file maintenance, reference and reporting: data field and file definition, screen format creation, search key definition, and automatic program generation.

In data field and file definition, users define each item by name and characteristics. The user creates or modifies the screen format with field labels, key-in positions, screen titles, miscellaneous screen test, field edits and verification displays. Up to nine consecutively numbered screens can be used in each program. Up to 40 data fields may be displayed per screen. Each character position in the key-in area is represented by an underscore. The last three lines of the screen are reserved for operator messages. The compiled, edited screen design is stored in the data dictionary to be recalled, modified and reused as needed. Screen format can be printed as hard copy while the design is going on.

After defining the screen format, INFOBASE automatically generates applications source code which can be modified by the user. It takes less than five minutes to generate a typical program between 500 and 1,000 lines. Applications programs provide three different message prompts: general prompts to advise the operator of field specifications, error messages, and help prompts whenever a question mark is entered. Each message can have up to 99 lines of 70 characters.

For file inquiry and review, the user selects a key from a menu of key names on multi-key ISAM files. Records may be accessed by full or partial key as well as next key and key previously fetched. Any data review screen image may be printed directly on the system printer.

INFOBASE's CONFIRM (Context-Free Index Retrieval Method) builds only one index file for an unlimited number of keys specified so records may be located by their access key or by multiple keys, class of items, field content, or partial information. Record fields to be changed are accessed randomly by number on the screen. New data is written over the old only after it has been verified. Full prompting is displayed in modification mode.

An INFOBASE array definition facilitates creating and updating files containing repeated rows of data. Data edits for each field can be specified in the data dictionary and applied whenever records are entered, added or modified.

Every INFOBASE-generated file maintenance program has a self-contained facility for producing formatted listings of user data files. Users can select file elements and specify column and page headings. A data file report details all dictionary-resident information for specific files and a field-file cross-reference report shows where each field name is used and its basic attributes. INFOBASE automatically handles formatting, page breaks, headings, column headings, and printer display for reports.

Operators are individually cleared to see data on a screen-by-screen basis. Clearance to review, enter and modify files and records may be assigned by function, operator and data element.

COMPONENTS

PROCESSOR: The System 9000 Processor is a desktop terminal with a processor, a CRT display, and a typewriter-style keyboard. The 248K-byte processor has a 600-nanosecond memory cycle speed and an enhanced instruction set. It supports up to 180 megabytes of disk storage plus a 9-track magnetic tape transport unit. Up to eight workstations and peripherals can be connected via a Multiport Workstation Interface. Two additional adaptors may be added to provide up to 24 available ports. Cassettes are used for program loading and diagnostics.

The CRT displays 960 characters on a 7 by 3.5-inch screen and features a 5 by 7 dot matrix for high legibility and a writing rate of up to 50,000 characters per second. The 55-key alphanumeric keyboard comes in a standard typewriter layout with an 11-key numeric pad and five system control keys.

The Ultranet Expansion Processor is identical to the system processor but it does not accommodate cassette tapes. It may function as an applications processor, a file management

Inforex 9000

processor, or a communications processor. Up to 255 processors plus associated peripherals can be connected in a single ULTRANET system.

WORKSTATION: The Universal Workstation is a desktop terminal with an interactive video display and keyboard. The video display screen measures 5 by 7.9 inches and generates 1920 characters from a 5 by 7 dot matrix using an easy-to-read high-contrast amber phosphor. There are 16 key-controlled increments of screen brightness. Character size is 0.146 x 0.071 inch. The workstation uses a 96-character ASCII set and foreign or special character sets are loaded from the system processor. The screen's refresh rate is 50 or 60 times per second synchronized to line frequency.

The multipurpose keyboard features a standard 55-key alphanumeric typewriter layout with multiple key rollover, an 11-key-calculator-style numeric keyboard, ten programmable function and control keys, and nine off-line diagnostics. It can emulate the IBM 029 keypunch-style keyboard for volume data entry. A character can be displayed 15 times per second by depressing a repeat action key for one-half second. Each workstation can support a 160-cps serial matrix printer and data may be simultaneously printed and displayed.

Any workstation can be used to perform any system function and can either be linked directly to the System 9000 processor or be connected over standard telephone lines.

MULTIPORT WORKSTATION INTERFACE: The Multiport Workstation Interface links the System 9000 processor and ULTRANET Expansion Processors with up to eight external devices such as workstations, printers, and modems. Local external devices are connected directly to the interface and remotely located devices are connected via modems and telephone lines. The RS-232C-compatible interface attaches directly to the processor via an I/O bus and draws power from the processor. Transmit and receive baud rates range from 110 to 9600 and may be set independently. Up to three interfaces may be attached to each processor.

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The Model 9090 Large System Storage Unit consists of a controller and two 60-megabyte removable disk packs. An optional 60-megabyte expansion unit housed in its own cabinet may be attached to the controller for a maximum of 180 megabytes of storage. The storage unit combines the disk spindle and drive motor in a single assembly and features an eletronic system for final head positioning and an air-cleaning system. Average access time is 30 milliseconds and maximum access time is 55 milliseconds. The disks contain 60,211,200 bytes, and buffer memory size is 16K bytes.

MAGNETIC TAPE: Optional 9-track tape transport units support 800- and 1600-bpi recording at a speed of 25 inches per second. The tape transport unit uses standard magnetic tape reels of 10.5 inches in diameter. Storage capacity is 5.7 megabytes.

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A 300-lpm band printer is also available. It uses a 64- or 96-character ASCII set and prints up to 132 columns with horizontal spacing of 6 or 8 lines per inch.

PRICING

System components are available for purchase or on a one-year lease. Prime shift maintenance for 9 hours/day, 5 days/week is standard; coverage for second and third shifts, six or seven days, and holidays is also available.

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Basic Configuration:			
248K-byte processor and 20-megabyte disk storage	$1,697	$ 44,630	$341
160-cps printer	130	2,875	38
8 workstations	600	15,960	152
	2,427	63,465	531
Beginning ULTRANET System Basic Configuration:			
(248K-byte processor and 20-megabyte disk storage)	1,697	44,630	341
9700 ULTRANET starter package (2 expansion processors plus buslink interface module, workstation interface and coaxial cable and connectors)	1,602	41,760	225
	3,299	86,390	566
160-cps printer	130	2,875	38
	3,429	89,265	604
8 workstations	600	15,960	152
	4,029	105,225	756 ■