2200 PCS-III

PRODUCT
DATA SHEET

INTRODUCTION

The PCS-III, developed by Wang Laboratories, Inc., is a personal computer system powerful enough to meet the specialized needs of the most demanding user. The PCS-III provides both data entry and business/scientific calculation capabilities at either local or remote sites. Because of its compact design, the PCS-III can be easily transported to any location where processing power is required.

Contained within the PCS-III is a central processor with a standard 32K-byte Random Access User Memory. Since only 700 bytes of memory are utilized for system overhead, all remaining memory is accessible to the user. A BASIC language interpreter contained in a separate 48K-byte control memory translates and executes Wang's BASIC language instruction set. With the many interactive programming and debugging capabilities provided by Wang BASIC, the time required for development and implementation of software is greatly reduced.

In addition to its powerful central processor, the PCS-III combines the following features in a single compact unit.

- A 9-inch (22.9 cm) Cathode Ray Tube (CRT) with a 1024-character display capacity (standard) or a 1924-character capacity (optional).
- A typewriter keyboard, with a numeric keypad and Special Function keys for simplified data entry and program control.
- A minidiskette drive for high-speed, random access data storage operations.
- A printer/plotter connector.
- An optional disk multiplexer controller for interface to additional 2200 series disk drives (except the Model 2280).
- An optional microprocessor-based communications controller or an instrumentation interface controller.

- **Self-Contained Desk Top Terminal**
- **Single-Sided, Double-Density Minidiskette Drive**
- **Programmable in Wang-Enhanced Basic**
- **Disk Multiplexing Capabilities**
- **Telecommunications Capabilities**

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THE CRT

The PCS-III features a 9-inch (22.9 cm) diagonal Cathode Ray Tube (CRT) screen display for operator prompting and verification. The CRT can display a maximum of 16 lines, with 64 characters in each line (standard), or a maximum of 24 lines, with 80 characters in each line (optional). Once the screen is full, the lines of information scroll upward; thus, as each new line appears at the bottom, the top line disappears. Screen brightness and contrast can be adjusted to provide sharp and clear screen displays. A cursor, resembling an underscore, is used to indicate the location on the screen display where the next character will appear. Since the cursor can be operated under program control, specially formatted displays can be created to increase operator efficiency for particular applications. The interactive BASIC language utilizes the CRT for automatic displays of information designed to aid operators during data entry operations.

THE KEYBOARD

The PCS-III has two modes of keyboard operation: A/a and Keyword/A. In the A/a mode, the keyboard functions as a standard typewriter, producing uppercase characters when shifted and providing lowercase when unshifted. In the Keyword/A mode, shifted alpha keys produce BASIC words, as labelled, while unshifted keys produce uppercase letters, thereby reducing the number of keystrokes necessary to enter program text.

The keyboard is divided into four zones. Zone 1 contains both double-duty standard/BASIC keys and System Command keys. Zone 2 contains a numeric keypad, which allows rapid entry of numeric characters. Program Control keys, which directly control and execute programs with a single keystroke, are contained in Zone 3. Lastly, Zone 4 contains 16 Special Function keys, which can be used to perform a maximum of 32 user-defined functions. For example, Special Function keys can be defined to initiate program execution, access subroutines, or enter a predefined text string.

An optional keyboard clicker provides audio feedback when a key is sufficiently pressed to ensure entry of the corresponding character, BASIC word, or command. An experienced typist need not "bottom out" a key to ensure entry, thereby increasing input speed and lessening the need to verify entry by checking the CRT. A second option, the Audio Alarm, can be used to minimize operator monitoring by signaling when special conditions occur, such as the need for input, the completion of a task, or the end of a program.

THE MINIDISKETTE UNIT

The PCS-III has either one single-sided double-density minidiskette drive (standard) or two single-sided double-density minidiskette drives (optional) to provide high-speed, direct-access, on-line storage. Off-line storage is limited only by the number of minidiskette platters. The platters are approximately 5.25 inches (13.3 cm) in diameter and only one surface is used to record data. The recording surface is divided into 35 concentric tracks, and each track is divided into 16 sectors. The 560 sectors can each store 256 bytes of information. The standard 143,360 bytes of on-line information can be increased to 286,720 bytes with the dual drive option.

Files can be maintained on single-sided double-density minidiskettes in one (or both) of two modes: Automatic File Cataloging mode and Absolute Addressing mode. Automatic File Cataloging includes several BASIC statements and commands which constitute an internal data management system. Catalog mode permits the user to save and load programs or data files by name, without concern for where or how the files are actually stored on disk or the actual sector address of the data. (This information is recorded in a special Catalog Index which is automatically maintained by the system itself.) Absolute Sector Addressing which also includes a number of BASIC statements permits direct addressing to specific sectors on disk, and to a customized file access method, if desired.

THE BASIC LANGUAGE

The PCS-III is programmed using Wang BASIC. The BASIC instruction set falls into categories including general-purpose, matrix, and sort statements. Statements included within the general-purpose category facilitate common programming tasks such as formatting printed output, decision-making, branching, looping, passing data to subroutines, controlling the format of the CRT display, overlaying program modules, and accepting and processing operator-entered data. Included in other categories are special-purpose statements which perform operations such as code conversion, sorting, matrix arithmetic, and customized I/O control. Following are brief descriptions for several categories of the Wang BASIC instruction set.

- General-Purpose Statements — The general-purpose category includes statements which qualify BASIC as a powerful and versatile high-level programming language. For example, the

OPTIONAL EQUIPMENT

- Option 60 — Keyboard Clicker, Alarm, and Auxiliary CRT Connector
- Option 60A — 24 x 80 CRT
- Option 62 — Buffered Asynchronous Controller
- Option 62B — Synchronous/Asynchronous Controller
- Option 65 — IEEE-488 Standard Interface
- Option 67 — I/O Interface Controller (8-bit parallel)
- Option 103 — Additional Minidiskette Drive
- Option 105 — Disk Multiplexer
- All 2200 series printers currently available

PCS-III SPECIFICATIONS

Unit Size

Height	18.8 in. (47.7 cm)
Depth	20.5 in. (52.1 cm)
Width	19.8 in. (50.3 cm)

Weight

62 lb (28.2kg)

CRT

Size ..... 9.0 in. (22.9 cm) diagonal measure

Display Capacity

Standard	16 lines, 64 characters/line
Optional	24 lines, 80 characters/line

Character Size

Height	0.125 in. (0.32 cm)
Width	0.125 in. (0.32 cm)

Minidiskette Drive

Tracks	35
Sectors/Track	16
Total Sectors	560
Bytes/Sector	256
Total Bytes	143,360
Average Access Time	180 ms
Average Latency Time	100 ms
Speed	300 rpm
Transfer Rate	250 kilobits/sec (31,250 bytes/sec)

Minidiskette

5.25 in. (13.3 cm) diameter with write-protect notch

Power Requirements

115 or 230 VAC ± 10%
50 or 60 Hz ± 1.0 Hz
260 Watts

Fuses

3.0 amp (SB) for 115 VAC
1.5 amp (SB) for 230 VAC

Operating Environment

Temperature
50° to 90°F (10° to 32°C)
Relative Humidity
35% to 65% noncondensing (recommended)
20% to 80% noncondensing (allowable)

Heat Output

887 Btu/hr (maximum)

Memory

32K

ORDERING SPECIFICATIONS

Within one compact unit, the following components must be included in the personal computer system. The dual-mode, standard/BASIC keyboard must contain typewriter keys with alternative single-keystroke BASIC words and commands, numeric keys, arithmetic operators, and system-defined mathematical functions. In addition, 16 user-definable Special Function Keys, and system-defined edit mode operations must also be standard on the keyboard. The CRT screen which measures 9 inches (22.9 cm) diagonally must be capable of displaying either 16 lines with 64 characters per line, or 24 lines with 80 characters per line. For high-speed, random access data storage operation, a minidiskette drive must be provided. The central processor must have an interactive BASIC language interpreter, and 32K bytes of random access memory. A printer/plotter connector with plug-in compatibility for optional hard copy output devices must be standard. Provisions for internal installation of an optional microprocessor-based communications controller, an instrument interface controller, or a disk multiplexer controller must also be available.

Standard Warranty Applies

MULTIPLEXING CAPABILITIES

In addition to the self-contained minidiskette storage, the PSC-III can contain an optional disk multiplexer controller that enables access to either a Model 2260B or a Model 2260BC fixed/removable disk drive. A maximum of three PCS-IIIs can be linked together to allow shared use of common disk files yet provide independent processing and local storage capabilities to users at each PCS-III site. When expanded computing needs dictate purchase of a larger Wang 2200 series system, the multiplexed PCS-III can be used as a disk Workstation to share a common disk data base with the larger system, thus preventing obsolescence of equipment.

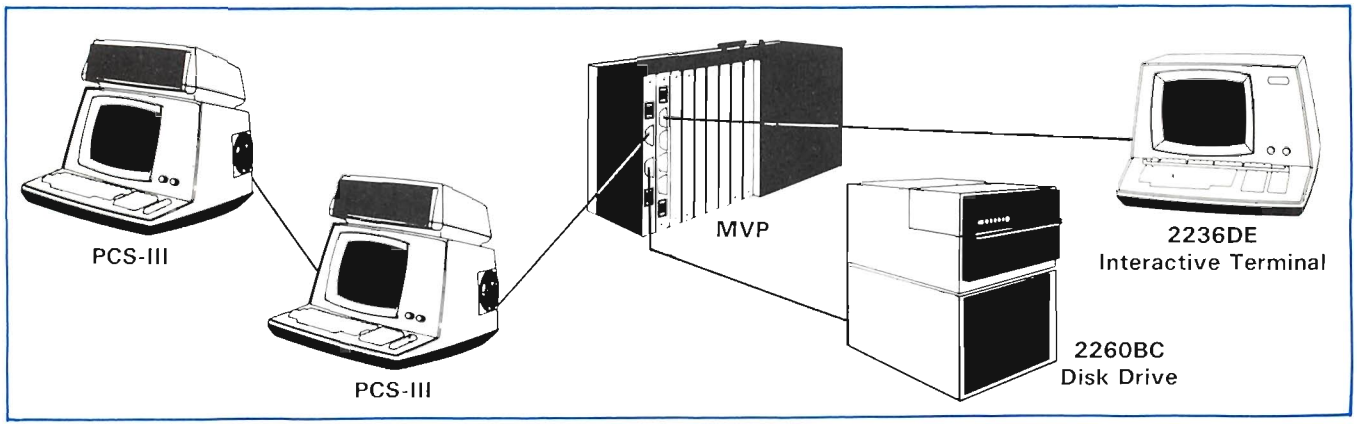
When connected to a Wang 2230MXA-1 master multiplexer controller installed in a 2200T, VP, or MVP CPU, the PCS-III may then access the disk attached to this master controller, as well as the built-in minidiskette drive standard on the PCS-III. The 2230MXA-1 board in the host CPU polls all attached CPUs on an equal priority basis until a system attempting to access the disk is detected. Control of the disk is then passed to the requesting CPU, which is permitted to execute a single disk statement. Polling then continues in the normal fashion. For operations such as on-line updating of a commonly shared file, a programmable "hog mode" enables one system to obtain exclusive control of the disk until such an operation is completed; undesirable interference during critical file maintenance is therefore prevented.

Extension cables are available in lengths of 50, 100, and 200 feet (15.2, 30.3, and 60.6 meters). The extension cable is coupled with a standard connector cable to permit an increased distance between successive systems in the chain. Since extension cables may be coupled together, the maximum distance between a pair of systems in the multiplexer chain is 512 feet (155.2 meters). The maximum distance between CPU 1 and CPU 4 in a four-station configuration is 536 feet (162.4 meters). The I/O cable connecting the disk to CPU 1 (the CPU containing the 2230MXA-1 master board) cannot be extended; the maximum distance between CPU 1 and the disk drive is 12 feet (3.7 meters).

The PCS-III has two connectors available for printers and plotters. However, when the multiplexing option is installed on the PCS-III, only one printer can be connected.

TELECOMMUNICATION CABABILITIES

By including an optional communications controller on the system, a wide range of data transmission and reception capabilities will be added to the stand-alone computer capabilities of the PCS-III. With either of Wang's microprocessor-based communications controllers, separate tasks related to data transmission/reception can be performed concurrently by the central processor and the communications controller. The Option 62 Asynchronous Controller allows the PCS-III to emulate a Teletype terminal or an IBM 2741 Selectric Typewriter terminal. Alternatively, the Option 62B Synchronous/Asynchronous Communications Controller, which supports batch data transmission to or from a host system via IBM's 2780, 3780, or 3741 Binary Synchronous Communications protocol is available.



A Sample PCS-III Multiplexed Configuration Using a 2200 Series MVP

PRINTUSING and % (Image) statements facilitate concise formatting of printed reports containing both text and numeric data fields with or without automatically inserted commas, decimal points, and leading dollar signs ($) in numeric fields. The PRINTUSING, PRINT, HEXPRINT, and PLOT statements can be used to control output to the CRT or a hard copy output device. Other general-purpose statements can be used to access a subroutine, define loops, reduce memory usage, or implement simple and conditional program branching.

- Matrix Statements — In addition to input and output operations, the matrix statements perform calculations and manipulations according to the rules of linear algebra; redimensioning of arrays is automatic for arithmetic operations, and optional for other operations.

- Sort Statements — The sort statements are designed to facilitate text editing operations, as well as high-speed data sorting, searching, merging, moving, and copying.

- System Commands — System commands provide the operator with a means of directly controlling system operations from the keyboard. Also, other commands provide convenient and powerful debugging features, such as the ability to interactively modify, trace, renumber, list, and step through programs.

IMMEDIATE MODE

Unnumbered single or multistatement lines can be entered and executed immediately to perform quick calculations. Since unnumbered lines can be entered and executed without altering programs or data currently stored in memory, selective program dumps can be obtained as a debugging tool.

PROGRAM MODE

Numbered statements, entered in any order, are stored in memory for later execution. Most BASIC words are automatically compressed into 1-byte "text atoms" when stored, thereby conserving memory ordinarily required by systems which store all program text character-by-character. Multistatement program lines are legal; they conserve memory, reduce program execution time, and group logically related statements.

EDIT MODE

The EDIT key automatically activates Edit mode operations on the eight rightmost Special Function keys, without affecting any user-defined functions on those keys. The Edit mode provides powerful capabilities for editing Immediate mode statements and alphanumeric characters in a line of text currently being entered, or in a line of program text resident in memory. Insertion and deletion of characters, non-destructive spaces and backspaces, and partial or total erasure of a field may all be performed in Edit mode.

ERROR DIAGNOSTICS AND DEBUGGING

Coded error messages automatically identify errors at each stage of program entry and execution. Normally, an arrow points to the approximate position where an error occurs in the program line. The HALT/STEP key enables the programmer to step through the execution of a program one statement at a time. The TRACE statement enables the programmer to trace through program execution, observing variable assignments and program transfers as they occur. The ON ERROR GOTO statement can be used to implement error recognition and/or recovery procedures under program control. Program lines are easily inserted and deleted, as needed; furthermore, the RENUMBER command can be used to renumber an entire program, or a portion of a program, with a specified line-number increment between successive lines.

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