

**WANG**

LABORATORIES, INC.

TO: ALL EUROPEAN, ASIA, PACIFIC, CANADIAN AND NORTH AMERICAN AREA DIRECTORS, COUNTRY AND DISTRICT MANAGERS

FROM: FREDERICK A. WANG AND JOHN N. MOLITOR

DATE: APRIL 2, 1981

SUBJECT: 2200 SERIES ENHANCEMENTS


On April 2, 1981, enhancements to Wang's 2200 Series of small business computers were announced and demonstrated at the Hanover Fair, Germany. These enhancements involve three distinct areas: the introduction of COBOL on the MVP/LVP, international network offerings, and memory and user expansion on the LVP to 256K bytes and 12 workstations. These enhancements emphasize the 2200 Series position as the most powerful, low-cost distributed information processor on the market today.


The introduction of the "C" Models of the LVP and MVP Central Processing Units provide ANSI 74 Level 1 COBOL capability with significant compatibility with the VS systems. This provides for access to the large library of COBOL software in the industry, as well as meeting many users' requirements for support of this universal language. We will continue our support of the current BASIC II language and operating system. The BASIC II operating system will load and run on the new option C expanded performance processors. This will assure that our users' and vendors' current software will be able to run on the enhanced 2200 Series systems. First deliveries to beta sites are scheduled for August 1981. Volume customer deliveries are expected to commence in November 1981.

The announcement of X.25, X.21, Teletex and advanced Batch Communications underscores the aggressive posture of the 2200 Series product line with respect to international user networking requirements. Certification of these offerings is planned to be complete by November 1981.

The tremendously successful 2200 LVP has been expanded to support up to 12 workstations and up to 256K of user memory. This continues the 2200 Series tradition of providing upgrade and expansion capabilities.

The purpose of these announcements is to provide you with greater capabilities to offer your prospects and customers, and information to include in planning your business for the rest of Fiscal '81 and next year. Details of these offerings are included on the following pages.

  
Frederick A. Wang  
Vice President, Development

  
John N. Molitor  
Vice President, Marketing Support

Attachment

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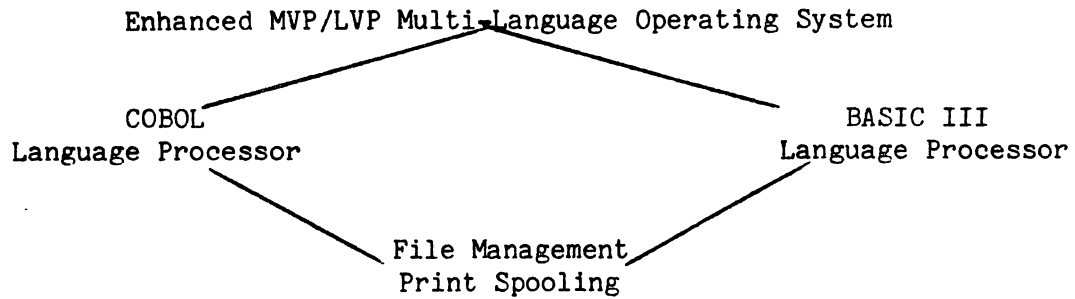
LABORATORIES, INC.

Marketing Release

2200 Interactive COBOL

Product Description

2200 Interactive COBOL consists of several major software subsystems supported by an enhanced version of the 2200 MVP/LVP operating system. The COBOL Language Processor, BASIC-3 Language Processor, and the File Management System including their related utilities as well as system utilities such as print spooling, and diagnostics are the major components.



## COBOL Language Processor Features/Benefits

### Feature - Incremental Compilation

Benefit - Because Wang's 2200 COBOL incrementally compiles user programs, it interpretes each statement line as it is entered. This line of text is

- (a) immediately checked for syntax, thereby providing the programmer with immediate validity of text entered
- (b) atomized or compressed into machine language and deatomized or regenerated from this compressed form upon request thereby eliminating storage requirement for both source and object code and providing for efficient memory utilization.
- (c) processed in a manner which utilizes to the fullest advantage the 2200 operating system as a decoding device thereby eliminating the need for timely compiles, debugs, re-writes and re-compiles inherent in compiler based systems' architecture.
- (d) This high degree of memory efficiency results in the ability to load and run large COBOL programs which heretofore has been a significant limitation on small systems supporting COBOL.

### Feature - Descriptive Error Messages

Benefit - Because Wang's 2200 COBOL supports descriptive error messages, the programmer's task of locating and identifying errors at resolution (execution time) is simplified via

- (a) execution diagnostics appearing on the screen in English-like messages
- (b) the ability to stop or halt step program execution in order to display and modify the values of variables
- (c) the ability to trace the value of variables through program execution
- (d) the ability to provide extensive documentary information such as cross-reference listings of data items, paragraph names and text strings
- (e) Substantially reduces overall program development time.

**Feature - ANSI (X3.23-1974) Level 1 compatible**

**Benefit- -** Because COBOL is a standardized programming language, it enjoys dominance as the most widely used language for data processing applications.

The Wang 2200 series support of the ANSI standard (X3.23-1974) Level 1 version of COBOL provides transportability of existing COBOL programs thereby broadening Wang's network of software suppliers and an incentive to COBOL shops to develop software on the 2200 series..

**Feature - VS COBOL Compatible**

**Benefit -** Because a large subset of 2200 COBOL is VS compatible, the 2200 series can be utilized for program development of software for execution on Wang's VS.

For Wang's network of software suppliers, and users alike, support of COBOL on the 2200 series offers a software migration path between the two families.

For a distributed processing environment, networking of VS and 2200 systems is enhanced via the support of a common language.

**Feature -** Concurrent processing of BASIC-3 and COBOL programs on the enhanced MVP/LVP.

**Benefit -** Utilization of the proven 2200 architectural design features and operating system ensures the high performance characteristic of the 2200 series not only in terms of storage and speed, but also in terms of execution time diagnostics, debugging features and uniformity.

This uniformity protects the initial investment by user and software supplier alike while enhancing the systems functionality.

## BASIC-3 Language Processor

**Feature** - New Extentions

**Benefit** - BASIC-3 supports

- Multicharacter Variable Names and Program Labels thereby improving program readability and documentation. For example,

(a) BASIC-3 supports real and longer variable names. Instead of using the variable X for sum, as in BASIC-II, BASIC-3 supports the name "SUM."

(b) BASIC-3 allows branching to paragraph names. On a "GO TO" statement, branch to paragraph "ENTER."

**Feature** - Numeric Functions and Alphanumeric manipulation.

**Benefit** - BASIC-3 is a high level language effective in the scientific application area as well as the data processing (commercial business) application area.

For example, BASIC-3 supports floating point data types and related arithmetic operations. The results of which are accurate to 13 digits.

**Feature** - Improved Program Structure.

**Benefit** - BASIC-3 supports statements that increase program efficiency, control, and structure.

For example, extended loop control is provided by the statement While/Until. This statement allows statements to be executed repeatedly until the specified condition becomes true or false thereby eliminating the need for "counters."

Additionally, a group of statements can be specified for conditional execution with IF/THEN/ELSE and ERROR constructs.

## 2200 FILE MANAGEMENT SYSTEM

**Feature - Language Independent**

**Benefit -** The file management subset of Wang's 2200 enhanced MVP/LVP operating system can be accessed by either COBOL and BASIC-3 and is therefore language independent. Consequently, other "users" in addition to COBOL and BASIC-3 such as telecommunications and network codes can be interfaced with the file management code in accordance with the specifications.

**Feature - Volume Management on the disk.**

**Benefit -** The user (programmer) is free from the responsibility of disk operations such as Data Load BA. Disk operations are controlled by file commands to create, open, close and delete files.

The system automatically maps the location of each file on the disk allowing it to be accessed by name without regard for the particular location on the disk.

File space is dynamically allocated, depending on program need, within limits set up by the user at configuration time. For example, a user can move, rename, or delete files, reuse the space occupied by deleted files and expand and shorten existing files.

Dynamic disk space allocation becomes increasingly important in a multifunction environment supporting data processing, word processing, print spooling, and telecommunications simultaneously. This is feature virtually unique within small computer system.

**Feature - All File types supported.**

**Benefit -** Indexed files as well as non-keyed files are supported. Records may be of fixed or variable length. Consequently, Wang's file management system frees the programmer from file access method constraints such as KFAM. Thereby improving the transportable of software supplier's code.

**Feature - Increased Security.**

**Benefit -** Passwords are assigned to individual files and each file has several passwords for specific groups of privileges. For example, a file may be assigned an exclusive read only, exclusive read/write shared read/write, shared read only and exclusive modify. This prevents access by unauthorized personnel and prevents possible conflicts with other users having the same file open.

**Feature - Enhanced Recovery Procedure**

**Benefit -** The file management system provides duplicate or redundant information storage to aid in recovery of data inadvertently destroyed.

When a file is created, parameters specific to that tile such as volume, file name, etc., are stored twice and one may be used to reconstruct the other. For example, an indexed file (including the Catalog file) will normally have the keys redundantly stored both in the key section and in the data section of the file.

**Feature** - Print Spooling

**Benefit** - Printer output may be placed in a disk file instead of sending it directly to the printer. Printer usage is thereby optimized to handle total system requirements. In addition, the individual terminal or background program is free from operating at printer speed and the user can continue processing at the terminal without interruption.

## Target Markets/Selling Strategy

### Major Account/Distributed Processing Market

Wang's 2200 series of small business systems is continually evolving to meet the trends of the distributed information environment. Today, the 2200 series is competitively positioned as an offering to major accounts.

Let's examine those trends and the ways in which the 2200 series' support of COBOL, BASIC-3 and an enhanced operating system meet these trends.

Users of information processing systems are looking to decentralize or distribute their information processing requirements functionally by task, geographically by location, and organizationally by department.

The advantages such a distributed environment affords are three-fold: increased cost effectiveness; increased control; and increased security.

Selling these advantages to prospective users and how these advantages can be realized with the enhanced 2200 MVP/LVP system.

### Benefit

#### 1. Increased Cost Effectiveness - How realized with 2200

- The language processors supported by the enhanced 2200 MVP/LVP operating system Option "C", i.e., COBOL and BASIC-3 are incrementally compiled.

The advantages of an incrementally compiled language are three-fold.

- . Elimination of large memory requirements since there is no storage of source and object code.
  - . No timely and costly compiles.
  - . Increased user productivity - Since syntax is checked immediately upon entering a line of code, timely and costly compiles, edits, debugs and recompiles are eliminated.
- 2200 COBOL compatible with VS COBOL

The advantage of such compatibility easily promotes the networking of 2200 and VS systems because they support a common language.

- 2200 COBOL ANSI 1974 level 1 compatible

Since COBOL is a standard programming language, it enjoys wide-use in data processing applications in the commercial environment.

The advantages of such compatibility with the ANSI standard COBOL is that COBOL programmers are immediately productive on the 2200.



In addition, the user can distribute program development by developing programs on the 2200 for execution on the host system or VS. The mainframe, or VS, is therefore, free to process, not develop, and the programmer is more productive on the highly interactive 2200 system.

- 2200 COBOL co-resident with BASIC-3

Wang's implementation of COBOL on the 2200 took advantage of the systems' proven architecture. Consequently, the same high performance is ensured when using COBOL or BASIC-3. In many ways, BASIC-3 is a companion language to COBOL, i.e., when certain COBOL verbs are atomized or compressed, they share the same microcode logic of BASIC-3. No separate procedure language is necessary.

- Print Spooling

Print spooling is part of the operating system. Consequently, no user memory overhead is required.

Print spooling, as supported by the enhanced MVP/LVP system Option "C", optimizes usage of a printer by placing printer output to a disk file.

The cost-effectiveness of such an implementation is realized in two ways. First, print spooling enables printers to be scheduled to handle the total system requirements, and two, it frees the terminal and/or background partition from operating at printer speeds. The user is free to continue processing without costly, timely interruption.

2. Increased Control - How realized with 2200

- The 2200 file management system supported by the enhanced version of the MVP/LVP operating system Option "C" is shared by both COBOL and BASIC-3.
- Wang's implementation of file management on the 2200 series is consequently language-independent. It frees the programmer from the constraints of disk I/O operations.
- The system automatically maps the location of each file, allowing it to be accessed by file name rather than by location on the disk.
- File space is dynamically allocated - insertions, deletions, and moves can be made without programmer intervention.
- Keyed, as well as non-keyed files are supported and records may be of fixed or variable lengths.

3. Increased Security - How realized with 2200

- The distributed processing capability of the 2200 Series is widely recognized via its support of extensive communications.

This ability meets the demand for security against natural disasters, such as fire and flood issues that concern the users of large centrally located processing power.

But there is second level of security that up until this time, had not been adequately addressed - security against unauthorized access to files and the ability to recover from system failures.

- Wang's file management system addresses this second level on two fronts.

The first line of defense is functional - the ability to limit use of specific files to individuals on a privilege basis.

The second line of defense is organizational - the ability to restrict the retrieval and/or update of particular data base records.

- Extensive recovery procedures are inherent in the 2200 file management system. As soon as a volume is mounted, certain integrity checks are performed. If the volume is bad, recovery utilities may be called. Such recovery utilities provide catalog reconstruct ensuring security of the sytem at file level.

File identification parameters are stored twice. This duplication or redundancy assures data integrity.

### Software Suppliers - System Houses, Software Vendors

The Wang sales rep deals with the small business computer market - a market inhabited typically by the first-time user or the major account market - inhabited by the sophisticated EDP professional.

Throughout the Wang sales rep's exposure to these markets, he/she has leveraged a resource known as a Systems House or software vendor. This resource is critical to closing business successfully. As a sales strategy in recruiting qualified software suppliers, let's look at markets from their perspective and how the 2200 series effectively addresses these markets.

Software suppliers are concerned with markets which differ in concept from those of the Wang sales rep. These markets are actually application areas of which there are four: the scientific application area, the data processing application area, the text processing application area, and the systems programming application area.

#### 1. Scientific Application Area

##### Requirements

- . Manipulation of numbers and arrays of numbers, e.g. statistical tabulation, linear programming regression analysis curve-fitting.
- . Often CPU-bound

##### 2200 Solutions

- . BASIC-3's extensive capability for processing both numeric and alphanumeric character strings.

- . Complete set of matrix arithmetic statements.
- . Data manipulation at bit and byte levels.
- . Boolean and binary operations.
- . Fastest execution time of any CPU in its class, reference the Association of Small Business Computers - negating the CPU bound characteristics of this application area.

## 2. Data Processing Application Area

### Requirements

- . Manipulation of files and the generation of reports from these files, e.g., order entry, payroll, administrative support.
- . Require careful program organization and coding.
- . High volume data
- . Input-output bound

### 2200 Solutions

- . Support of Ansi COBOL 1974 level 1, via a highly interactive incremental compile version - a language noted for its structured program techniques and documenting facilities.
- . Intelligent controllers, e.g., disk cache that minimize the I/O bound characteristics of this application area.
- . Support of 2236DE or DW terminal which facilitates data entry applications via character display attributes, business graphics and human-engineered keyboard.
- . File Management System which is language independent supporting both COBOL and BASIC-3. The file management code frees the programmer from responsibility of allocating disk resources.
- . Dynamic allocation of file space.
- . Provides security at file level and extensive recovery utilities.
- . Supports indexed, as well as non-keyed files and both fixed and variable length records.

- . Print spooler which optimizes printer usage by spooling printed output to disk. This frees the terminal or background partition from operating at printer speed and allows the user to continue processing without interruption.
- . BASIC-3 with proven editing, debugging and data verification features.

### 3. Text Processing Application Area

- . Manipulation of data in form of free-running text of unstructured data, e.g., letters, memos, mailing lists.
- . The 2200 series supports Wang Word Processing. The 2200 WP package is a direct emulation of the Wang OIS, including workstation keyboard layout and archive diskette compatibility.

### 4. Systems Programming Application Area

- . Expedite the interface between the programmer and the computer.
- . An operating system that supports incrementally compiled languages - BASIC-3 and COBOL which are highly interactive. The programmer receives immediate syntactical checking upon entering a line of code and descriptive error messages at execution time. Can modify and re-run without wasteful, lengthy re-compilation.

Ordering Information

Option C - Expanded version of the MVP/LVP operating system.

MVP = . Expanded CPU capacity  
      . Multi-language capabilities

LVP = . 7 I/O  
      . Expanded CPU capacity  
      . Multi-language capability

Pricing Information - U.S. List

Option C	\$2,000 additional to current LVP/MVP base models
e.g. 2200 LVP-8	\$ 8,000
Option C	\$ <u>2,000</u>
Total	\$10,000

Upgrade to Option C

VP - MVP =	\$ 2,000
VP - MVPC =	\$ 4,000
MVP - MVPC =	\$ 2,500
LVP - LVPC =	\$ 2,500

plus installation

Model number is therefore 2200 LVPC8D.

Delivery Information

Available November, 1981 - 8 weeks from receipt of order.

Additional Technical Information

Subsequent documentation on the expanded MVP/LVP operating system supporting COBOL, BASIC-3, the File Management System and print spooling will be distributed in the form of a 2200 Technical Bulletin in May, 1981. Updates will follow every eight weeks.

## M E M O R A N D U M

To: Distribution  
From: B. Patterson  
Date: July 2, 1982  
Subject: BASIC-3 FILE AND RECORD LOCKING  
RECORD NOT FOUND CONDITION

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Record and file locking in BASIC-3 has been changed. The following new locking rules replace all previous rules.

- . Record and file locking can be done in any file access mode except READ ONLY. Attempting a file or record lock in a file open in READ ONLY mode, results in an error.
- . Attempting to lock a record that is already locked or attempting to lock a record in a file that is locked (ie, all records are locked), results in an error.
- . Attempting to lock a file that is already locked or attempting to lock a file that has a locked record, results in an error.
- . Attempting to CREATE, READ, WRITE or DELETE a record in a file that is locked (ie, all records are locked) by another user or with another file number, results in an error.
- . Attempting to READ, WRITE or DELETE a record that is locked by another user or with another file number, results in an error.
- . Attempting lock more than one record in the file with the same file number, results in an error.
- . File CLOSE clears any locks under the specified file number.

The IF FOUND/END statement has been eliminated. Record-not-found and end-of-file conditions are now reported as errors. This enables all exception handling in disk statements to be fielded by a single ERROR statement, which will only be executed when exceptions occur. The ERROR statements can check the error code for particular exceptions (such as, record not found, record locked, access conflict and volume full) and take the appropriate actions.

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