

# Pertec XL40 and XL50 Distributed Processing Systems



*The XL50 is available in two models and can be configured with up to 32 terminals. Maximum system memory for both models is 512K bytes.*

## MANAGEMENT SUMMARY

Pertec's XL40 and XL50 constitute the XL Distributed Processing System. Introduced in 1976 and enhanced in 1979, the XL40 supports up to 80 megabytes of fixed disk storage and 2.2 megabytes of diskette-based storage. It can handle from one to 16 operator terminals. The XL40 can be arranged as a standalone system with multiple local workstations or it can be set up in a network of terminals and station printers accessing a local XL40 over dial-up or leased telephone lines.

An enhanced member of the XL family, the recently introduced XL50 is designed to eliminate the need for time-sharing activities and to lessen the need for access to large mainframe computers. Two versions of the XL50 are available: the Model 4050-1 with system memory up to 512K bytes, one or two diskette drives, and 10 or 20 megabyte hard disk drives; and the Model 4050-2 with system memory up to 512K bytes, and one or two 70 megabyte large capacity hard disk drives. The XL50 can be configured with up to 32 terminals.

Both versions of the XL50 feature a wide range of peripherals, including both standard and intelligent CRT terminals, multiple high-speed printers with spooling, multiple concurrent communications ports, and a coaxial station controller. ➤

The two current members of Pertec's XL Distributed Processing family.

The XL40 supports up to 80MB of fixed disk storage and 2.2MB of diskette-based storage, and provides support for up to 16 workstations. The newer XL50 is available in two models. Model 4050-1 has a system memory of up to 512K bytes, and provides support for one or two diskette drives, 10MB or 20MB hard disk drives, and up to 32 workstations. Model 4050-2 also has a system memory of up to 512K bytes, and provides support for one or two 70MB large capacity hard disk drives as well as up to 32 workstations.

Purchase prices for the XL40 range from \$22,812 to \$74,878. Prices for the XL50 range from \$24,648 to \$86,988.

## CHARACTERISTICS

**VENDOR:** Pertec Computer Corporation, 17112 Armstrong Avenue, Irvine, California 92714. Tele-phone (714) 540-8340.

**DATE OF ANNOUNCEMENT:** November 1976.

**DATE OF FIRST DELIVERY:** November 1976.

**NUMBER DELIVERED TO DATE:** Information not available.

**SERVICED BY:** Pertec Computer Corporation.

## CONFIGURATION

The XL40 system consists of a system processor, micro-peripheral processor and memory, from one to three magnetic tape drives, from one to four disk drives, from one to 16 operator terminals, from one to 16 station printers, and an optional communications processor, line printer, character printer, and card reader. The system processor and memory, a single tape unit, a single disk drive, and micro-peripheral controllers are all integrated within a single cabinet, which is called the Micro Control Unit (MCU). Also included in the MCU are the DC power supply and system control panel.

The XL50 Advanced Processing Unit is designed around a 16-bit high speed, programmable, bipolar microprocessor with a cycle time of 200 nanoseconds. All XL50 systems (Model 4050-1, Model 4050-2) offer a minimum of 128K bytes of RAM. Memory can be expanded increments of 128K bytes up to a maximum of 512K bytes by means of the insertion of PCBAs into the card cage of the Central Processing Unit. The memory cycle time is 600 nanoseconds.

The XL40 features seven- or nine-track NRZI (556 or 800 bits per inch) or nine-track phase-encoded (1600 bits per inch) tape drives. Two types of tape drives are available: the standard unit with a seven-inch reel, 600-foot long magnetic tape with a transport speed of 18.75 inches per second; and an optional unit with a reel capacity of 2400 feet on 10.5 inch ➤

## Pertec XL40 and XL50 Distributed Processing Systems

### ➤ USER REACTION

The 1982 Datapro survey of users of Key Entry Equipment yielded three responses from users of the XL40 system. The users represented 28 keystations in operation with a daily volume of records ranging from 750 to over 1500 per keystation. In regard to data editing and validation features employed in the users' data preparations operations, one user checked batch balancing and all three users checked value checking, range checking, and prompting. None of the users intended to change their data entry operations to another type of device within the near future. The ratings assigned by the users are indicated below.

	Excellent	Good	Fair	Poor	WA*
Overall performance	0	3	0	0	3.0
Ease of operation	0	3	0	0	3.0
Hardware reliability	2	0	1	0	3.3
Maintenance	1	2	0	0	3.3
Software	0	2	1	0	2.7
Technical support	0	2	1	0	2.7

\*Weighted average on a scale of 4.0 for Excellent. □

➤ reels. Tape transport speed is 37.5 inches per second. The optional unit can be mounted only in an expansion cabinet.

The XL50 offers one 7-inch (18cm) 9-track tape drive that is included in the CPU of the Model 4050-1, set into the top of the cabinet. It operates at a speed of 18.8 ips (47 cm/sec) and is available in the standard NRZI format or the optional PE format. If the PE format is chosen, a PE formatter PCBA must be inserted into the card cage of the CPU.

The Model 4050-1 can be configured with one to three additional tape drives. One or two 7-inch (18cm) 9-track drives can be inserted into a desk-high expansion cabinet if one is already in use for add-on disk drives. One 10.5-inch (27cm) tape drive can be fitted into the top of the expansion cabinet. The larger tape drive operates at a speed of 37.5 ips (94 cm/sec) and also is available in NRZI or PE formats. If no expansion cabinet is used, the tape drives are set into their own tables.

The Model 4050-2 with its larger cabinet contains one 10.5-inch (27 cm) tape drive set into the front panel. A second 10.5-inch (27 cm) tape drive can be inserted into the matching extension cabinet when additional disk drives are configured. Tape drives of the same sizes are available as Model 424X Maxi-Tape Table units.

### TRANSMISSION SPECIFICATIONS

The communications feature for the XL40 system permits data transmission between two XL systems, between an XL system and another CMC (Pertec) system, or between an XL system and the following IBM computers: System/3 with RPG II; System/360 with DOS/BTAM; System/360 or 370 with OS/BTAM, TCAM, or QTAM; or System/360 or 370 with ASP, HASP or HASP II. Binary synchronous protocols are supported in half-duplex mode at line speeds up to 9600 bits per second in point-to-point or multipoint leased or switched telephone networks. IBM 2770, 2780, 3780 or 360/20 HASP Workstation protocols can be emulated. Features supported within these protocols include EBCDIC or ASCII code transmission, EBCDIC transparency, space compression/expansion, and auto answer. The XL40 system also supports SDLC functions in half-duplex mode up to 9600 bits per second in EBCDIC only. Terminals appear as an IBM 3776/3777. The feature

provides data compression, packing/unpacking the data as though the system were in a HASP workstation mode.

Also on the XL40, a form of IBM 3270 passthrough called Host Interactivity extends the information retrieval package so that requests for information not resident in the XL40 local files can be automatically passed to the host computer in a manner completely transparent to the operator. Thus, no change in operator procedure is required to interrogate remote files.

An XL50 System features the Multiport Communications Processor (MCP) which is an independent microprocessor with 32K bytes of memory. It controls communications facilities while relieving the APU of the heavy processing load created by high-speed data communications. Each line can use either of two communications protocols and can function independently from each other. The 3270 protocol can be used on only one line. Protocols can be down-loaded from the APU under the control of the terminal operator and the MCP monitor. Network configuration variables can be changed using the Network Definition Facilities. The MCP can operate multiple lines at speeds up to 9,600 bps concurrently, or a single line at speeds up to 56,000 bps. The optional Multiport Communications Processor supports binary synchronous 2780, 3780, 3741, and HASP workstation protocols, as well as SDLC 3776-2 single logical unit support, and ICL 7020.

### SYSTEM OPERATION

**OVERVIEW:** All operations of the XL systems are under the basic control of the XL/OS operating system. All data entered into the system is under format control. The format specifies the editing to be performed on the data as it is keyed or processed after entry. Formats are entered via the video display terminals.

Data entry/verification is initiated and controlled at the operator keyboards. Data communications operations are controlled by the supervisor. To initiate a transmission, the supervisor builds a directory of those files to be transmitted, establishes a communications linkage with the remote station, and selects the appropriate protocol.

**OPERATOR FUNCTIONS:** The operator's primary responsibility is the processing, key entry, verification, and retrieval of data. The operator can use an unlimited number of application format/format programs, tables, check-digits, subprograms, and tape label programs with up to 32 levels per format program. Concurrent enter and verify modes on the same batch are permitted. Both memory and disk table look-up are available for validation and data insertion. Real-time file inquiry and updating are provided with an audit trail. An indexed direct-access method is used for data retrieval. The operator can access the files by a primary and up to nine alternate keys without requiring multiple copies of the data file in different sort sequences.

**CONTROL FUNCTIONS:** The XL control function continuously displays system status information such as the percentage of disk available; monitors the activity of any other terminal; obtains the status of any job or program on the system; deletes batches and jobs from disk; compiles programs and subprograms; performs on-line hardware and software diagnostics; and initiates and controls media conversion and processing routines. Any control function can be concurrent with data entry.

### OPERATING MODES

- **ENTER**—This mode is used to create records in a data file under control of a format program. It is the primary means of defining and creating a data file or adding a record to an existing file. ➤

## Pertec XL40 and XL50 Distributed Processing Systems

- ▶ ● **VERIFY**—In this mode, previously entered data is compared with the information on source documents. The only fields presented to the operator in this mode are those programmed for verification or invalid fields. Records may be inserted or deleted in the verify mode. Concurrent entry and verification of the same batch can be accomplished as long as a separation of at least one record is maintained between the respective operations.
- **SEARCH/MODIFY MODE**—In this mode, a batch file may be searched and any selected field within the record may be modified under format program control. In searching for records containing invalid fields, the system scans the file sequentially from the beginning until any record containing an invalid field is found. When such a record is found, the search is suspended and the record is displayed with the cursor positioned at the start of the invalid field. If no invalid fields are found, the search is terminated at the end of the file. A file can also be searched for a particular data configuration by entering the desired search mask. The system searches the batch file sequentially, and when a record is found that matches the mask, it is displayed with the cursor positioned at the start of the first manually keyed field. In all cases, the displayed record may then be modified or deleted, or a record inserted before it.
- **UPDATE MODE**—In this mode, the operator may key additional data into each of the records of an existing batch file. The cursor is automatically positioned at the beginning of each field designated for updating in the controlling format application program. All fields not designated for updating are skipped.
- **FILE UPDATE MODE**—In this mode, the operator may enter, retrieve or change indexed file data under program control. File protection features are inherent in this mode, ensuring against inadvertent change to indexed files due to operator error.

### SOFTWARE

All XL system operations are performed under the control of the XL/OS operating system, which contains the functional elements required for system resources management, data management, file processing, program compilation, and input/output operations. The system software includes the XL/OS operating system, the SYSGEN utility program, a series of diagnostic programs for hardware testing, and a user's program library. The SYSGEN utility program is necessary to generate, load, and maintain operational software systems, diagnostic programs, and the user's program library.

The XL/OS operating system consists of seven major elements: Executive, Editor, input/output routines, system subroutines, run-time Cobol routine, Supervisor Task Manager, and Background Task Manager.

The Executive is the primary controlling program for the entire system. It is divided into four sections: scheduler, save and restore stack, enqueue and dequeue, and memory allocation. The scheduler allocates use of the routines among the terminals. The save and restore stack routines are responsible for the memory management tasks associated with the stack that stores items for terminals awaiting input/output operations. The enqueue and dequeue routines manage the first-in/first-out (FIFO) queue employed for input/output requests. The memory allocation routine is responsible for all dynamic memory allocation.

The Editor routine, under control of the Executive scheduler, handles data management and validation within the system software. The routine calls the input/output routines to display the keystrokes by updating the

appropriate CRT display. At record end, the Editor calls the write routines to store the information on disk. In addition, the Editor also handles verify, update, search/modify, and the operations necessary for work initiation and batch close.

The Input/Output routines are divided into four major software modules: file control, index files, logical I/O, and physical I/O. All calls for input/output from other modules are routed through the file control module. The index files module and logical I/O module perform such services as loading a format program, loading overlays, and reading, writing and updating data records. The logical I/O module interfaces between file control and physical I/O to maintain the status and operations necessary to perform I/O functions. The physical I/O module is responsible for all interfaces between the program and the physical input/output devices.

The system subroutines contain all the general routines needed by the remainder of the system software. These include the binary-to-decimal and decimal-to-binary conversion modules, the get-time and convert-time modules, and the move byte string module.

The Cobol compiler produces interpretive code that is included in the format programs. When the Editor detects this code, it calls the run-time Cobol routine to execute the interpretive code. Examples of such interpretive code include add, subtract, multiply, divide, and subroutine calls.

Console functions are handled by one or more overlay programs grouped under the Supervisor Task Manager. These programs permit the system console operator to establish system operating parameters, check on system status, monitor system operation, and perform other console tasks.

The Background Task Manager provides an alternate method of control, in addition to the console, for data communications, spooling, and other background functions.

The SYSGEN program provides field personnel with a means of generating, loading and maintaining the operating system software. The SYSGEN process uses a master program tape for input. This master tape is identical for all installations and contains SYSGEN and all other system software programs. From a terminal, using a series of commands and responses to prompting messages issued by the SYSGEN program, field personnel can select system options, set parameters, and specify the hardware elements that are to be available in the system.

A set of off-line and on-line diagnostic programs is provided to functionally test the performance of the CPU, main memory, disk or diskette drives, magnetic tape unit, CRT terminals, and station and system printers. These tests are run from a terminal. When a fault is detected, an error message is displayed at the control terminal. If no faults are detected by the diagnostic test programs, the operator can reasonably assume that the system is operating properly and no equipment malfunctions exist. An automatic diagnostic self-test function is also performed each time the system is powered up. Any faults found during this self-test are reported via the system status indicator on the control panel. In addition, an off-line software diagnostic utility program is provided to diagnose and back up the operating system software.

The user's program library contains common applications and formats, subprograms, tables, and label programs. The formats allow the keying of tables, label programs, subprograms, and additional formats. Tables provide for data validation and insertion. The subroutines perform Cobol procedures outside the main application program. ▶

## Pertec XL40 and XL50 Distributed Processing Systems

- The label programs allow creation and processing of IBM label formats, as well as other standard label formats.

### COMPONENTS

**XL40 SYSTEM PROCESSOR AND MEMORY:** The system processor is designed around a 16-bit, programmable, bipolar microprocessor with an instruction cycle time of 200 nanoseconds. The main memory is a random-access read/write storage facility consisting of 16-bit words (two 8-bit bytes per word). The minimum system configuration requires 128K bytes, expandable to 512K bytes of directly addressable memory. Memory boards are fabricated with 16K RAM chips.

**MAGNETIC TAPE UNIT:** Seven- or nine-track NRZI (556 or 800 bits per inch) or nine-track phase-encoded (1600 bits per inch) tape drives are available on the XL40 only. Two types of tape drives are available. The standard unit is a seven-inch reel, 600-foot long magnetic tape, with a transport speed of 18.75 inches per second. An optional unit is available which has a reel capacity of 2400 feet on 10.5-inch reels. Tape transport speed is 37.5 inches per second. Magnetic tape is one-half inch wide. This optional unit may only be mounted in an expansion cabinet. The system can accommodate one to three tape drives. All drives use dual-read/write heads.

**DISK DRIVE:** On the XL40, a single disk drive is integrated within the MCU and may contain one to four platters. Each platter stores 5 or 7 million bytes of information. Average seek time is 70 milliseconds, and average rotational delay is 12.5 milliseconds. Track density is 200 tracks per inch and the bit density is 2200 bits per inch. The system can accommodate up to three additional disk drives. Maximum disk storage capacity is 50 to 80 megabytes per system, depending on the disk configuration.

The CPU of the Model 4050-1 contains one hard disk drive, available in capacities of either 10 or 20 megabytes. From one to three more disk drives of the same capacity can be supported by the XL50 operating system. When needed, these optional drives are housed in a desk-high expansion cabinet. The disks rotate at 2,400 rpm with an average rotational latency of 12.5 milliseconds. The smaller capacity drive offers an overall average read time of 52.5 milliseconds; the larger version offers an overall read time of 87.5 milliseconds.

The CPU of the Model 4050-2 contains one 70 megabyte Large Capacity Disk (LCD) drive. Incorporating Winchester technology, the sealed unit consists of three platters with five recording surfaces, and two read/write heads per surface. The average seek time is 4.5 milliseconds with an 8 MHz data transfer rate. From one to three more LCD drives can be supported by the XL50 operating system. When needed, the first of these optional drives can be inserted into the CPU cabinet of the Model 4050-2. The third and fourth drives are housed in a matching expansion cabinet.

**DISKETTE STORAGE:** Up to two diskette drives on the XL40 can be employed for data capture and for storage of data for file inquiry and report generation. The diskette drives read and record double-density, double-sided diskettes with a capacity of 1.2 megabytes of information each, thereby providing a system maximum of 4.8 megabytes. Track density is 48 per inch. Average seek time is 3 milliseconds track-to-track, and average rotational delay is 83.3 milliseconds. It is possible for the diskette drives to write a diskette which is compatible with the IBM Basic Data Exchange format for transmission or other use on an IBM 3741 or 3742 data station.

One or two Model 4271 8-inch (20 cm) single-sided single-density diskette drives may be inserted into the CPU of the

Model 4050-1 to provide IBM BDE format compatibility. Each diskette drive has a capacity of 400K bytes and an average latency time of 83 milliseconds.

**VIDEO DISPLAY TERMINALS:** Up to 32 operator CRT terminals can be connected to an XL50 system in any mixture of three types. Model 4141-4143 Video Display terminals for users of the XL systems consist of separate and interchangeable keyboards and video display units connected by a cable. The Model 4141-1/4143-1 is a keypunch style keyboard and Model 4141-2/4143-2 consists of a typewriter-style keyboard with an adjacent numeric pad. The keyboards on the Model 4141/4143 terminals contain alphanumeric and control function keys. The Model 4141 video screen displays 480-characters within a 6 inch by 3½ inch active display area, and 12 lines with 40-characters per line. The Model 4143 video screen displays a total of 2000 characters within a 10 inch by 5 inch active display area and 25 lines with 80 characters per line. Model 4141 forms each character by a 5 x 7 dot pattern within an 8 x 13 dot character cell; Model 4143 uses a 7 x 9 dot pattern within a 10 x 15 dot character cell. The character set includes upper and lower case numerics and a full symbol set including special ASCII characters.

The Model 4145 Intelligent CRT terminal is a 2,000 character unit for use with XL50 systems to provide increased computing power at individual work stations. When equipped with from one to eight Model 4145 intelligent CRT terminals, an XL50 system can support the emulation of the IBM 3270 Display System. However, at least one Model 4143 standard terminal must also be configured in the XL50 system. The Model 4145 incorporates its own 8-bit Z80 microprocessor and 32K bytes of user memory to relieve the processing load on the Advanced Processing Unit in the central processing unit of the host XL50 system.

Software for the Model 4145 is stored on the XL50 system disk and down-loaded as required. During normal processing on the XL50 system, the Model 4145 is functionally similar to the Model 4143 standard terminal. It uses a 15 inch screen to display 2,000 characters in 25 lines of 80 characters each. Characters are formed by a 7 x 9 dot pattern within a 7 x 15 dot matrix. A detached keyboard is a standard feature on the 4145 Intelligent CRT terminal.

On the rear of the XL50 CPU are two coaxial cable ports, by means of which CRT terminals can be connected to the system. Each cable can extend up to 2,000 feet from the CPU. Via telephone lines, either type of standard CRT can also be connected to the XL50 CPU when a Remote On Line Subsystem is incorporated.

Each terminal is assigned a unique hardware address. During operation, each is sequentially polled by the terminal controller and data, as it is entered, is passed immediately to the CPU for processing. All three types of CRT terminals include a fail-safe feature to ensure that the remainder of the XL50 System is not affected when a terminal is turned off or disabled.

**COAXIAL STATION CONTROLLER:** Located within the CPU cabinet, the Coaxial Station Controller can connect up to 32 devices (any mix of CRT terminals or printers) to the coaxial cable of the XL50 System. The controller provides the interface between the coaxial devices, the APU, and the main memory. It contains its own memory and programs for controlling all devices attached to the coaxial cable to reduce demands for main system resources.

**STATION PRINTERS:** Available on the XL40, serial printers rated at 60 to 120 characters per second may be logically associated with specific terminals through dynamic assignment. These printers can provide hard copies of keyed

## Pertec XL40 and XL50 Distributed Processing Systems

► data or previously stored disk file information, or both, under program control. Single terminals or clusters with or without station printers can be remotely located and can communicate with the XL40 controller over leased or switched telephone lines.

The XL50 can be configured with any mixture of high-speed line printers and station printers, up to a maximum total throughput of 2,000 lpm, connected by coaxial cable. Five available types of printers feature ASCII 64-character sets as standard, with 96-character sets available on some models. Remote locations can have printers connected at distant sites when the XL50 system incorporates ROLS capability.

**SYSTEM PRINTERS:** Line printers, rated at up to 900 lines per minute, and a serial character printer, rated at 160 characters per second, are offered as options. Reports are produced through the use of Cobol procedures within the user's program. Line length is 132 positions. Horizontal spacing is 10 characters per inch; vertical spacing is 6 or 8 lines per inch.

**CARD READER:** The Model 4545 Card Reader supports a variety of remote batch terminal applications on the XL systems, including JCL transmission, card-to-tape conversion, and turnaround document processing. The vacuum pick mechanism on the Model 4545 assists in accepting mutilated and edge-damaged cards; stapled cards are automatically rejected without damaging the rejects. A straight-through card track allows constant re-use of card decks. It also features a phototransistor sensor array reads standard 12-row, 80-column punched cards in serial, column-by-column fashion.

**CONSOLE STATION:** Any one of the terminals can perform console or command functions. These functions are protected by a password.

**REMOTE ON-LINE SUBSYSTEM (ROLS):** The ROLS feature extends the full capabilities of the XL40 system by permitting remote users to access a local XL40 MCU via switched or leased telephone lines. The user can utilize both 480- and 2000-character video display terminals and station

printers, either separately or in combination, providing keyboard input and display or printer output to support a wide variety of remote applications. Remote devices are connected to the MCU via a local control unit (LCU), PCC- or user-supplied modems, and a remote control unit (RCU). The user may build a network of up to 15 terminals and up to 16 station printers. Data transmission is asynchronous in full duplex mode over two-wire or dial-up lines when using switched telephone lines; data transmission using leased telephone lines is synchronous up to 9600 bits per second in a full duplex mode. ROLS communication is independent of and does not interfere with the system data communications features. Remote workstations may be located up to 1000 feet from a remote control unit.

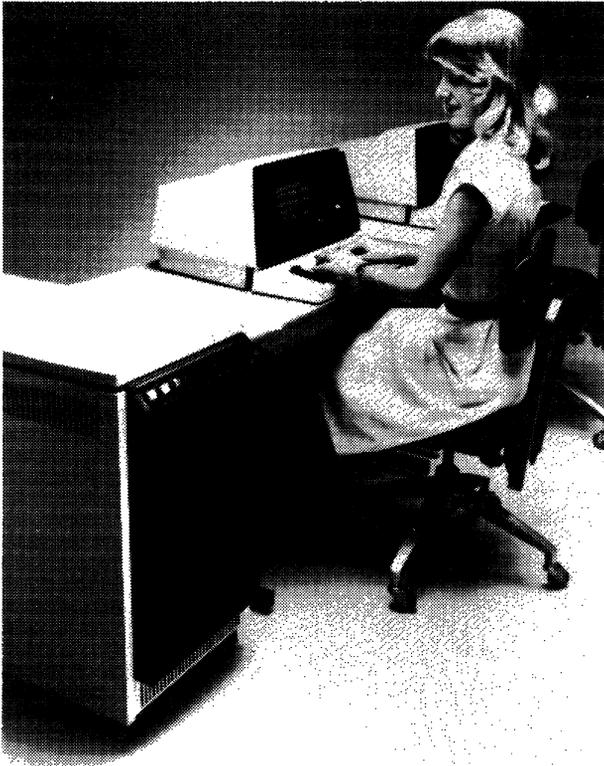
In the XL50, ROLS comprises two microprocessor-based controllers that provide the necessary logic to connect standard CRT terminals and printers in remote locations to the XL50 System coaxial interface. A Local Control Unit (LCU) monitors remote device activity and responds to the System's Coaxial Station Controller as if the device were locally connected. A Remote Control Unit (RCU) consists of a terminal controller and the necessary logic to allow communication over telephone lines to the LCU. Both the LCU and the RCU provide an RS232 modem interface and may be optionally configured with integrated Pertec modems. One LCU can control up to four telephone lines with a total of eight active devices. Each RCU can support up to eight devices attached to the XL50 System's coaxial cable. Three LCUs may be connected to the local coaxial cable to provide up to 24 active remote devices. Via dial-up or leased telephone lines, these devices can be located at up to 12 remote sites.

### PRICING

The XL40 and XL50 Systems are sold only through dealers and distributors, not directly to end users. Purchase prices are established by dealers and distributors. Suggested retail prices for the XL40 are from \$22,812 to \$78,878; for the XL50 are \$24,648 to \$86,988. Monthly maintenance and monthly rental plans can be arranged through dealers and distributors. ■



# Pertec XL20 and XL40 Distributed Processing Systems



The XL20 is a diskette-based system that can be used alone or in conjunction with the XL40. Both use the same XI. OS operating system.

## MANAGEMENT SUMMARY

The XL40 and XL20 Systems are designed for a distributed data entry environment. The XL40 System also may be set up as a standalone system with multiple local workstations, or it may be set up in a network of terminals and station printers accessing a centrally located XL40 over dial-up or leased telephone lines. The XL20 standalone diskette-oriented system is ideal for location in dispersed user departments. The XL system software enables the operator to validate the entered data at the point of entry. A COBOL programmer aid provides data entry, editing, local processing, and report writing capabilities. Data retrieval is accomplished using the COBOL Shared Access Method (COSAM) retrieval package and indexed files.

The XL40 was announced in December 1976 and enhanced through a series of announcements in 1979. These enhancements included an expanded main memory, a number of CRT terminals, larger disk storage, new large screen displays, and the availability of keystation printers, remote terminals, station printers, and the IBM 3270 Mode. These enhancements made the XL40 very competitive in the distributed data processing marketplace.

Two systems designed for data entry and local processing in a distributed systems environment.

The XL40 system supports up to 80 megabytes of fixed disk storage and 2.2 megabytes of diskette-based storage while the smaller diskette-oriented XL20 system has a total storage capacity of 4.8 megabytes. Both systems accommodate 480- or 2000-character display terminals although only the XL40 features both remote and local terminals. Options available for the XL20 and the XL40 are a communications processor, a line printer, a character printer, and a card reader.

The basic XL40 Control Unit is priced at \$13,200, or \$580 per month on a two-year lease including maintenance. The basic XL20 Control Unit starts at \$10,800, or \$481 per month. Keyboard/CRT workstations start at \$2,550, or \$101 per month.

## CHARACTERISTICS

**VENDOR:** Pertec Computer Corporation, 12910 Culver Boulevard, P.O. Box 92300, Los Angeles, California 90009. Telephone (213) 822-9914.

**DATE OF ANNOUNCEMENT:** XL40—December 1976; XL20—May 1978.

**DATE OF FIRST DELIVERY:** November 1976 (XL40); October 1978 (XL20).

**NUMBER DELIVERED TO DATE:** Over 1100 (XL40 shipments as of October 1980).

**SERVICED BY:** Pertec Computer Corp.

## CONFIGURATION

The XL40 system consists of a system processor, micro-peripheral processor and memory, from one to three magnetic tape drives, from one to four disk drives, from one to 16 operator terminals, from one to 16 station printers, and an optional communications processor, line printer, character printer, and card reader. The system processor and memory, a single tape unit, a single disk drive, and micro-peripheral controllers are all integrated within a single cabinet, which is called the Micro Control Unit (MCU). Also included in the MCU are the DC power supply and system control panel.

The XL20 system consists of a system processor, micro-peripheral processor and memory, and up to four diskette drives housed in a single cabinet approximately the size of a two-drawer file cabinet. From one to four operator terminals are supported. An optional communications processor, line printer, character printer, and card reader are also available.

## Pertec XL20 and XL40 Distributed Processing Software

▷ In May 1978, Pertec announced the XL20, a smaller, diskette-based system that supports up to four video display terminals and is fully compatible with the XL40. The XL20 uses the same XL/OS operating system and can support either the 480- or 2000-character display. Up to four double-sided, double-density diskette drives with a total capacity of 4.8 megabytes of diskette storage are available on the XL20. These drives can also write/read IBM 3740-compatible diskettes where such capability is desirable.

Pertec stated that over 1100 XL40 systems had been shipped as of October 1980. Shipments of the XL20 began in October 1978.

In March 1979, Pertec changed the name of its CMC Division to the Computer Systems Division to reflect the organization's principal marketing activity rather than the brand name of some of its products. The company provides its own service and customer training through its nationwide network of education, sales and service points.

### USER REACTION

Datapro's 1980 survey of key entry equipment users produced responses from 11 users of the Pertec XL40. In July 1980, we spoke to an additional four users whose names were supplied by Pertec. These two groups of users had a total of 39 systems installed with 400 CRT terminals in operation. The ratings supplied by 14 users are summarized below:

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>WA*</u>
Overall performance	3	9	2	0	3.1
Ease of operation	5	6	3	0	3.1
Hardware reliability	5	6	2	1	3.1
Maintenance service	1	9	3	1	2.7
Software	2	7	3	2	2.6
Technical support	2	7	4	1	2.7

\*Weighted Average on a scale of 4.0 for Excellent.

Several users told us they had chosen the XL40 for its reliability, flexibility, ease of programming, and ability to concurrently key and verify data. One user said that the software was set up with menus and that every operation on the system was logical. He felt that he could do virtually anything on his system. This same user was also impressed with Pertec's service record and he said that the company almost "bends over backwards" to help their customers. Another user commented that Pertec was slow in coming out with processor speed enhancements. □

### ▶ TRANSMISSION SPECIFICATIONS

The communications feature for the XL40 and XL20 systems permits data transmission between two XL systems, between an XL system and another CMC (Pertec) system, or between an XL system and the following IBM com-

puters: System/3 with RPG II; System/360 with DOS/BTAM; System/360 or 370 with OS/BTAM, TCAM, or QTAM; or System/360 or 370 with ASP, HASP or HASP II. Binary synchronous protocols are supported in half-duplex mode at line speeds up to 9600 bits per second in point-to-point or multipoint leased or switched telephone networks. IBM 2770, 2780, 3780 or 360/20 HASP Workstation protocols can be emulated. Features supported within these protocols include EBCDIC or ASCII code transmission, EBCDIC transparency, space compression/expansion, and auto answer. The XL40 system also supports SDLC functions in half-duplex mode up to 9600 bits per second in EBCDIC only. Terminals appear as an IBM 3776/3777. The feature provides data compression, packing/unpacking the data as though the system were in a HASP workstation mode.

Also on the XL40, a form of IBM 3270 passthrough called Host Interactivity extends the information retrieval package so that requests for information not resident in the XL40 local files can be automatically passed to the host computer in a manner completely transparent to the operator. Thus, no change in operator procedure is required to interrogate remote files.

### SYSTEM OPERATION

**OVERVIEW:** All operations of the XL systems are under the basic control of the XL/OS operating system. All data entered into the system is under format control. The format specifies the editing to be performed on the data as it is keyed or processed after entry. Formats are entered via the video display terminals.

Data entry/verification is initiated and controlled at the operator keyboards. Data communications operations are controlled by the supervisor. To initiate a transmission, the supervisor builds a directory of those files to be transmitted, establishes a communications linkage with the remote station, and selects the appropriate protocol.

**OPERATOR FUNCTIONS:** The operator's primary responsibility is the processing, key entry, verification, and retrieval of data. The operator can use an unlimited number of application format/format programs, tables, check-digits, subprograms, and tape label programs with up to 32 levels per format program. Concurrent enter and verify modes on the same batch are permitted. Both memory and disk table look-up are available for validation and data insertion. Real-time file inquiry and updating are provided with an audit trail. An indexed direct-access method is used for data retrieval. The operator can access the files by a primary and up to nine alternate keys without requiring multiple copies of the data file in different sort sequences.

**CONTROL FUNCTIONS:** The XL control function continuously displays system status information such as the percentage of disk available; monitors the activity of any other terminal; obtains the status of any job or program on the system; deletes batches and jobs from disk; compiles programs and subprograms; performs on-line hardware and software diagnostics; and initiates and controls media conversion and processing routines. Any control function can be concurrent with data entry.

### OPERATING MODES

- **ENTER**—This mode is used to create records in a data file under control of a format program. It is the primary means of defining and creating a data file or adding a record to an existing file.
- **VERIFY**—In this mode, previously entered data is compared with the information on source documents. The only fields presented to the operator in this mode are ▶

## Pertec XL20 and XL40 Distributed Processing Software



The Pertec XL40 is a disk-based system that can support both local and remote keystations.

► those programmed for verification or invalid fields. Records may be inserted or deleted in the verify mode. Concurrent entry and verification of the same batch can be accomplished as long as a separation of at least one record is maintained between the respective operations.

- **SEARCH/MODIFY MODE**—In this mode, a batch file may be searched and any selected field within the record may be modified under format program control. In searching for records containing invalid fields, the system scans the file sequentially from the beginning until any record containing an invalid field is found. When such a record is found, the search is suspended and the record is displayed with the cursor positioned at the start of the invalid field. If no invalid fields are found, the search is terminated at the end of the file. A file can also be searched for a particular data configuration by entering the desired search mask. The system searches the batch file sequentially, and when a record is found that matches the mask, it is displayed with the cursor positioned at the start of the first manually keyed field. In all cases, the displayed record may then be modified or deleted, or a record inserted before it.
- **UPDATE MODE**—In this mode, the operator may key additional data into each of the records of an existing batch file. The cursor is automatically positioned at the beginning of each field designated for updating in the controlling format application program. All fields not designated for updating are skipped.
- **FILE UPDATE MODE**—In this mode, the operator may enter, retrieve or change indexed file data under program control. File protection features are inherent in this mode, ensuring against inadvertent change to indexed files due to operator error.

### SOFTWARE

All XL system operations are performed under the control of the XL/OS operating system, which contains the functional elements required for system resources management, data management, file processing, program compilation, and input/output operations. The system software includes the XL/OS operating system, the SYSGEN utility program, a series of diagnostic programs for hardware testing, and a user's program library. The SYSGEN utility program is necessary to generate, load, and maintain operational software systems, diagnostic programs, and the user's program library.

The XL/OS operating system consists of seven major elements: Executive, Editor, input/output routines, system

subroutines, run-time COBOL routine, Supervisor Task Manager, and Background Task Manager.

The Executive is the primary controlling program for the entire system. It is divided into four sections: scheduler, save and restore stack, enqueue and dequeue, and memory allocation. The scheduler allocates use of the routines among the terminals. The save and restore stack routines are responsible for the memory management tasks associated with the stack that stores items for terminals awaiting input/output operations. The enqueue and dequeue routines manage the first-in/first-out (FIFO) queue employed for input/output requests. The memory allocation routine is responsible for all dynamic memory allocation.

The Editor routine, under control of the Executive scheduler, handles data management and validation within the system software. The routine calls the input/output routines to display the keystrokes by updating the appropriate CRT display. At record end, the Editor calls the write routines to store the information on disk. In addition, the Editor also handles verify, update, search/modify, and the operations necessary for work initiation and batch close.

The Input/Output routines are divided into four major software modules: file control, index files, logical I/O, and physical I/O. All calls for input/output from other modules are routed through the file control module. The index files module and logical I/O module perform such services as loading a format program, loading overlays, and reading, writing and updating data records. The logical I/O module interfaces between file control and physical I/O to maintain the status and operations necessary to perform I/O functions. The physical I/O module is responsible for all interfaces between the program and the physical input/output devices.

The system subroutines contain all the general routines needed by the remainder of the system software. These include the binary-to-decimal and decimal-to-binary conversion modules, the get-time and convert-time modules, and the move byte string module.

The COBOL compiler produces interpretive code that is included in the format programs. When the Editor detects this code, it calls the run-time COBOL routine to execute the interpretive code. Examples of such interpretive code include add, subtract, multiply, divide, and subroutine calls.

Console functions are handled by one or more overlay programs grouped under the Supervisor Task Manager. These programs permit the system console operator to establish system operating parameters, check on system status, monitor system operation, and perform other console tasks.

The Background Task Manager provides an alternate method of control, in addition to the console, for data communications, spooling, and other background functions.

The SYSGEN program provides field personnel with a means of generating, loading and maintaining the operating system software. The SYSGEN process uses a master program tape for input. This master tape is identical for all installations and contains SYSGEN and all other system software programs. From a terminal, using a series of commands and responses to prompting messages issued by the SYSGEN program, field personnel can select system options, set parameters, and specify the hardware elements that are to be available in the system.

A set of off-line and on-line diagnostic programs is provided to functionally test the performance of the CPU, main memory, disk or diskette drives, magnetic tape unit, CRT terminals, and station and system printers. These tests are

## Pertec XL20 and XL40 Distributed Processing Software

► run from a terminal. When a fault is detected, an error message is displayed at the control terminal. If no faults are detected by the diagnostic test programs, the operator can reasonably assume that the system is operating properly and no equipment malfunctions exist. An automatic diagnostic self-test function is also performed each time the system is powered up. Any faults found during this self-test are reported via the system status indicator on the control panel. In addition, an off-line software diagnostic utility program is provided to diagnose and back up the operating system software.

The user's program library contains common applications and formats, subprograms, tables, and label programs. The formats allow the keying of tables, label programs, subprograms, and additional formats. Tables provide for data validation and insertion. The subroutines perform COBOL procedures outside the main application program. The label programs allow creation and processing of IBM label formats, as well as other standard label formats.

### COMPONENTS

**XL40 SYSTEM PROCESSOR AND MEMORY:** The system processor is designed around a 16-bit, programmable, bipolar microprocessor with an instruction cycle time of 200 nanoseconds. The main memory is a random-access read/write storage facility consisting of 16-bit words (two 8-bit bytes per word). The minimum system configuration requires 128K bytes, expandable to 512K bytes of directly addressable memory. Memory boards are fabricated with 16K RAM chips.

**XL20 SYSTEM PROCESSOR AND MEMORY:** The system processor is designed around a 16-bit programmable microprocessor with an instruction cycle time of 200 nanoseconds. The main memory is expandable from 80K to 128K bytes in 16K-byte increments. Memory cycle time is 600 nanoseconds.

**MAGNETIC TAPE UNIT:** Seven- or nine-track NRZI (556 or 800 bits per inch) or nine-track phase-encoded (1600 bits per inch) tape drives are available on the XL40 only. Two types of tape drives are available. The standard unit is a seven-inch reel, 600-foot long magnetic tape, with a transport speed of 18.75 inches per second. An optional unit is available which has a reel capacity of 2400 feet on 10.5-inch reels. Tape transport speed is 37.5 inches per second. Magnetic tape is one-half inch wide. This optional unit may only be mounted in an expansion cabinet. The system can accommodate one to three tape drives. All drives use dual-gap read/write heads.

**DISK DRIVE:** Available on the XL40 only, a single disk drive is integrated within the MCU and may contain one to four platters. Each platter stores 5 or 7 million bytes of information. Average seek time is 70 milliseconds, and average rotational delay is 12.5 milliseconds. Track density is 200 tracks per inch and the bit density is 2200 bits per inch. The system can accommodate up to three additional disk drives. Maximum disk storage capacity is 50 to 80 megabytes per system, depending on the disk configuration.

**DISKETTE STORAGE:** Available on the XL20 and XL40; up to four diskette drives on the XL20 and up to two diskette drives on the XL40 can be employed for data capture and for storage of data for file inquiry and report generation. The diskette drives read and record double-density, double-sided diskettes with a capacity of 1.2 megabytes of information each, thereby providing a system maximum of 4.8 megabytes. Track density is 48 per inch. Average seek time is 3 milliseconds track-to-track, and average rotational delay is 83.3 milliseconds. It is possible for the diskette drives to write a diskette which is compatible

with the IBM Basic Data Exchange format for transmission or other use on an IBM 3741 or 3742 data station.

**VIDEO DISPLAY TERMINALS:** Each terminal consists of a CRT display and a detached alphanumeric keyboard. The 9-inch CRT unit displays 480 characters in 12 lines of 40 characters each. The top two lines are reserved for current job or supervisor status information, which is displayed continuously. The third line is for informational or error messages. The remaining nine lines are for the display of data being entered through the keyboard or generated by the user programs; a blinking solid rectangle acts as the cursor.

A video display terminal with display capacity of 2000 characters is also available. The 15-inch video screen displays 2000 characters in 25 lines of 80 characters each. The top two lines are reserved for operator guidance and status indicators, leaving 23 lines (1840 characters) for application information, prompts, and display of entered data. The 2000-character video display can be intermixed on the same system as the 480-character terminals.

The keyboard, available in keypunch- or typewriter-style layout, contains both alphanumeric and control function keys. If desired, different keyboard configurations can be intermixed in the same system. The terminals are daisy-chained to either or both of two interface ports on the MCU, and may be located up to 2000 feet from the MCU. Each terminal is assigned a unique, but changeable, address code by the service engineer at installation.

**STATION PRINTERS:** Available on the XL40 only, serial printers rated at 60 to 120 characters per second may be logically associated with specific terminals through dynamic assignment. These printers can provide hard copies of keyed data or previously stored disk file information, or both, under program control.

Single terminals or clusters with or without station printers can be remotely located and can communicate with the XL40 controller over leased or switched telephone lines.

**SYSTEM PRINTERS:** Line printers, rated at up to 900 lines per minute, and a serial character printer, rated at 160 characters per second, are offered as options. Reports are produced through the use of COBOL procedures within the user's program. Line length is 132 positions. Horizontal spacing is 10 characters per inch; vertical spacing is 6 or 8 lines per inch.

**CARD READER:** Two optional card readers, rated at 300 and 600 cards per minute, are available.

**CONSOLE STATION:** Any one of the terminals can perform console or command functions. These functions are protected by a password.

**REMOTE ON-LINE SUBSYSTEM (ROLS):** The ROLS feature extends the full capabilities of the XL40 system by permitting remote users to access a local XL40 MCU via switched or leased telephone lines. The user can utilize both 480- and 2000-character video display terminals and station printers, either separately or in combination, providing keyboard input and display or printer output to support a wide variety of remote applications. Remote devices are connected to the MCU via a local control unit (LCU), PCC- or user-supplied modems, and a remote control unit (RCU). The user may build a network of up to 15 terminals and up to 16 station printers. Data transmission is asynchronous in full duplex mode over two-wire or dial-up lines when using switched telephone lines; data transmission using leased telephone lines is synchronous up to 9600 bits per second in a full duplex mode. ROLS communication is independent ►

## Pertec XL20 and XL40 Distributed Processing Software

► of and does not interfere with the system data communications features. Remote workstations may be located up to 1000 feet from a remote control unit.

**STATION LINE CRT SWITCH:** An on-line switch permits an XL20 CRT to become an XL40 CRT with interactive access to an XL40 data base via the XL40 host interactivity feature.

### PRICING

XL Distributed Processing Systems are available for purchase or on a one-, two-, three-, three-and-a-half-, or five-year lease that includes maintenance. A separate maintenance contract is available for purchased units. There is an additional \$25.00 monthly maintenance charge for each optional item. Purchase prices and monthly rental prices based on a two-year lease are as follows:

	Monthly Rental*	Purchase	Monthly Maint.
XL20 Micro Control Unit including executive processor, memory modules-80K bytes, CRT controller, diskette processor, diskette drives, communications processor, system printer controller	\$ 580	\$13,200	\$115
XL20 Micro Control Unit including executive processor, memory modules-64K bytes, CRT controller, diskette processor, diskette drive, system printer controller	481	10,800	100
XL20 Micro Control Unit including executive processor, memory modules-64K bytes, CRT controller, diskette processor, diskette drives, system printer controller	542	11,960	115
Memory module, 16K bytes	96	2,400	12
Memory module, 32K bytes	149	2,400	25
Diskette Drive No. 3 (1.2 Megabytes)	86	1,950	17
Diskette Drive No. 4 (1.2 Megabytes)	86	1,950	17
Card Reader Controller	62	1,400	12
XL40 Micro Control Unit including one executive processor, one memory module (128K bytes), one keystation controller, one disk processor, and one tape processor	685	14,000	185
Expansion cabinet	116	2,875	25
Memory module, 16K bytes	96	2,400	12
Memory module, 32K bytes	149	2,400	25
Memory module, 32K bytes	149	NA	14
Memory module, 64K bytes	270	NA	22
Memory module, 96K bytes	391	NA	31
Memory module, 128K bytes	468	7,000	40
Station Line Switch	17	475	NC
CRT Terminal Desk	NA	195	NC
CRT Terminal, 480 characters, keypunch style (local)	97	2,550	16
CRT Terminal, 480 characters, typewriter style (local)	100	2,600	16
CRT Terminal, 480 characters, keypunch style (remote)	101	2,550	20
CRT Terminal, 480 characters, typewriter style (remote)	105	2,600	20
CRT Terminal, 2000 characters, keypunch style (remote)	130	3,200	23
CRT Terminal, 2000 characters, typewriter style (local)	133	3,300	23
CRT Terminal, 2000 characters, keypunch style (remote)	133	3,200	26
CRT Terminal, 2000 characters, typewriter style (remote)	136	3,300	26
Local Control Unit (with Modem Master)	138	3,300	22
Local Control Unit (without Modem Master)	119	2,900	16
Coax Adapter Remote Station (CARS)	64	1,495	11
Remote Control Unit (with Modem Master)	138	3,300	22
Remote Control Unit (without Modem Master)	119	2,900	16
Modem Adapter for CARS	8	240	NC
Modem Adapter for LCU & RCU	9	255	NC
Integrated Modem (Auto Answer) Local	36	700	11
Integrated Modem Local	33	600	11
Integrated Modem (Auto Answer) Remote	36	700	11
Integrated Modem Remote	30	600	11
Disk Controller	149	3,550	25
Disk Drive, 5 megabytes	278	NA	50
First Disk Drive, 10 megabytes	278	6,500	50
Second Disk Drive, 10 megabytes	359	8,800	55
Third Disk Drive, 10 megabytes	359	8,800	55
Fourth Disk Drive, 10 megabytes	359	8,800	55
First Disk Drive, 20 megabytes	458	10,750	80
Second Disk Drive, 20 megabytes	458	10,750	80
Third Disk Drive, 20 megabytes	458	10,750	80
Fourth Disk Drive, 20 megabytes	458	10,750	80
First Disk Drive, 35 megabytes	616	16,250	60
First Disk Drive, Disk Increment, 35 megabytes	594	NA	40
Second Disk Drive, 35 megabytes**	616	16,250	60
Second Disk Drive, Disk Increment, 35 megabytes	594	NA	40
First Disk Drive, 35 megabytes, Field Upgrade Kit	781	20,000	85
First Disk Drive, Disk Increment, 35 megabytes, Field Upgrade Kit	539	NA	40
Second Disk Drive, 35 megabytes, Field Upgrade Kit**	649	17,000	60
Second Disk Drive, Disk Increment, 35 megabytes, Field Upgrade Kit	539	NA	40
Diskette Master Unit consisting of the XL compatible controller, one diskette drive, power supply adapter cable, bezel, and mounting hardware	145	3,450	25
Diskette Slave Unit consisting of one diskette drive and one power supply adapter cable	86	1,995	15
Phase Encoded Tape Formatter	123	1,500	15
Tape Drive, 7-in. reel, 7-track/556-800 BPI	204	4,500	45
Tape Drive, 7-in. reel, 9-track/800 BPI	204	4,500	45

\*For 2-year lease, includes monthly maintenance.

\*\*This option requires Model 4045 Expansion Cabinet.

Pertec XL20 and XL40  
 Distributed Processing Software

	<u>Monthly Rental*</u>	<u>Purchase</u>	<u>Monthly Maint.</u>
▶ Tape Drive, 7-in. reel, 9-track/1600 BPI	204	4,500	45
Tape drive, 10.5-in. reel, 7-track, 556/800 BPI	325	7,685	55
Tape Drive, 10.5-in. reel, 9-track, 800 BPI	325	7,685	55
Tape Drive, 10.5-in. reel, 9-track, 1600 BPI	325	7,685	55
Communications Processor	83	880	47
System Printer Controller	55	1,100	15
Card Reader Controller	69	1,600	13
Station Printer, 60-120 CPS	194	4,500	35
System Character Printer, 160 CPS, Bidirectional, 96 Character Set	226	5,300	40
Line Printer, 170 LPM	393	9,500	60
Printer Switch	41	1,200	NC
Line Printer, 300 LPM	454	10,500	85
Line Printer, 600 LPM, 64 Character Set	1,009	24,100	165
Line Printer, 436 LPM, 96 Character Set	1,057	25,500	165
Line Printer, 900 LPM, 64 Character Set	1,288	30,950	205
Line Printer, 900 LPM, 96 Character Set	1,332	32,235	205
Card Reader, 300 CPM	233	4,950	57
Card Reader, 600 CPM	349	8,100	64

\*For 2-year lease, includes monthly maintenance.

\*\*This option requires Model 4045 Expansion Cabinet.■

# Pertec XL20 and XL40 Distributed Processing Systems



*The Pertec XL40 is a disk-based system that can support both local and remote keystations.*

## MANAGEMENT SUMMARY

In the course of assisting Datapro in updating this report, Pertec Computer Corporation requested that we discontinue the former reference to the company's CMC Division in the XL Series product name and, instead, use the name Pertec. Pertec has, of course, become a "household word" in the OEM marketplace as a supplier of tape drives and both rigid and flexible disk drives for minicomputers and turnkey systems. Until now, however, the company has not been prominent in the end-user market, and apparently it is ready to change this.

The XL40 system was introduced in November 1976 and enhanced through a series of announcements in February 1978. These enhancements included an expanded main memory, larger disk memory, new large screen displays, availability of keystation printers, availability of remote keystations, and availability of IBM 3270 Mode. These enhancements made the XL40 very competitive on the high end, but the system met severe competition on the low end.

This situation was remedied in May 1978 with the announcement of the XL20, a smaller, diskette-based system that supports up to four keystations and is fully compatible with the XL40. The XL20 uses the same XL/OS operating system and can support either the 480- or 2000-character display. Up to four double-sided, double-density diskette drives with a total capacity of 4.8 megabytes of diskette storage are available on the XL20. These drives can also write IBM 3740-compatible diskettes where such capability is desirable.

## USER REACTION

Datapro's 1978 survey of key entry equipment users yielded four responses from users of the Pertec XL40. These users had five systems installed with a total of 42 keystations. Their ratings are summarized below. ➤

Multistation systems intended for distributed data entry or 3270 emulation (XL40).

The XL20 supports up to four local 480- or 2000-character keyboard/display stations with up to 128K bytes of main memory and 4.8 megabytes of diskette storage.

The XL40 supports up to seven local and/or remote stations with up to 512K bytes of main memory and 70 megabytes of disk storage. Up to four tape drives can be added.

A basic XL20 system with controller, two diskette drives, and 480 character CRT terminal and communications processor sells for \$17,360 and leases for \$460 per month on a three-year lease.

An XL40 system with processor, 10 megabyte disk drive, 7-inch reel tape drive, 4,480 character CRT terminals, printer controller and 300 lpm printer sells for \$44,840 and leases for \$1,380 per month on a three-year lease.

## CHARACTERISTICS

**VENDOR:** Pertec Computer Corporation, 12910 Culver Boulevard, P.O. Box 92300, Los Angeles, California 90009. Telephone (213) 822-9914.

**DATE OF ANNOUNCEMENT:** XL40—November 1976; XL20—June 1978.

**DATE OF FIRST DELIVERY:** November 1976 (XL40); October 1978 (XL20).

**NUMBER DELIVERED TO DATE:** Over 1000 (XL40).

**SERVICED BY:** Pertec Computer Corp.

## CONFIGURATION

The XL40 system consists of a system processor and memory, from one to four magnetic tape drives, from one to four disk drives, from one to seven operator keystations, and an optional line printer and card reader. The system processor and memory, a single tape unit, a single disk drive, and peripheral controllers are all integrated within a single cabinet, which is called the Micro Control Unit (MCU). Also included in the MCU are the DC power supply and system control panel.

The XL20 system consists of a system processor and memory and up to four diskette drives housed in a single cabinet approximately the size of a two-drawer file cabinet. From one to four operator keystations are supported. Optional printers and card readers are also available. ➤

## Pertec XL20 and XL40 Distributed Processing Systems

	Excellent	Good	Fair	Poor	WA*
➤ Overall performance	1	3	0	0	3.3
Ease of operation	1	3	0	0	3.3
Hardware reliability	0	4	0	0	3.0
Maintenance service	0	2	2	0	2.5
Software	0	2	2	0	2.5
Technical support	1	1	2	0	2.8

\*Weighted Average on a scale of 4.0 for Excellent.

All of these systems were producing magnetic tape output, and, at the time of our survey, none of them was communicating with another system or host processor.

One XL40 user reported production averaging between 7500 and 10,000 keystrokes per hour. The other three users reported production averaging between 10,000 and 15,000 keystrokes per hour. □

### ➤ TRANSMISSION SPECIFICATIONS

The communications feature for the XL40 and XL20 systems permits data transmission between two XL systems, between an XL system and another CMC (Pertec) system, or between an XL system and the following IBM computers: System/3 with RPG II; System/360 with DOS/BTAM; System/360 or 370 with OS/BTAM, TCAM, or QTAM; or System/360 or 370 with ASP, HASP or HASP II. Binary synchronous protocols are supported in half-duplex mode at line speeds up to 9600 bits per second in point-to-point or multipoint leased or switched telephone networks. IBM 2770, 2780, 3780 or 360/20 HASP Workstation protocols can be emulated. Features supported within these protocols include EBCDIC or ASCII code transmission, EBCDIC transparency, space compression/expansion, and auto answer.

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## Pertec XL20 and XL40 Distributed Processing Systems

► status, monitor system operation, and perform other supervisory tasks.

The Background Task Manager provides an alternate method of control, in addition to the Supervisor, for data communications, spooling, and other background functions.

The SYSGEN program provides field personnel with a means of generating, loading and maintaining the operating system software. The SYSGEN process uses a master program tape for input. This master tape is identical for all installations and contains SYSGEN and all other system software programs. From a keystation, using a series of commands and responses to prompting messages issued by the SYSGEN program, field personnel can select system options, set parameters, and specify the hardware elements that are to be available in the system.

A set of off-line and on-line diagnostic programs is provided to functionally test the performance of the CPU, main memory, disk or diskette drives, magnetic tape unit, keystations, and line printer. These tests are run from a keystation. When a fault is detected, an error message is displayed at the control keystation. If no faults are detected by the diagnostic test programs, the operator can reasonably assume that the system is operating properly and no equipment malfunctions exist. An automatic diagnostic self-test function is also performed each time the system is powered up. Any faults found during this self-test are reported via the system status indicator on the control panel. In addition, an off-line software diagnostic utility program is provided to diagnose and back up the operating system software.

The user's program library contains common formats, subprograms, tables, and label programs. The formats allow the keying of tables, label programs, subprograms, and additional formats. Tables provide for data validation and insertion. The subroutines perform COBOL procedures outside the main format program. The label programs allow creation and processing of IBM label formats, as well as other standard label formats.

### COMPONENTS

**XL40 SYSTEM PROCESSOR AND MEMORY:** The system processor is designed around a 16-bit, programmable, bipolar microprocessor with an instruction cycle time of 200 nanoseconds. The main memory is a random-access read/write storage facility consisting of 16-bit words (two 8-bit bytes per word). The minimum system configuration requires 64K bytes, expandable to 512K bytes of directly addressable memory. Memory boards are fabricated with 4K RAM chips.

**XL20 SYSTEM PROCESSOR AND MEMORY:** The system processor is designed around an 18-bit programmable microprocessor with an instruction cycle time of 200 nanoseconds. The main memory is expandable from 80K to 128K bytes in 16K-byte increments. Memory cycle time is 600 nanoseconds.

**MAGNETIC TAPE UNIT:** Seven- or nine-track NRZI (556 or 800 bits per inch) or nine-track phase-encoded (1600 bits per inch) tape drives are available on the XL40 only. The tape transport speed is 18.75 inches per second. The magnetic tape is one-half inch wide, 600 feet long, and mounted on a seven-inch reel. The system can accommodate one to four tape drives. All drives use dual-gap read/write heads.

**DISK DRIVE:** Available on the XL40 only, a single disk drive is integrated within the MCU and may contain one or two platters. Each platter stores 4.4 or 8.8 million bytes of information. Average seek time is 70 milliseconds, and

average rotational delay is 12.5 milliseconds. Track density is 200 tracks per inch and the bit density is 2200 bits per inch. The system can accommodate up to three additional disk drives. Maximum disk storage capacity is 35.2 or 70 megabytes per system, depending on the disk configuration.

**DISKETTE STORAGE:** Available on the XL20 only; up to four diskette drives can be employed for data capture and for storage of data for file inquiry and report generation. The diskette drives read and record double-density, double-sided diskettes with a capacity of 1.2 megabytes of information each, thereby providing a system maximum of 4.8 megabytes. Track density is 48 per inch. Average seek time is 3 milliseconds track-to-track, and average rotational delay is 83.3 milliseconds. It is possible for the diskette drives to write a diskette which is compatible with the IBM Basic Data Exchange format for transmission or other use on an IBM 3741 or 3742 data station.

**KEYSTATIONS:** Each keystation consists of a CRT display and a detached alphanumeric keyboard. The 9-inch CRT unit displays 480 characters in 12 lines of 40 characters each. The top two lines are reserved for current job or supervisor status information, which is displayed continuously. The third line is for informational or error messages. The remaining nine lines are for the display of data being entered through the keyboard or generated by the user programs; a blinking solid rectangle acts as the cursor.

A video display terminal with display capacity of 2000 characters is also available. The top two 80-character lines are reserved for operator guidance and status indicators, leaving 23 lines (1840 characters) for application information, prompts, and display of entered data. The 2000-character video display can be intermixed on the same system as the 480-character terminals.

The keyboard, available in keypunch- or typewriter-style layout, contains both alphanumeric and control function keys. If desired, different keystation configurations can be used simultaneously in the same system. The keystations are daisy-chained to either or both of two interface ports on the MCU, and may be located up to 2000 feet from the MCU. Each keystation is assigned a unique, but changeable, address code by the service engineer at installation.

**STATION PRINTERS:** Available on the XL40 only, serial printers rated at 60 to 120 characters per second may be logically associated with specific terminals through dynamic assignment. These printers can provide hard copies of keyed data or previously stored disk file information, or both, under program control.

Single keystations or clusters of keystations with or without station printers can be remotely located and can communicate with the XL40 controller over leased or switched telephone lines.

**LINE PRINTER:** Line printers, rated at up to 900 lines per minute, are offered as an option. Reports are produced through the use of COBOL procedures within the user's program. Line length is 132 positions. Horizontal spacing is 10 characters per inch; vertical spacing is 6 or 8 lines per inch.

**CARD READER:** Two optional card readers, rated at 300 and 600 cards per minute, are available.

**SUPERVISORY STATION:** Any one of the keystations can perform supervisory or command functions. These functions are protected by a password.

**PRICING:** XL Distributed Processing Systems are available for purchase or on a one-, two-, three-, or five-year lease that includes maintenance. A separate maintenance contract is available for purchased units. Purchase prices and monthly rental prices based on a three-year lease are as follows: ►

## Pertec XL20 and XL40 Distributed Processing Systems

	<u>Monthly Rental*</u>	<u>Purchase</u>	<u>Monthly Maint.</u>
▶ XL20 Control Unit including processor, 80K bytes of memory, CRT controller, diskette processor and two diskette drives, communications processor, and printer controller	\$395	\$15,000	\$85
Memory module, 16K bytes	70	3,000	10
Memory module, 32K bytes	140	5,320	20
Additional diskette drive (up to 2)	80	3,040	14
Card reader controller	75	2,600	10
XL40 Control Unit including processor, 64K bytes of memory, keystation controller, disk processor, tape processor	425	13,600	85
Expansion Cabinet	50	2,000	NC
Memory module, 16K bytes	70	NA	10
Memory module, 32K bytes	140	5,320	20
Memory module, 64K bytes	225	NA	15
Memory module, 96K bytes	325	NA	20
Memory module, 128K bytes	425	10,450	25
Disk drive, 5 megabytes	125	NA	30
First disk drive, 10 megabytes	200	6,800	30
2nd through 4th disk drive, 10 megabytes**	200	6,800	35
First disk drive, 20 megabytes	320	12,160	50
2nd disk drive, 20 megabytes**	300	12,160	40
3rd disk drive, 20 megabytes**	280	12,160	40
4th disk drive, 20 megabytes**	260	12,160	40
Track drive, 7-inch reel, 7- or 9-track, 556, 800, or 1600 bpi	100	3,000	25
Tape drive, 10.5-inch reel, 7- or 9-track, 556, 800, or 1600 bpi**	175	5,800	30
Tape formatter for 1600-bpi drives	125	4,800	5
Communications processor	60	1,400	25
System printer controller	75	2,000	25
Card reader controller	75	2,600	10
Local or remote control unit (with Modem Master)	55	2,640	20
Local or remote control unit (without Modem Master)	45	1,710	15
Local or remote modem adapter	5	190	NC
Integrated modem (local or remote)	24	960	10
Integrated auto-answer modem (local or remote)	28	1,120	10
CRT terminal, 480 char., keypunch style (local)	64***	2,360	6
CRT terminal, 480 char., keypunch style (remote, on XL40 only)	65***	2,360	11
CRT terminal, 2000 char., keypunch style (local)	80***	3,040	10
CRT terminal, 2000 char., keypunch style (remote, on XL40 only)	80***	3,040	15
CRT terminal desk	8	120	NC
Station line switch	20	800	NC
Station printer, 60-120 cps (on XL40 only)	140	5,320	30
System serial printer, 160 cps	95	3,200	15
Line printer, 170 lpm	220	7,400	35
Line printer, 300 lpm	320	10,000	70
Line printer, 600 lpm (64 char.) or 436 lpm (96 char.)	595	18,000	145
Line printer, 900 lpm (64 char.) or 660 lpm (96 char.)	895	28,800	175
Card reader, 300 cpm	200	6,000	50
Card reader, 600 cpm	275	8,800	55

\*For 3-year lease; includes monthly maintenance.  
 \*\*Requires expansion cabinet.  
 \*\*\*For typewriter style keyboard add \$5.00/month.■