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For Immediate Release

XEROX OFFERS TWO MODELS
OF A NEW COMPUTER LINE

EL SEGUNDO, Calif., Feb. 5 -- Xerox Corporation announced today two models of a new computer line, the medium-scale Xerox 550 and 560 systems, and a new line of peripheral equipment.

John C. Lewis, vice president, computer marketing, said that "these systems will achieve up to twice the performance of machines in the same size and price class now in widespread use."

Standard features include virtual memory, central control of multiple processors, built-in error detection facilities, and communication links for troubleshooting from regional service centers.

"The improvement in price/performance ratios," Lewis said, "is the result of manufacturing economies through new technology and packaging techniques plus system design that closely matches users' application requirements."

The Xerox 550 computer has been designed primarily for scientific/engineering and real-time applications. The Xerox 560 system is for the multi-use market, offering all variations of data processing modes -- local batch, remote batch, interactive time sharing, transaction processing and real time.

Both systems have decentralized architecture, formerly available

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only with the industry's very largest computers, which allows central control of up to 22 processors. Thus the systems can be adapted to the user's applications, with a mix of computing and input/output processors to produce optimum data rates and throughput.

Other key features include integrated circuit (IC) control memory, memory expansion to 256,000 words, upward compatibility from Xerox Sigma computers, four register blocks, four real-time clocks, 14 internal and up to 48 external priority interrupts, and memory access protection.

New Xerox peripheral equipment has been developed to provide lower cost input/output for the Xerox 550 computer and higher performance for the Xerox 560 system. Eleven new peripheral units have been added to the standard equipment previously offered: three tape drives, two removable disk systems, two cartridge disk systems, three line printers and a fixed-head disk file. Line printers are now available in 300, 700, and 1250 line-per-minute models; tape drives of Ampex 45, 75, and 125 inch-per-second speeds and dual-density 800 and 1600 bits per inch recording density; removable disk drives with up to 100 megabyte capacity; cartridge disk drives with 5.7 or 11.4 megabyte capacity; and 2.88 megabyte fixed-head disc files.

"Both the Xerox 550 and 560 systems incorporate facilities for reliability, maintainability and availability extended from those developed for the Xerox 530 computer," Lewis said. "For example, there are six classes of error detection for all processors and 13 error detection tests for memory banks. Imbedded in the

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system is a comprehensive set of microcoded diagnostics. These and other built-in hardware and software features handle error detection, logging, diagnosis and system recovery."

Like the Xerox 530 computer, the new machines are equipped with facilities for on-line trouble-shooting from regional service centers.

The Xerox 550 system uses the Control Program for Real Time (CP-R) operating system and the 560 uses Control Program Five (CP-V). Both operating systems are enhanced versions of field-proven software first developed for the latest Sigma computer models. A full range of language processors, including Extended FORTRAN IV, BASIC, APL, ANS COBOL and RPG, is also available.

Deliveries of the Xerox 550 and 560 systems are scheduled to begin in the fourth quarter of 1974.

A typical configuration for a 550 system (64K memory, card reader, fixed-head disk, line printer, and magnetic tape unit) will sell for \$280,780, or rent for \$7,524 per month on a four-year lease.

A typical configuration for a 560 system (96K memory, 24 lines, three disk drives, printer, punch, card reader, four magnetic tape units, and fixed-head disk) will sell for \$723,650 or rent for \$17,028 per month on a four-year lease.

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XEROX 550 COMPUTER SYSTEM

Hardware Background Information

The Xerox 550 computer system, smaller of the two models announced, is designed primarily for the scientific/engineering/real-time market. Typical applications that make best use of its characteristics are data acquisition and reduction, laboratory automation, simulation, telemetry, power utility control, environmental monitoring, traffic control, communications and factory automation.

Running under the Control Program for Real Time (CP-R) operating system, the low-cost, medium-scale Xerox 550 system offers an efficient combination of multiprogrammed real-time foreground processing concurrently with batch and terminal operations. Some standard features of special interest: up to 17 mixed computing and I/O processors; virtual memory; maximum 256K words of 32-bit memory; built-in error detection and reporting facilities; and new low-cost peripherals.

System Architecture

The Xerox 550 system is centrally controlled from the System Control Processor, which contains system and real-time clocks, interrupts, system and configuration control panels, power fail-safe unit, console and local/remote maintenance facilities. Each memory unit contains up to 32K 32-bit words, hardware write lock logic, and provision for up to six separate and independent access paths. Other parts of the 550 system are organized in clusters. A basic cluster includes a basic processor for arithmetic and logic operations, plus a multiplexor I/O processor. Input/output clusters consist of up to three I/O processors with independent access to memory, each with 16 channels for peripheral device controllers.

Other System Features

LSI/MSI technology

Microprogrammed read-only control memory

Direct, indirect, and indexed addressing

550 hardware background/2

Single-and double-precision floating point

Memory access protection

64 general registers in four 16-register blocks

Seven index registers for each general-register block

Up to 48 external interrupts

Four real-time clocks

Stack operations to facilitate re-entrant programming

Error detection and reporting for each system unit

Centralized configuration control

Memory Characteristics

Cycle time: 645 nanoseconds

Word size: 32 bits plus four check bits

Capacity: 256K maximum, 32K per unit, 16K increments

Two-way interleaving

Multiplexor Input/Output Processors

Maximum of 16 I/O processors

Independent operation

Data rate: up to one megabyte/second per processor

Multiple-record operations without computer intervention

16 I/O channels per processor

Direct memory interface for special-purpose devices

Direct input/output interface

Immediate transfer of 32-bit word under program control

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XEROX 560 COMPUTER SYSTEM

Hardware Background Information

The high-performance Xerox 560 computer system has the capacity and facilities needed for multi-use installations. Five processing modes can be used concurrently: multiprogrammed batch, remote batch, conversational time sharing, real time and transaction processing. This versatility makes the 560 system suitable for large and medium-sized educational, industrial and commercial organizations with mixed applications. As many as 128 lines can be provided for time sharing and transactional processing while local and remote batch operations are in progress.

Using the Xerox Control Program Five (CP-V) operating system, the Xerox 560 system provides virtual memory capabilities. Other features of special interest are: up to 22 mixed computing and I/O processors; maximum 256K words of core memory; comprehensive built-in error detection and reporting facilities; and new high speed peripheral equipment.

System Architecture

The Xerox 560 system's decentralized organization is centrally controlled from the System Control Processor, which contains system and real-time clocks, interrupts, system and configuration control panels, power fail-safe unit, console and local/remote maintenance facilities. Each memory unit contains up to 32K 32-bit words, hardware write locks, and provision for up to six separate and independent access paths. Other parts of the 560 system are organized in clusters. A basic cluster includes a basic processor for arithmetic and logic operations, plus a multiplexor I/O processor. An input/output cluster consists of up to three I/O processors and one rotating memory processor.

Other System Features

LSI/MSI technology

Microprogrammed read-only control memory

560 hardware background/2

- Direct, indirect and indexed addressing
- Single- and double-precision floating point
- Decimal arithmetic
- Memory access protection
- 64 general registers in four 16-register blocks
- Seven index registers for each general-register block
- Up to 48 external interrupts
- Four real-time clocks
- Stack operations to facilitate re-entrant programming
- Error detection and reporting for each system unit
- Centralized configuration control

Memory Characteristics

- Cycle time: 645 nanoseconds
- Word size: 32 bits plus four parity bits
- Capacity: 256K maximum, 32K per unit, 16K increments
- Two-way interleaving

Input/Output Processors

The Xerox 560 system provides two types of I/O processors. Basic unit is the multiplexor I/O processor for all peripherals except mass storage. A rotating memory processor is supplied for mass storage units.

- Maximum of 16 multiplexor I/O processors and five rotating memory processors
- Independent operation
- Data rate: up to one megabyte/second per processor
- Multiple-record operations without computer intervention
- 16 I/O channels per I/O processor, 15 devices per rotating memory processor
- Direct memory interface for special-purpose devices
- Direct I/O interface.
- Immediate transfer of 32-bit word under program control

XEROX 550 AND 560 COMPUTER SYSTEMS

Availability Background Information

Xerox has emphasized reliability and simplicity of maintenance in the design and manufacture of the 550 and 560 systems. Beginning with the initial design, the number of circuit boards was reduced to a small number. Computer-controlled checkout isolates faults down to the component level. And after installation the customer has access to a unique complement of hardware/software diagnostic and reporting aids, as well as built-in facilities for on-line connection to a regional service center. This combination of features results in a level of availability new to the computer industry.

Error Detection

All functional units of the systems include error-detection facilities of six different types:

1. Data transmissions between units include parity information, which is checked by the receiving unit.
2. Memory units have facilities for a series of parity and operational error checks.
3. Register blocks within the functional units hold parity bits with the stored data. Parity is generated at the time data is written into the register and checked on read-out.
4. Control memories include parity bits, stored with the appropriate data, allowing checking of control logic.
5. Control sequence errors are detected for special situations, such as mutually exclusive control terms active simultaneously or undefined operations.
6. Power failures or overheating are detected to prevent system failure.

Error Reporting

Errors are signaled by the hardware in five ways: condition code settings in response to I/O instructions; I/O interrupt; fault trap; memory fault interrupt; and processor fault

550/560 Availability Background/2

interrupt. Each unit contains a status register to store information about the nature of the detected error and the registers can be read out. When feasible, automatic instruction retry occurs and the results are logged. The multiplexor I/O processors report errors from device controllers, adaptors, and devices. Memory units are able to detect 13 different types of errors. Detection results in a parity error signal to the requesting unit, a write lock violation signal, or a request to raise a memory fault interrupt.

Remote Assist Facility

As a standard feature, Xerox 550 and 560 systems provide for connection of a communications modem through which hardware and software maintenance specialists at regional offices can control and test the system remotely. In effect, the regional office can duplicate the functions of the local operator's console.

If an installation has trouble, the customer can telephone the nearest Xerox center. A specialist there can then diagnose the problem. For example, he can run diagnostic programs, interrogate the system log, and help in debugging programs.

Diagnostic Programming System Library

All the programs needed to diagnose a maximum configuration are contained in the Diagnostic Programming System Library. It also provides all necessary system control programs and those required for updating. The library is available on tape or, for those installations using only card input, as card decks. Key characteristics of the diagnostic library are:

1. Stratified fault isolation that identifies system, unit, and module faults.
2. Semi-automatic load and go of all selected diagnostic programs.
3. Common user interface across all current and future development.

Fourteen hardware/software checking programs are included in the Diagnostic Programming System Library. Some examples:

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Microdiagnostics Test -- Microprogrammed test sequences are incorporated into the control memory. It checks data registers, transfer paths, control logic, and the first page of memory. The test is automatically activated during the load sequence.

Programmed Read-Only Memory Test -- Checks overhead instructions, I/O data paths, and instructions to be used by the hardware bootstrap loader.

Basic Instruction Diagnostic -- Checks all basic single and double operand instructions, trap hardware, and all modes of instruction addressing.

Memory Diagnostic -- Checks core storage modules and memory control modules. Control logic is verified first. Testing is done on 4K increments and includes worst case pattern testing and checking of write locks.

Priority Interrupt Diagnostic -- Performs static and dynamic tests of the interrupt system.

I/O Processor Diagnostic -- Checks each I/O processor, one at a time, for all functions.

XEROX 550 COMPUTER SYSTEM

Software Background Information

Software for the Xerox 550 computer system includes a field-proven operating system, a selection of language processors, and a wide choice of service, utility and diagnostic programs.

The Xerox 550 computer system runs under the Control Program for Real Time (CP-R) operating system. The disk-oriented CP-R, in conjunction with hardware memory mapping, supplies complete task and memory management--including virtual addressing and automatic roll-in/roll-out of program segments.

CP-R supports three levels of processing: primary real-time, secondary real-time, and background batch. For high-priority, primary tasks assigned directly to hardware interrupts, response time is under 100 microseconds. Secondary real-time jobs can be scheduled by the software and through local or remote access to the system. Up to 32 jobs can operate concurrently using foreground multiprogramming and the multitasking facility will control up to 255 tasks.

Language Processors

Xerox Extended FORTRAN IV--This three-pass compiler is a superset of ANS FORTRAN X3.9. Features include: bit manipulation functions, compiler-generated re-entrant code, re-entrant real-time library, and in-line assembly language coding.

Xerox Assembly Program -- This four-phase macro assembler allows recursive procedures, conditional coding to govern assembly, arithmetic and Boolean operators, and updating of source program during assembly.

XEROX 550 AND 560 COMPUTER SYSTEMS
Peripheral Equipment Background Information

The Xerox line of peripheral equipment has been extended to complement the characteristics of the new computer systems. The full range now includes three magnetic tape drives, four printers, two removable disk systems, fixed-head disk drive, two cartridge disk drives, three card readers and punch, plus message- and character-oriented communications equipment.

Tape drives range in speed from 45 ips to 125 ips at 800 and 1600 bpi recording density. Disk pack drives are available with 49 megabytes and up to 100 megabytes per drive unformatted capacity. There is a choice of 400 cpm or 1500 cpm card readers. Impact line printers are available in 300 lpm, 700 lpm, and 1250 lpm models. And the recently announced Xerox 1200 nonimpact printer, rated at 4000 lpm, is also offered.

Most of the peripheral product line can be used with both the Xerox 550 and 560 systems. However, the low speed printer, low speed tape drive, and cartridge disk drives are only offered for the 550 system. The Xerox 1200 xerographic printer is available for the Xerox 560.

XEROX 560 COMPUTER SYSTEM

Software Background Information

Software for the Xerox 560 computer system includes an operating system managing five modes of operation, language processors, application, service and utility processors.

The Xerox 560 system runs under the Control Program Five (CP-V) operating system. Any combination of five modes of processing may be used concurrently: multiprogrammed batch, remote batch, time sharing, transaction processing, and real-time. This operating system includes comprehensive monitoring and reporting facilities to assist in the allocation of system resources and to gather accounting data for effective cost control.

Language Processors

To take advantage of the Xerox 560 system's five operating modes, CP-V has a wide variety of language processors, including:

Extended Xerox FORTRAN IV -- A superset of most available FORTRAN languages, this processor includes an algebraic programming language, compiler, and library of subprograms.

BASIC -- The Xerox version of BASIC offers simple and convenient on-line use of the system for non-programmers.

APL -- A concise interactive language, widely used by universities and in engineering and other applications.

ANS COBOL -- This standard language for business and commercial applications can be used for both batch and on-line processing.

FLAG -- A core-resident high speed compiler effective for small jobs, FLAG is a superset of FORTRAN IV-H.

560 software background/2

META-SYMBOL -- A two-pass symbolic assembly language and processor that allows generation of variable code according to the results of parameter tests during assembly.

Xerox/TEXT -- a text processing system for creating, editing, and printing documents through terminals.

RPG -- The Report Program Generator is a convenient problem-oriented language for commercial processing applications.

Applications Processors

EDMS -- A generalized data management system offering various file organization arrangements and allowing the user to define data relationships to fit his requirements.

EDMS can be used with COBOL, FORTRAN, and META-SYMBOL programs.

CIRC -- A circuit design and analysis program to help engineers simulate, evaluate and modify their designs to optimize circuit performance.

IDP -- Interactive Database Processor, with query and report generation facilities for on-line and batch users.