MODULE 3

VS/IIS

Software Release VS/IIS 1.1

CONTENTS

CONTENTS (CONT.)

The VS/IIS is one of Wang's major entries in its Integrated Information Systems (IIS) line of office products. IIS products are aimed at meeting the increasing needs of businesses to automate their information handling capabilities. The VS/IIS combines the state-of-the-art technologies of Wang's powerful VS computer system and word processing software. The addition of telecommunications provides the VS/IIS with additional integrated ability to access and transfer information throughout a large network of information handling systems.

This module provides an overview of the features, capabilities, and advantages of the VS/IIS. Specifically, the module first describes the tremendous advantages which the VS/IIS provides its customers, the characteristics of the target market for the VS/IIS, general sales strategy, and home office and local resources which Wang provides in support of VS/IIS accounts. The module then presents specific hardware and software features and capabilities (including telecommunications) and an overview of configuration considerations.

OBJECTIVES

Upon completion of the module, you will be able to:

- Describe how word processing on the VS meets the goals of IIS.
- Identify five general advantages which the VS/IIS offers its users.
- Define the target market for the VS/IIS system and the characteristics of prospective VS/IIS customers.
- Evaluate the appropriateness of a VS/IIS solution in meeting particular types of customer needs.
- Identify the home office and local resources which Wang offers in support of VS/IIS sales and customer service and define the roles each of these resources plays.
- Identify the main characteristics of VS/IIS hardware.
- Identify the main characteristics of VS/IIS software.
- Identify the most important considerations to take into account in configuring a VS/IIS system.
- Describe the telecommunications options available on a VS/IIS system and describe the capabilities of each.

DIRECTIONS FOR COMPLETION

Read the Module Text and complete the Review Exercises. When you have finished, contact the Course Administrator for the Module Test.

INTRODUCTION TO THE VS/IIS

Businesses are becoming concerned about the need to increase productivity and reduce costs. The roots of this concern are the rising costs of office operations, runaway inflation, and keen competition. Businesses have a continuing need to increase productivity at both the management and clerical levels, reduce operating costs, and enhance management decision-making capabilities in order to maintain and strengthen their competitive positions.

Recent technological advancements in information processing have made it possible for offices to be more efficient and for accurate information to be available to key decision makers faster and more reliably. When office technology is appropriately suited to the information needs of the office and when it is understood and properly employed by the office staff, the benefits can be dramatic: time and costs are saved and productivity substantially increased. Automation will be even more prevalent in the coming years with Office of the Future innovations. These advancements will remove many of the constraints to solving information processing problems that existed in manual or simple mechanical systems.

The vision of the automated office of the future is becoming a reality today through Wang's Integrated Information Systems (IIS). These systems combine data processing, word processing, and communications capabilities in one functional unit. This means that information is processed in a unified way with one cost-effective, easy-to-use system (Figure 1).

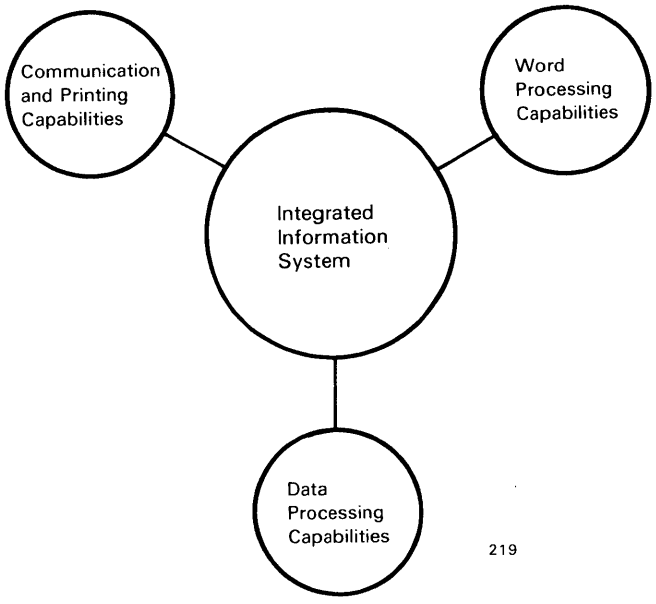


Figure 1. Integrated Information System

Presently, Wang offers two main IIS entries: OIS/BASIC and the VS/IIS. OIS/BASIC combines the extensive word processing capabilities of Wang's Office Information Systems (OIS) with data processing capabilities in the form of a Wang-enhanced version of the popular BASIC programming language. The VS/IIS, which is the focus of this module, combines the power and versatility of Wang's VS computer family with the same word processing capabilities that have earned Wang recognition as the leader in CRT-based word processing systems. Through the addition of telecommunications (including the Mailway electronic mail system), the VS/IIS acquires tremendous capabilities for accessing and transferring information throughout a large network of interconnected systems.

A VS/IIS system can function as an interactive distributed computer, as a word processor, or as an integrated information system. Word processing on the VS/IIS can handle all typing applications including "everyday" documents, heavily revised or lengthy documents, and documents requiring frequent updates. The data processing capabilities of the VS system are well documented and include a support of seven different programming languages[1] and a powerful virtual memory system. The power and flexibility of the VS cannot be matched by a computer in its size and price range. The integrated data and word processing capabilities of the VS/IIS support combined WP and DP output and permit a common data base to be shared by data and word processing functions. These and other VS/IIS features are highlighted throughout this module.

Advantages of the VS/IIS

The VS/IIS offers customers several significant advantages. Each of these advantages is discussed below.

User Oriented - The VS/IIS incorporates all of the important user-oriented features of the VS computer and the ease-of-use that is characteristic of Wang's word processing software. Non-technical personnel can quickly learn to use the system. Clerks, managers, programmers, and system administrators are guided through system functions by easy-to-read menus and conversational prompts and questions. All system functions, including data processing, word processing, and tele-communications, are initiated from the same workstation and one operator can perform all system functions. The keyboard is uncomplicated, with function keys clearly labeled. Many one- or two-keystroke commands further simplify use. Advanced security features of the system protect against unauthorized access to system files. The user-orientation of the VS/IIS provides direct and immediate information access. Moreover, the system can be installed and made operational with minimal training costs and start-up time.

[1] The seven languages are COBOL, BASIC, RPGII, ASsembler, Procedure Language, PLII, and FORTRAN.

Versatile - Because all system functions are combined into one functional unit, the VS/IIS is a versatile system. The VS family of computers outdistances the competition in terms of both power and speed. When configured properly, the system can support a large number of users (up to 128 workstations) with little degradation in access and execution time. An unparalleled choice of seven different programming languages can be used on the system simultaneously. This means that literally any type of data processing application can be supported. Wang's advanced word processing software offers extreme functionality. The software incorporates numerous automated routines which allow the deletion, replacement, or movement of text in a document from one location to another and sophisticated standard features such as Global Replacement, Glossary, Decision Processing, and Sort. An extensive range of peripheral devices is available, including a variety of character and draft printers and additional storage capacities of up to 5.4 billion bytes of on-line storage, enough to satisfy even the largest data base requirements. Telecommunications available with the system allow the VS/IIS to communicate with both Wang and non-Wang computer systems and peripherals from remote locations. The versatility of the VS/IIS makes it a major and unrivaled entry in the integrated office systems marketplace.

Growth-Oriented - The VS/IIS is not a single machine but rather a family of modular components that can be combined in a wide variety of configurations to suit the needs of its various users. One of the most frustrating and costly problems faced by customers of Wang's competition is the so-called "dead-end" system. A dead-end system cannot be upgraded, and the customer has to buy a new system to get more capability and power. With the Wang VS/IIS system, however, a customer's initial investment is protected against obsolescence, since a starter system can be easily expanded or upgraded to a larger system which supports greater volume, more workstations, greater processing power and/or additional peripheral devices. The VS line offers four models of the VS computer and eight models of the VS-100, a larger and more powerful system. The VS can be expanded to a maximum configuration of 512K main memory with 32 workstations, several printers, and more than 2.3 billion bytes of disk storage. When greater expansion is required, the VS computer can be replaced with a VS-100 which supports up to 2048K in main memory, 128 workstations, and more than 5.4 billion bytes of disk storage. In addition a wide variety of printers and telecommunication protocols can accommodate almost any type of system expansion.

The VS/IIS offers extensive growth potential so that the system can expand as a business's information processing needs grow.

Cost-Effective - The VS/IIS provides powerful and integrated information handling capabilities for the cost of one system. Cost-effectiveness is also obtained by using peripheral devices for both data processing and word processing functions. The system's multifunctionality (i.e., both data and word processing) is extended even further by linking it with other computers and word processing systems via telecommunications capabilities. In addition, duplication of effort (and, therefore, time and money) is saved because once the file conversion utilities of the VS/IIS capture data, it can be processed in data processing, word processing, or telecommunications mode.

Productivity-Enhancing - People are more productive when they can get the same amount of work (of equal or superior quality) accomplished in less time. The VS/IIS includes a range of features which help its users to be more productive. Multiple operators can use the system for multiple functions simultaneously from their individual workstations. Each user has direct and immediate access to needed data and programs. The multiple users of the system can be located throughout a building or throughout the world. Multiple workstations can communicate with one central VS computer, with several VS computers linked together, or with non-Wang computers. The VS/IIS supports background processing. This means that even though the system is primarily designed to be interactive, it is possible to run jobs in background mode. Thus, system resources are used efficiently, since workstations need not be tied up while jobs which require large amounts of processor (e.g., batch processing) or input/output time are running. Print spooling allows a job schedule to be temporarily stored in a disk file (rather than being sent directly to the printer). Thus, an operator does not have to wait for a printer to become available before requesting a print job. Programmers can be more productive, too, since a range of programming languages and system utilities are supported. All of these features help to improve the overall productivity of an organization by providing an information processing environment which is accessible, powerful, and easy-to-use.

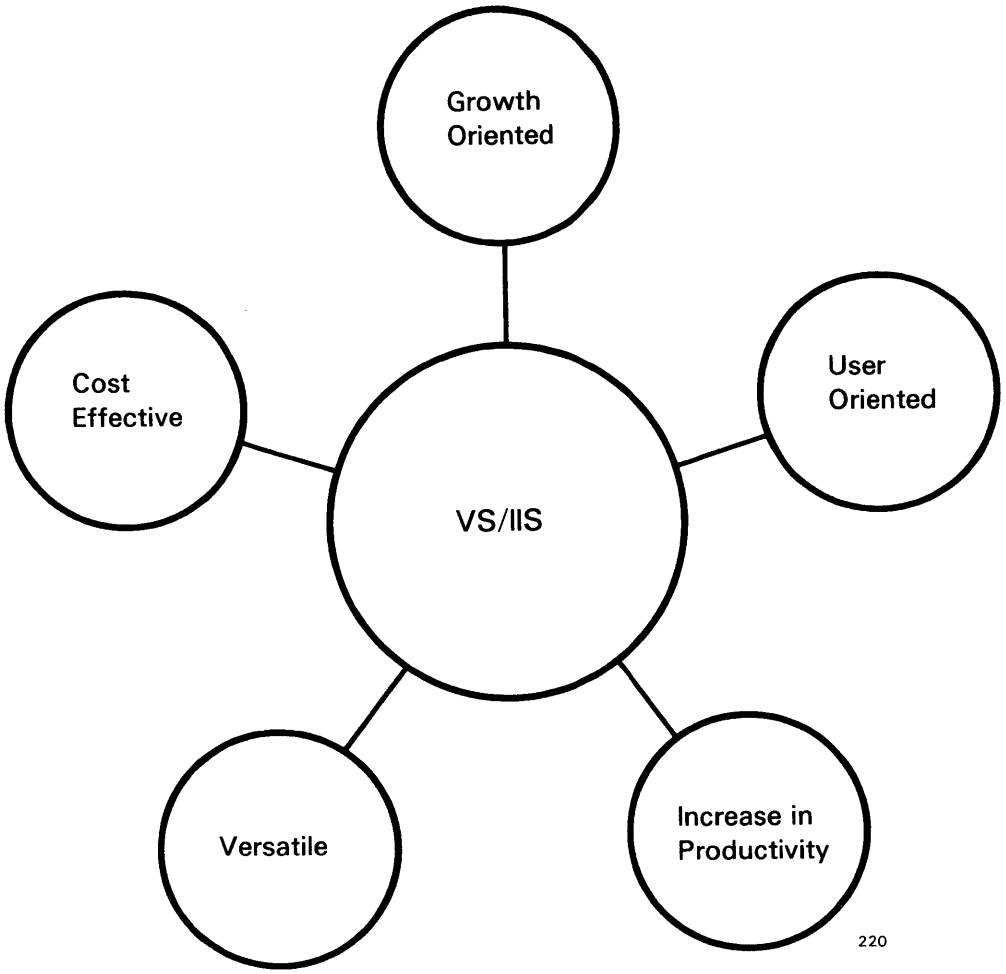


Figure 2. Advantages of VS/IIS

In summary, the VS/IIS is a truly integrated system, combining data processing, word processing, and communications capabilities in one easy-to-use system. It has been designed with the user in mind, incorporating the many user-oriented features of the VS computer and Wang's human-engineered word processing software. The system provides great versatility in supporting seven programming languages, sophisticated word processing functions, and an extensive range of peripheral devices. It is designed for easy expansion and upgradability to accommodate growing information processing needs in a cost-effective way. The capstone advantage of the system is that it enhances the productivity of its users. A summary of the advantages which the VS/IIS offers follows.

USER-ORIENTED
- Use by nontechnical personnel
- Interactive
- Fill-in menus, conversational prompts/questions
- All functions initiated at same workstation
- Easy-to-use workstation
- Single data base for multiple users
- Advanced security features

VERSATILE
- Supports large number of users
- Seven programming languages
- Sophisticated word processing software
- Extensive range of peripherals
- Large storage capacity
- Telecommunications

GROWTH-ORIENTED
- Modular design
- Easy expansion and upgradability
- Four models of VS and eight models of VS-100
- Peripherals include printers, disk drives, tape drives, and communication devices
- Industry compatibility

COST-EFFECTIVE
- Multifunctionality in one system
- Maximum use of peripheral devices
- Telecommunications capabilities
- File conversion utilities avoid duplication of effort
- Enhancement of management decision-making

PRODUCTIVITY-ENHANCING
- Multiple users for multiple functions simultaneously
- Direct and immediate access to needed information
- Background processing
- Print spooling
- Programming features

THE VS/IIS MARKET

Wang has introduced its IIS to fill an important existing and future need in the information processing marketplace. This need is for a single system that can accomplish both data and word processing. Many companies offer limited systems which can only marginally perform both functions. Wang, because of its leadership role in both the CRT-based word processors and business computers, is the only company to offer a powerful and truly integrated information system. Wang, then, is in an advantageous position to capitalize on the growing need for an effective system that integrates multiple information processing functions.

As the previous section of this module illustrated, the VS/IIS provides its users with important advantages in handling their information processing needs. Potential customers for the VS/IIS system include both new customers who are looking for an integrated approach to their information processing needs and those customers who already have VS installations. The VS/IIS, like the entire VS line, is primarily airmed at medium- to large-sized businesses and organizations and to Fortune 1000 companies with distributed processing networks. Strong potential market segments include manufacturers, government agencies, financial institutions, and law firms. These are all areas with which Wang has had much experience and in which there are already strong user bases.

In addition to this general description of the VS/IIS marketplace, there are specific characteristics that can help to identify prospective VS/IIS customers. If customers want some word processing capability and have one or more of the following characteristics, they are prospects for the VS/IIS system.

- Emphasis on data processing functions
- Use of mainframe computer
- Use of wide variety of programming languages
- Development of own applications (e.g., data entry, reporting programs)
- Interest in electronic mailing systems (i.e., Mailway electronic mail)
- Extensive peripheral requirements (e.g., tape, disk, workstations)
- Desire to implement existing VS-supported software packages (e.g., GBS/VS, HRMS)
- Remote computing requirements

When to Recommend a VS/IIS

The VS/IIS, however, is not necessarily the appropriate choice for every IIS customer. There are several considerations in making either a VS/IIS or an OIS/BASIC recommendation. Following are brief discussions of the more important of these considerations.

Data Processing Needs - The VS computer is designed to handle heavy data processing needs. The VS/IIS system, therefore, would be the appropriate choice for prospective IIS customers who have heavy data processing needs but who also want to take advantage of some word processing and telecommunications capabilities. The OIS/BASIC system can handle a variety of data processing applications, but its data processing capabilities are limited in comparison to the enormous capabilities of the powerful VS computer.

Word Processing Needs - Heavy word processing needs can be handled on both the VS/IIS and the OIS/BASIC systems. Therefore, if the prospective IIS customer requires both extensive data processing and word processing, the VS/IIS is the preferable solution. OIS with Office BASIC should probably not be used with very large data files. If, however, the customer's requirements are primarily word processing with relatively minimal need for data processing capabilities, OIS/BASIC should be more seriously considered.

Types of Applications - The particular type of application weighs heavily in a VS/IIS recommendation. Transactional applications which are heavily input/output-oriented are more efficiently handled through a VS/IIS system than through an OIS/BASIC system. Transactional applications (e.g., an accounts payable/receivable program) require a great deal of access to and from files. The extensive file handling and data management capabilities of the VS support heavier use of transactional applications than OIS/BASIC. Limited- to medium-sized parametric (or processor-oriented) applications, however, such as financial modeling, forecasting, regression, and problem-solving, are well-suited for OIS/BASIC. The availability of particular software packages for the two different systems is also an important consideration. For example, if the customer needs extensive general business accounting, a VS/IIS with a GBS/VS software package would be appropriate.

Customer Attitudes - The attitude of the customer is a very important factor to consider in making an IIS recommendation. In order to capitalize on the data processing capabilities of an OIS/BASIC system, the customer must be willing and able to commit the programming resources required to make use of BASIC on the system. Wang does not provide programming support on OIS/BASIC. The VS/IIS, on the other hand, because of its utilities and software packages, will allow customers with relatively limited programming capabilities to take advantage of many of the VS's data processing capabilities. Prior customer experience with word processing and data processing is also important. For the customer who is heavily data processing-oriented, the VS/IIS probably will have more appeal than an OIS/BASIC system.

Cost/Purchasing Process - The most important concern is to sell customers the right product for their information processing needs, but sometimes cost and purchasing process can be important factors. The price of a standard VS configuration is generally higher than that of an OIS/BASIC. If price is an important consideration for the customer, the differential cost of the two systems may be a significant factor in the decision. The customer's purchasing process can also be an important factor in recommending an appropriate IIS system. In many cases, purchases of computers involve a lengthier and more complex approval process than purchase of word processing systems.

Future Needs - A VS/IIS is an integrated system which has more potential for expansion and can grow much larger than an OIS/BASIC system. If it appears that the customer's future growth outlook is rapid and large, the VS/IIS is the preferred choice because of its ability to sustain substantial growth. It should be noted, however, that through WISE (Wang Inter-System Exchange) several OIS systems can be linked together to form larger functional units.

In summary, the choice of which Wang IIS (VS/IIS or OIS/BASIC) to recommend is a difficult one. It is a choice, however, which many of Wang's competitors would like to have. Among the considerations in this decision are the relative word processing and data processing needs of the customer, the types of applications for which the system will be used, customer attitudes, price and the customer's purchasing process, and future needs. The relative importance of each of these considerations will vary from situation to situation, but each is important in evaluating the appropriateness of a VS/IIS recommendation to a customer. Table 1 summarizes these considerations.

Table 1. IIS Recommendation: VS/IIS or OIS/BASIC

Considerations	VS/IIS	OIS/BASIC
Data Processing Needs	Handles heavy data processing use	More limited in data processing power
Word Processing Needs	Supports extensive word processing use	Supports extensive word processing use
Types of Applications	Heavy input/output-oriented (or transactional) applications more efficiently handled General business accounting software Office applications	Better suited to processor-oriented (parametric) applications Office application packages
Customer Attitudes	Utilities and software packages reduce need for programming support Data processing oriented	Commitment of programming resources for data processing capabilities Word processing oriented
Cost/Purchase	More involved purchase process	Lower price
Future Needs	Greater growth potential	WISE network of multiple OIS systems

Consider the following situations and determine if you would recommend the VS/IIS system to a prospective IIS customer.

Situation 1: A medium-sized furniture manufacturing company is looking for an automated solution to its information handling needs. The data processing manager has been evaluating the appropriateness of various computer systems in the hope of replacing the company's small business computer which has become overtaxed. Business is booming and the DP manager fears that soon the system will be incapable of handling the increasingly heavy stream of accounts payable/receivable for the company's expanding list of vendors and customers. At the same time, the company's incipient word processing department is looking to expand their capabilities beyond the pool of IBM Mag Card Typewriters which were purchased several years ago to handle general business correspondence. The volume of correspondence over the past several years has more than tripled. The department is having particular problems in generating and distributing to the field up-to-date and frequent pricing and product availability information.

Your Analysis (please write in): _____

_____

_____

Situation 2: A branch office of a large Fortune 1000 company in your city is in the market for expanded data processing and word processing capabilities. They have heard about Wang's integrated approach and are interested in acquiring a system which can become part of the corporation's distributed processing network. They are interested in a system which can handle various data processing applications including financial modeling and sales analyses for their market research group and some general business accounting functions for their purchasing department. Their word processing needs include general business correspondence and extensive financial report generation.

Your Analysis (please write in): _____

_____

_____

An IIS solution is an obvious choice for both Situations 1 and 2. Both companies have recognized the need for additional data processing and word processing capabilities. The furniture company's frequent pricing and product availability field updates could be very efficiently streamlined through an IIS since data on the system could easily be merged with correspondence sent to the field. An IIS would be a particular advantage to the Fortune 1000 branch in their need to utilize market and sales data in the generation of financial reports.

In Situation 1, a VS/IIS seems to be the appropriate choice. The company's primary data processing applications are accounts receivable/payable which are highly input/output-oriented. The enormous file handling and data management capabilities of the VS system can handle such applications very efficiently. In addition, the company is anticipating continued rapid growth. One VS/IIS system will be more able than an OIS/BASIC to keep up with this growth.

Situation 2 is not quite as clear-cut. This company's data processing application needs appear to be both input/output-oriented (general business accounting) and processor-oriented (financial modeling, sales analyses). The relative balance between the two is unclear. If the primary use will be for the market research group in their market and sales analyses, it is possible that the OIS/BASIC system could handle their needs. If, however, the system will be heavily used for general business accounting purposes, the VS/IIS might be a more appropriate consideration. Before a recommendation can be made, more information about the account's requirements must be acquired.

General Sales Approach

VS/IIS sales are more like computer sales than word processing sales. Unlike word processing sales, which are often made through specific user departments or through corporate word processing center managers, a VS/IIS sale is typically made through top management, often through the financial vice president or equivalent administrator, or through a steering committee acting on behalf of management. (See Figure 3.)

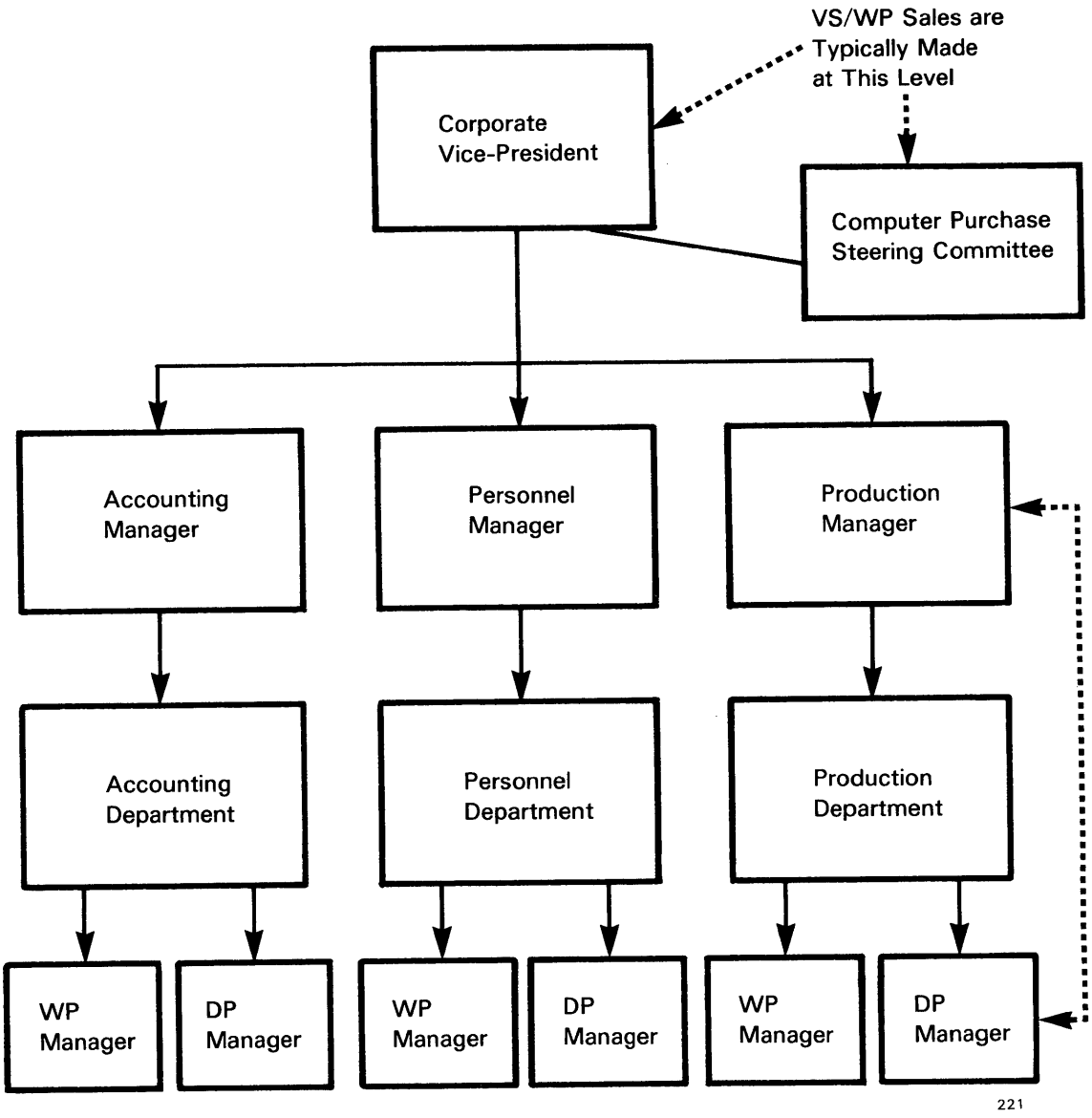


Figure 3. Top Management Sales Approach for VS/IIS

Though the primary decision-maker for a VS/IIS sale is usually top management, it is important that others in the organization be involved in the sales process. This involvement is particularly important when information is gathered on the company's information processing needs. Table 2 is a general guide to the types of questions which might be asked of individuals at various organizational functions and levels. The answers to these questions not only provide important insight into which IIS system to recommend, but they also provide useful information for determining which system features and advantages are most important to stress.

Table 2. Question Areas for Various Organizational Levels

Question Area	Top Management	Data Processing Management	Word Processing Management
Redundancy in information storage	X		
Merging of data processing and word processing functions	X		
Duplication of effort	X	X	X
Work flow surveys, measures of clerical activity	X	X	X
Use of computer reports			X
Use of word processing		X	
Additional information needs	X	X	X
Timeliness, quality, and usefulness of received information	X		
Reformatting of received information		X	X
Use of own equipment		X	X
File or list maintenance in different ways		X	X
Frequency of information access	X		
Work priorities	X	X	X

The most important message to deliver to management in a VS/IIS sale is that the ultimate goal and consequence of a VS/IIS system is increased productivity. The specific advantages of the system can be geared to the particular concerns and needs of the organization, but the overall advantage and the bottom line for management is productivity. Wang has always had a great sensitivity to the goal of efficient, effective, and accurate handling of office information. The VS/IIS will help make that goal a reality in today's offices.

Sales/Support Resources

Wang provides excellent support and service for its VS/IIS customers. A variety of sales/support resources is available both through the home office and locally. These resources were described in detail in the module on OIS/BASIC. That discussion will not be repeated in this treatment of VS/IIS, but these resources are crucial to Wang's total solution of hardware and software services. Service to the customer has always been of paramount importance to Wang. A summary of both home office and local service resources follows.

ISS MARKETING GROUP
- Provides sales tools
- Assists at customer seminars
- Makes presentations to upper-level management and major accounts

FIELD MARKETING SUPPORT GROUP
- Administers/implements home office programs in the field
- Supports seminars/demonstrations
- Assist in major account penetration

TECHNICAL INFORMATION CENTER
- Answers telephone and telex inquiries of technical nature
- Compiles technical data; provides demonstrations and benchmarks

SYSTEM SUPPORT CENTER
- Answers in-depth, time-consuming technical inquiries.
- Serves as "second line" for technical inquiries.

DISTRICT/BRANCH MANAGER
- Provides direct sales support
- Gives advice on other support personnel

DISTRICT ANALYST
- Assists in pre-sales presentations/ demonstrations
- Serves as customer contact point for detailed technical information
- Evaluates validity of VS/IIS requirement
- Serves as liaison between prospective customers and software vendor

MARKETING SUPPORT REPTESENTATIVE
- Assists in pre-sales presentationsand system evaluation
- Serves as ongoing liaison with customer installation in procedures and applications

CUSTOMER ENGINEER
- Assists in pre-sales presentations
- Provides pre-installation site preparation support
- Provides system installation support
- Provides post-installation service support

AREA/DISTRICT COMMONICATION SPECIALIST
- Provides pre- and post-salessupport for telecommunications

SOFTWARE VENDORS
- Provide turnkey applications
- Write custom-designed programs
- Serve as consultants to customers developing own software

CUSTOMERS
- Provide information through internal organizational surveys
- Serve as references

The following list of documents containing VS/IIS Product Information can be obtained either through Wang's General Services or your branch library.

Manuals

VS Executive Introduction	800-1105EI
Data Communication User's Guide	800-1302DC
VS System Operation Guide	800-110250
VS Utilities Reference Manual	800-1303UT
VS Principles of Operation	800-1100PC
VS Configuration Guide	800-2100
VS/WP Operator's Guide	800-1109-WO-01
Programmer's Guide to WP on the VS	800-1304-PW-01

Data Sheets

Processors	800-2105
Peripherals	800-2102
2246 Serial Workstation	800-2104
VS/IIS Integrated Information System	800-2103
System Software	800-2101
Data Communication	800-2107
Mailway Electronic Mail	800-2108

Sales Aids

Introducing WP on the VS	800-14071W
Integrated Information Systems	700-5426
Telecommunications	700-5424
Flipcharts	700-4605

SUMMARY

IIS exists to fill an unmistakable void in the information processing marketplace: integrated capabilities. The VS/IIS is one of Wang's major entries in the IIS series. It is based on the powerful state-of-the-art technologies of the VS computer system and Wang's word processing software. Targeted primarily for the medium- to large-size business and organization, it is intended to support both heavy data processing and word processing needs.

The VS/IIS is not necessarily the appropriate choice for all prospective IIS customers. Several factors including relative data and word processing requirements, types of desired applications, customer attitudes, cost and customer purchasing processes, and future needs, must considered in making an appropriate IIS recommendation (VS/IIS or OIS/BASIC).

VS/IIS sales are usually made at the top management level, either through the financial vice president (or equivalent administrator) or through an executive steering committee. The most important message to deliver to top management about the VS/IIS system is that it increases the organization's overall productivity.

In support of both pre- and post-sale accounts, Wang offers a wide range of home office and local resources. Home office resources include the IIS Marketing Group, the Field Marketing Support Group, the Technical Information Center, the System Support Center and a range of product documentation. Local resources include the Branch Manager, the District Analyst, the Marketing Support Representative, the Customer Engineer, the Area or District Communication Specialist, software vendors and satisfied customers who can be a very effective sales tool when used as references.

REVIEW QUESTIONS

The following questions are based on the material presented in the module thus far. Use them to check your understanding of the material. If you have difficulty answering the questions you should review the material before proceeding further in the module.

1. Which of the following statements are TRUE of the VS/IIS?

   a. Both word processing and data processing functions can be initiated from the same workstation.
   b. A VS with word processing capabilities can support four programming languages.
   c. There are a total of twelve VS and VS-100 models available.
   d. Data processing information can be automatically incorporated into word processing files, but word processing information cannot be incorporated into data processing files.

2. The VS/IIS is primarily targeted for customers who have

   a. heavy data processing and light word processing needs.
   b. heavy data processing and heavy word processing needs.
   c. light data processing and heavy word processing needs.
   d. light data processing and light word processing needs.

3. Which of the following types of application are more suited for the VS/IIS than OIS/BASIC?

   a. transactional applications
   b. parametric applications
   c. office management productivity applications
   d. processor-oriented applications

4. Which of the following is NOT TRUE of the VS/IIS?

   a. It requires that at least one workstation on the system be totally devoted to data processing functions.
   b. It is more difficult to supervise than OIS/BASIC.
   c. Multiple VS/IIS systems can be linked together through WISE.
   d. It will likely require a lengthier purchasing process than an OIS/BASIC.

5. Which of the following would be the best prospect for a VS/IIS sale?

   a. a small training development firm requiring extensive word processing capabilities
   b. a branch office of a large national corporation interested in more extensive general business data processing applications as well as automated word processing capabilities
   c. a market research firm interested in financial modeling and sales trend analysis data processing applications, as well as word processing capabilites for frequent market trend report generation
   d. an IBM branch sales office

6. VS/IIS sales are usually made through

   a. data processing managers.
   b. word processing managers.
   c. user department managers.
   d. top corporate management.

7. Match the following home office resources with the appropriate description of roles.

System Support Center	a. responds to telephone and telex inquiries about technical matters.
Field Marketing Support Group	b. deals with in-depth, time consuming inquiries.
Technical Information Center	c. provides seminars to major accounts on office automation.
IIS Marketing Group	d. is responsible for interface between home office and field sales force.

8. Match the following local resources with the appropriate description of roles.

District Analyst	a. provides ongoing liaison with customers in support of new word processing procedures and applications.
Software Vendor	b. serves primary customer contact for detailed technical information.
Customer Engineer	c. is responsible for telecommunications support.
Area/District Communications Specialist	d. provides pre- and post-installation service and support.
Marketing Support Representative	e. writes custom-designed programs for customers.

ANSWERS

1. a and c are correct.

2. b is correct.

3. a is the correct answer. Transactional applications, which are heavily input/output-oriented, are particularly well suited for the VS/IIS.

4. c is the correct answer. WISE (Wang Inter-System Exchange) links together OIS systems into larger functional units.

5. b is the best choice. Although you might have been tempted to choose d, certain conditions would be likely to mitigate the possibility of consumating the sale.

6. d is correct.

7.
System Support Center	- b
Field Marketing Support Group	- d
Technical Information Center	- a
IIS Marketing Group	- c

8.
District Analyst	- b
Software Vendor	- e
Customer Engineer	- d
Area/District Communication Specialist	- c
Marketing Support Representative	- a

VS/IIS HARDWARE

The cornerstone of the VS/IIS integrated information system is the advanced technology of the VS computer. The VS, as you know, is an extremely powerful and versatile system which can support up to 128 workstations; 5.4 billion bytes of on-line storage; and a complete network of input, output, and storage devices. The VS also incorporates many of the latest technological advancements, including virtual memory, multi-language support and intelligent input/output processors.

Virtual memory is significant because the size of main memory is no longer a constraint on the type of programs and applications that can be run. If more memory is needed, the VS memory management system can utilize disk storage as an extension of main memory. For all practical purposes, main memory has a "virtually" unlimited capacity. The VS computers are also unique because they support seven different programming languages. These seven languages allow the user to pick the language best suited to the problem or the one s/he is most comfortable with. The advantage of the intelligent and independent input/output processors in the VS product line are discussed later in this section.

There are no special additions to VS hardware other than the 2246C workstation to accommodate the VS/IIS system. This is an important consideration for customers because some expect a few mysterious black boxes (at several thousand dollars each) to supply the extra word processing capability. There are, however, some rules on the use of existing VS hardware that must be followed for VS/IIS operation. Two of these rules are that no parallel peripheral devices can be used and that at least one Wang combined workstation must be employed. Other rules are presented as specific VS/IIS hardware is discussed.

This section of the module describes the hardware of the VS/IIS system. It is intended to serve two functions. First, it briefly reviews information relating to the characteristics and capabilities of VS system hardware components. This information can be used as a summary reference source. In addition, it provides a more detailed treatment of the combined workstation and other hardware requirements for VS/IIS operation.

The VS and VS-100 Systems

As previously mentioned, the VS family actually consists of two major computer systems: the VS and the VS-100. The VS system is available in four models, each differing in size of main memory, storage capacities, and in the number of input and output devices which can be supported. The VS-100 is available in eight models. Upgrading from a smaller to a larger model in both the VS and VS-100 product line is easily accomplished. Overall, the VS-100 is a larger and more powerful system than the VS and it differs somewhat in terms of internal system architecture. Functionally, however, the two systems provide similar capabilities. Both share the same instruction set and can run the same operation system and utilities. Both the VS and VS-100 support the addition of word processing software and can, therefore, be part of the VS/IIS integrated information system.

Recently, a third VS system has been introduced: the VS-50. The VS-50 is a low end VS system that is best suited for a limited number of users (usually six or less), and it can also support the addition of word processing software. The VS-50 has redesigned cabinetry and it includes an internally-housed Winchester 28MB disk drive. Since the main characteristics of the VS-50 are similar to those of the VS (minimum and maximum memory, number of workstations, and maximum on-line storage), we will mainly discuss the differences and similarities between the VS and VS-100 systems. It should be understood that whenever the VS is referenced, that discussion also pertains to the VS-50.

Table 3 compares the VS and VS-100 systems in terms of memory size, number of input/output processors (IOPs), workstations supported, and the maximum amount of on-line storage available. A very important characteristic is the amount of memory on a system. In order to run word processing on the VS, 256K of memory is needed. WP, therefore cannot be run on the minimum VS and VS-50 system.

Table 3. Comparison of VS and VS-100 Characteristics

Characteristic	VS	VS-100
Minimum Memory	128K	256K
Maximum Memory	512K	2048K
Maximum Number of I/O Processors	8	16
Maximum Number of Workstations	32	128
Maximum Billion Bytes of On-line Storage	2.3	5.4
Diskette Drive in CPU Cabinet?	Yes	No

The central processing unit is the core or "brain" of the VS and VS-100 systems (Figure 4). All other components of the system serve primarily to transmit information to and from the CPU. It is in the CPU that data processing programs are executed, the calculations performed, and the decisions made. These functions are accomplished through the main memory of the CPU.

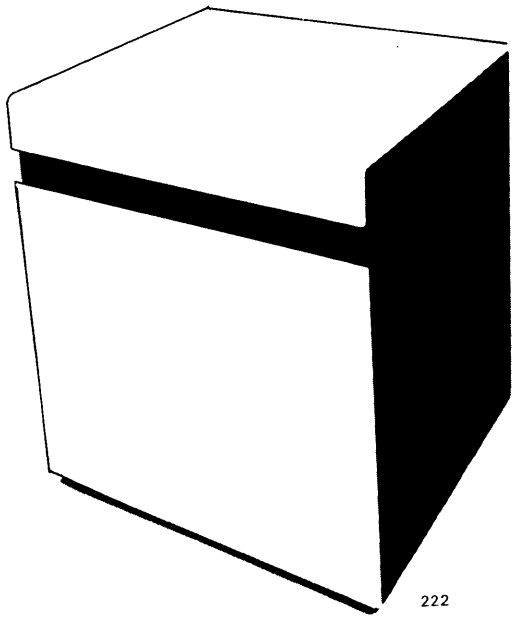


Figure 4. VS-100 CPU

As was previously illustrated, the VS-100 is larger than the VS, and it is also faster. There are two primary reasons for this increased speed: cache memory and large data paths. Cache memory is a high speed memory with a capacity of 32K that stores the most frequently used information. The computer identifies the information most repeatedly used and stores it in cache. Since retrieval from cache is considerably faster than from main memory, processing speed is enhanced. Large data paths also increase speed. In the VS, 16 bits of data are transferred in one operation while either 32 or 64 are transferred in VS-100 systems. The combination of cache memory, large data paths, and other factors (e.g., system bus architecture) accounts for the fact that the VS-100 offers processing speeds up to eight times faster than the VS.

Both the VS and the VS-100 offer the customer a range of main memory capacities. The memory capacities of each of the models of the VS and VS-100 systems are presented in Table 4.

Table 4. Main Memory Capacities of VS and VS-100 CPUs

VS Model	Memory Capacity	VS-100 Model	Memory Capacity
VS-4B	128K	VS-8F	256K
VS-8B	256K	-16F	512K
VS-12B	384K	-24F	768K
VS-16B	512K	-32F	1004K
		-40F	1280K
		-48F	1536K
		-52F	1792K
		-64F	2048K

Workstations

VS workstations are interactive and user-oriented. Users enter information on a typewriter-like keyboard and receive output on the CRT situated above the keyboard (Figure 5). The operating software automatically causes menus, messages, and prompts to appear on the CRT to help users communicate with the system.

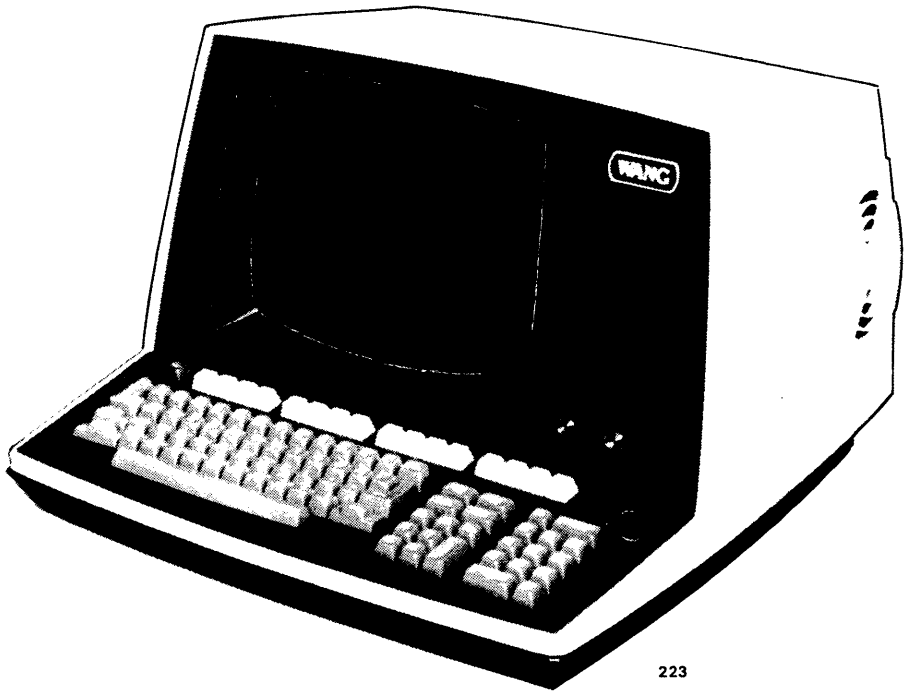


Figure 5. A VS Workstation

There are five different workstations which can be used with a VS computer. They include:

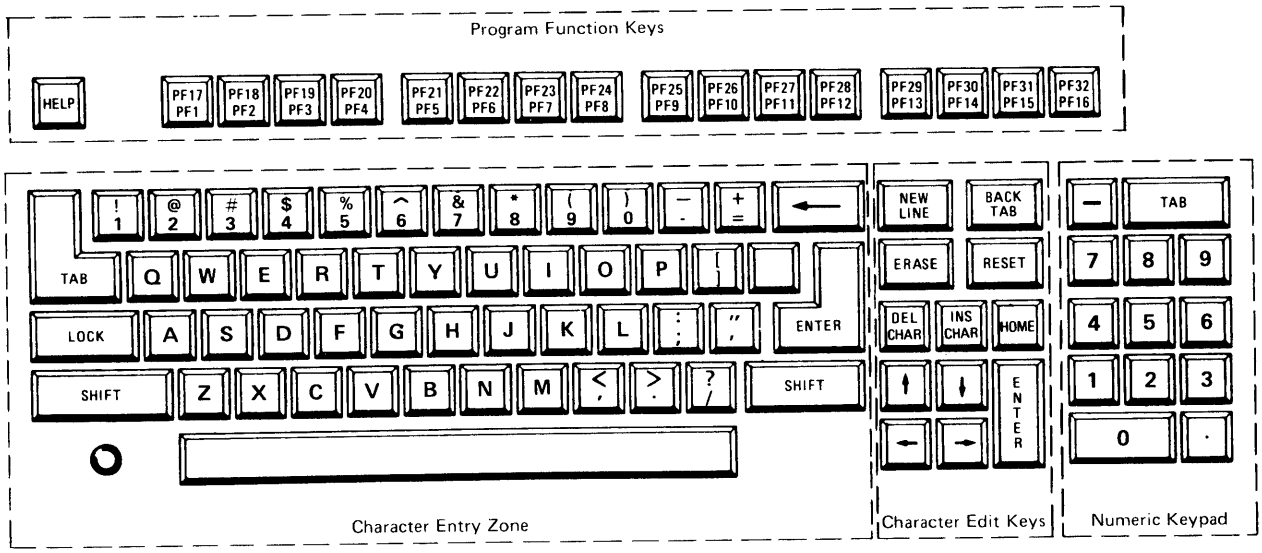
- The 2246P Parallel Workstation which can be located up to 500 feet from the CPU.
- The 2246S Serial Workstation which can be located up to 2000 feet from the CPU.
- The 2246R Remote Workstation which has a built-in communications link that enables it to operate over telephone lines.
- The 2246C Combined Workstation which is used in a VS/IIS system for both data processing and word processing functions.
- The 2266S/2266C Archiving Workstation which allows the operator to archive data onto a diskette.

Table 5. VS Workstation Summary

Workstation	VS Supported	VS-100 Supported?	Maximum Distance From CPU	Special Capabilities
2246P	Yes	No	500'	Parallel transmission; 2K random access memory
2246S	Yes	Yes	2000'	Serial transmission; 16K random access memory
2246R	Yes	Yes	Unlimited	Remote operations; connects to parallel printer; 16K random access memory
2246C	Yes	Yes	2000'	Word processing and data processing; cannot be used for remote operation; 32K random access memory
2266S/2266C	Yes	Yes	2000'	Enables data to be archived onto a diskette.

There are no major differences in look or in manner of use among the 2246P, 2246S, 2266S/2266C, and 2246R workstations. The differences are primarily internal and relate to the way in which the workstation transmits information to and from the CPU. Serial transmission is more efficient than parallel, which accounts for the fact that a serial workstation can be placed at a greater distance from a CPU than a parallel workstation. Only serial workstations can be supported on the VS-100 system.

The keyboards of the 2246P, 2246S, 2266S/2266C, and 2246R are identical (Figure 6). Four zones of keys can be identified:



- *The Character Entry Zone*—Resembles a typewriter keyboard.
- *The Character Edit Keys*—Allows the user to edit the contents of the display.
- *The Numeric Keypad*—Provides a convenient means of entering data and resembles the keypad of a desktop calculator.
- *The 16 Program Function Keys*—Can be used ih upper and lower case to provide access to 32 system or user-defined functions.

Figure 6. Keyboard of the 2246P, 2246S, 2266S/2266C, and 2246R

The 2246C Combined Workstation keyboard (Figure 7) is more similar in appearance to the keyboard of an OIS workstation than to the standard VS workstation keyboard. There are, however, several important differences between the OIS keyboard and the combined workstation keyboard.

- The VS HELP and HOME keys are included in the 2246C keyboard but not in an OIS keyboard. The HELP key interrupts data processing and returns the operator to the VS System Menu without the loss of any information. The HOME key moves the cursor to the first position that can be changed on the data processing screen. Both of these keys are disabled when the workstation is operating in word processing mode.

- The numeric keypad at the right of the keyboard is a standard feature of the combined workstation. The numeric keypad is an optional component of an OIS workstation.

- The 16 special function keys at the top of keyboard are assigned dual-function capabilities on the combined workstation to allow the operation of VS program function keys when the workstation is operating in data processing mode. A convenient plastic strip fits directly beneath these keys to indicate their program function numbers when the workstation is used for data processing.

- Eight dual function keys perform different functions depending upon whether the system is operating in data processing or word processing mode. The functions of these keys are summarized in Table 6.

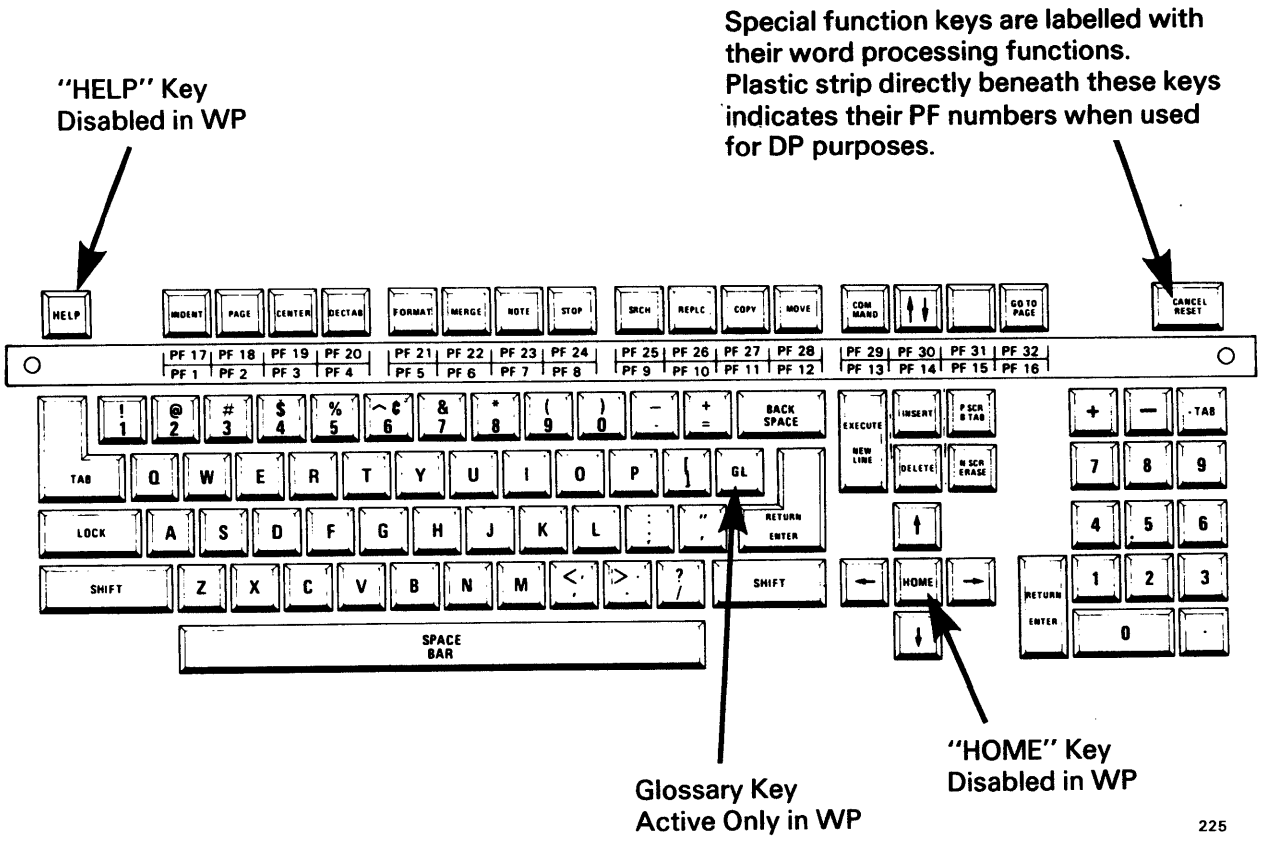
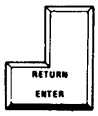


Figure 7. Keyboard of the 2246C Combined Workstation

Table 6. Eight Dual Function Keys of Combined Workstations

Key	System Mode: Word Processing	System Mode: Data Processing
RETURN/ENTER 	RETURN causes cursor to move to beginning of new line.	ENTER causes information on the screen to be entered into memory.
EXECUTE/NEW LINE 	EXECUTE initiates operation of a command to the system.	NEW LINE advances cursor to the next tab stop.
PREVIOUS SCREEN/ BACK TAB 	PREVIOUS SCREEN causes the 21 lines of text immediately preceding to be displayed on the screen.	BACK TAB moves cursor backward until the first tab stop is found.
NEXT SCREEN/ ERASE 	NEXT SCREEN causes the next screen of 21 lines to be displayed.	ERASE erases all characters which follow.
CANCEL/RESET 	CANCEL causes a command to be ignored.	RESET replaces all blinking characters with high-intensity characters.
	Operates as the character key for the "cents" symbol (¢).	The symbol 
	Operates as the character key for a comma (,).	"Less Than" 
	Operates as the character key for a period (.).	"Greater Than" 

Storage Peripherals

Any disk storage devices supported on the VS are appropriate for a VS/IIS system. All disk devices available allow storage of both data processing and word processing files. In addition, the VS/IIS makes tape available for the first time as a storage medium for word processing documents. Tape is attractive for economical storage of documents which have infrequent, yet

necessary use. Diskette storage of word processing and data processing files can also be accomplished on VS models through the use of the diskette drive which is attached to all VS CPUs. (The diskette device is not available physically on VS-100 models.) The method of using diskette storage for word processing documents, however, differs from that used on WPS and OIS systems. The difference will be discussed in a subsequent section of this module which deals with the software of the system.

Disk Devices - Disks are the most popular and important storage medium for VS computers. Disks provide large, on-line storage at a reasonable cost. Compared to tape, disks are significantly faster because disks can access information randomly as opposed to sequentially on tape. The two disk drive units that form the basis of the VS storage capability are the following:

- Phoenix (Model 2280V) Fixed/Removable Disk Drives - The VS and VS-100 support three models of F/R drives: 30, 60, and 90 megabyte systems. Each model has 15MB of removable storage, and the remaining amount is fixed. One removable disk can be exchanged for another and the ones not being used can be stored off-line. This is probably the drive to be recommended to a customer who can purchase only one disk drive.

Figure 8. Phoenix F/R Disk Drive

- Model 2265V Removable Disk Drives - These are high capacity disks that have a very low cost per byte of storage. They are available in two models, with 75MB and 288MB storage capacity respectively. Since the disks are fully removable, off-line storage is virtually unlimited. These models would probably be recommended for customers who require a large capacity of on-line storage or low cost storage for future expansion.

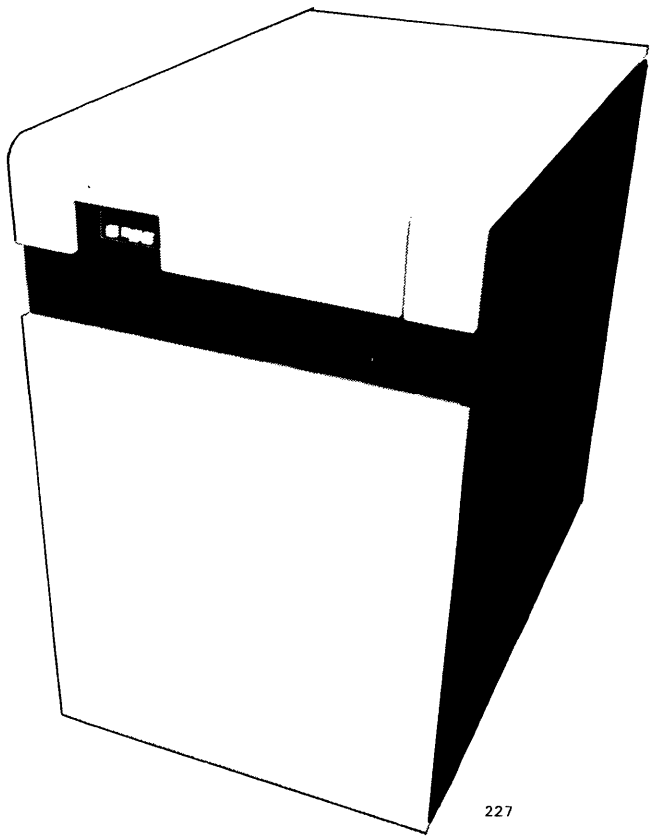


Figure 9. Model 2265 Removable Disk Drive

These are two types of hard disk systems supported by the VS. The VS can support up to eight disk drives and the VS-100 up to 16 drives. In total, the VS and the VS-100 can provide up to 2.3 and 5.4 billion bytes of on-line storage, respectively. A summary of their storage capacities and model numbers are provided in Table 7.

Table 7. Capacity of VS Hard Disk Drives

Disk Drive Model	Fixed Capacity	Removable Capacity	Total Capacity
2280V-1	15MB	15MB	30MB
2280V-2	45MB	15MB	60MB
2280V-3	75MB	15MB	90MB
2265V-1	—	75MB	75MB
2265V-2	—	288MB	288MB

Tape Drives - Tape is an easy-to-use, economical off-line storage medium. Because of standard, industry-wide conventions, tape formats are the same regardless of the manufacturer of the system. Tape has relatively slow access time because it must sequentially access information.

The VS supports three tape drives. One seven-track and two nine-track tape drives are available. The seven-track drive is for those customers who need to maintain compatibility with equipment that has previously supported seven-track tape.

New customers should purchase the nine-track tape because of its capability to represent more characters. Table 8 summarizes the key features of the three VS tape drives.

Table 8. VS Tape Drives

Model	Density	Track
2209V-1	1600bpi	9
2209V-2	800 & 1600bpi	9
2209V-3	800bpi	7

Printers

A variety of printers is available for the VS product line. Currently, the VS/IIS system supports the use of all serial printers. Parallel printers cannot be used for word processing ing in VS/IIS systems. When the VS system is installed, printers can be designated to print data processing files exclusively or to handle both word processing and data processing printing. VS/IIS printers must, of course, be configured to handle both word and data processing printing. Any VS/IIS printing device must have both uppercase and lowercase character sets. Printers can be modified in the field if they do not have both character sets. The VS/IIS currently supports seven printer models of four types: daisy wheel, matrix, band and chain.

Daisy Wheel Printer - Daisy wheel printers produce letter quality print using a rotating character wheel similar to that on some electric typewriters. While the head of a daisy wheel printer can rotate many times faster than that of an electric typewriter, it is relatively slow (40 characters per second) compared to most computer printers. In addition, a daisy wheel printer does not have the durability of some of the other printers and should only be used a few hours a day. The daisy wheel printer is available in two models:

- 6581W serial printer with 132 characters per line (10-pitch) and 158 characters per line (12-pitch).
- 6581WC wide carriage serial printer with 180 characters per line (10-pitch) and 216 characters per line (12-pitch).

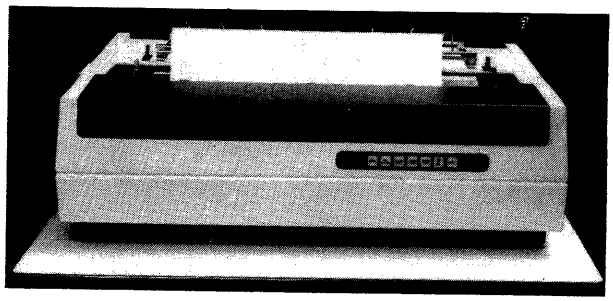


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Figure 10. Daisy Printer and Sample of Type Face

Matrix Character Printers - Matrix character printers produce characters which consist of a series of dots in the appropriate letter patterns. These printers are faster than daisy wheels. The matrix printer is the most economical printer in the VS product line. Though it is available in both parallel and serial versions, only the serial models are supported on the VS/IIS. These are:

- 5521 serial printer which operates at 200 characters per second.
- 5531-2 serial printer which operates at 120 characters per second.

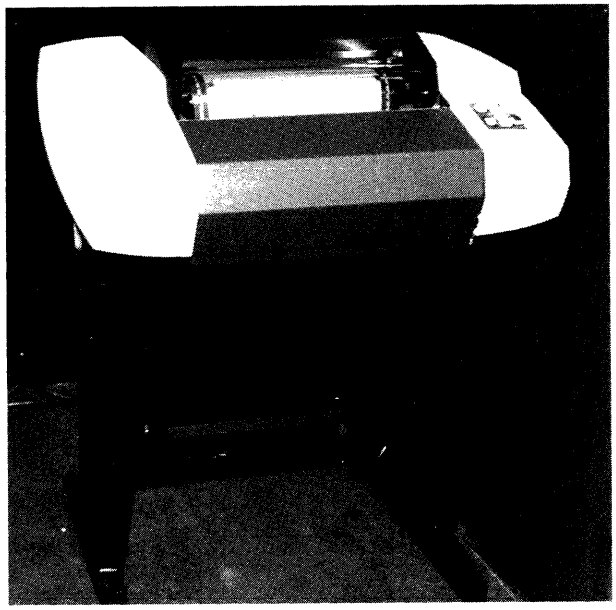

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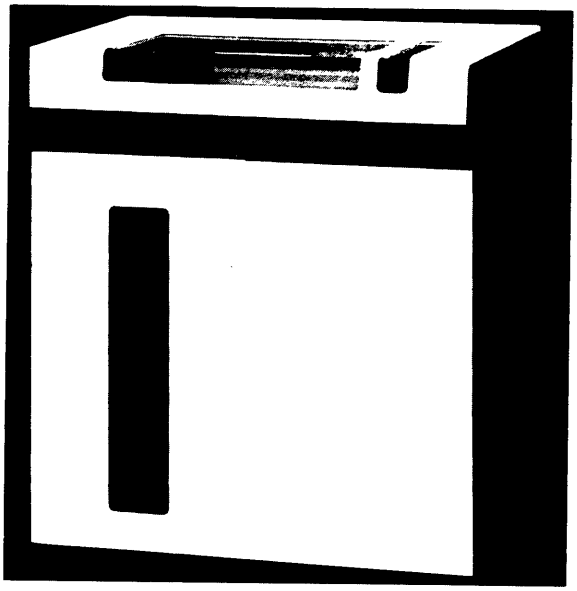
Figure 11. Matrix Printer and Sample of Type Face

Chain Printers - Chain printers are the serial printers of choice for those customers who have extensive printing needs. The print quality is quite good and, more importantly, a chain printer has exceptional durability and speed. In fact, a chain printer can run all day with almost no degradation in performance or risk of breakdown. Although two models are available, only the model which supports both uppercase and lowercase character sets can be used with a VS/IIS system: 5571 serial printer which operates at 430 lines per minute.



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;<=>?@ABCDEFGHIJKLMNOPQR

STUVWXYZ[\]^_!"

Figure 12. Chain Printer and Sample of Type Face

Band Printers - Band printers are similar to chain printers except that they have interchangeable type faces. They are slightly less durable than chain printers, but cost 30-50% less. Two of the three models available are supported by a VS/IIS system:

- 5573 serial printer which operates at 250 lines per minute.
- 5574 serial printer which operates at 600 lines per minute.

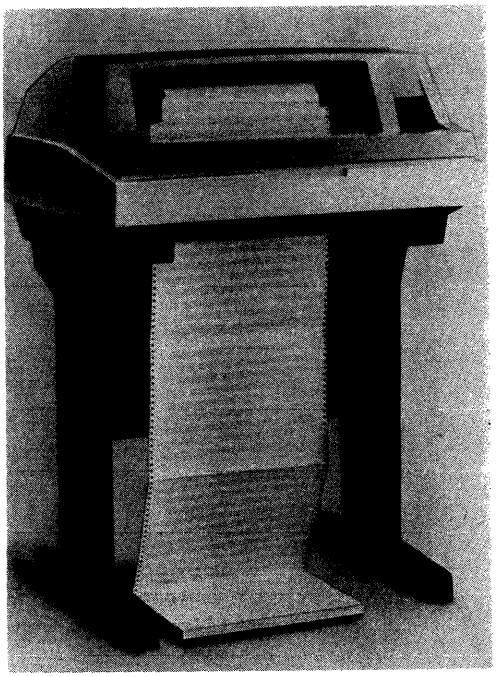

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Figure 13. Band Printer and Sample of Type Face

These are the types of printers supported by a VS/IIS system. It should be noted that the VS/IIS does not currently support the dual-head printer or the intelligent image printer, nor does it support the magnetic card reader or photocomposition peripherals since none of these devices is currently supported by the VS. The twin-sheet feeder is, however, supported on the VS/IIS, but it should be employed only when a printer is printing word processing documents. It must be removed when that same printer is used for printing data processing files.

Table 9 summarizes the specific printer models available with the VS/IIS and compares them in terms of print quality, speed, and selling features.

Table 9. VS/IIS Printer Summary

Type	Model	Print Quality	Speed*	Durability (Lines/Day)	Selling Cost	Features
Daisy Wheel	6581 W	High	40 cps	6,000	Low	Letter quality print
	6581 WC	High	40 cps	6,000	Low	Letter quality print; wide carriage
Matrix	5531-2	Medium	120 cps	6,000 - 20,500	Lowest	Inexpensive
	5521	Medium	200 cps	6,000 -	Lowest	Inexpensive
Chain	5571	Medium	430 lpm	211,000 - 312,000	High	Heavy production durability
Band	5573	Medium	250 lpm	72,000 - 165,000	Medium	Interchangeable typeface
	5574	Medium	600 lpm	72,000 - 165,000	Medium	Interchangeable typeface

*Due to current software restrictions, high-speed printers will not reach their current rated speed when printing word processing documents.

Input/Output Processors

Input/output processors (IOPs) monitor the flow of information to the CPU from one or more input/output or storage devices. When an input/output operation is needed, the IOP transfers data directly from main memory to the peripheral and vice-versa. The IOP directs data to and from the right location in main memory and performs error checking on I/O devices. I/O processors, then, relieve the CPU of the need to regulate incoming information, and the CPU is freed to do the calculations and comparisons for which it was designed. The IOPs also permit the central processor to work concurrently with I/O device operations, thus enhancing the overall performance of the system. Figure 14 is a functional diagram of IOPs and their role in a VS configuration.

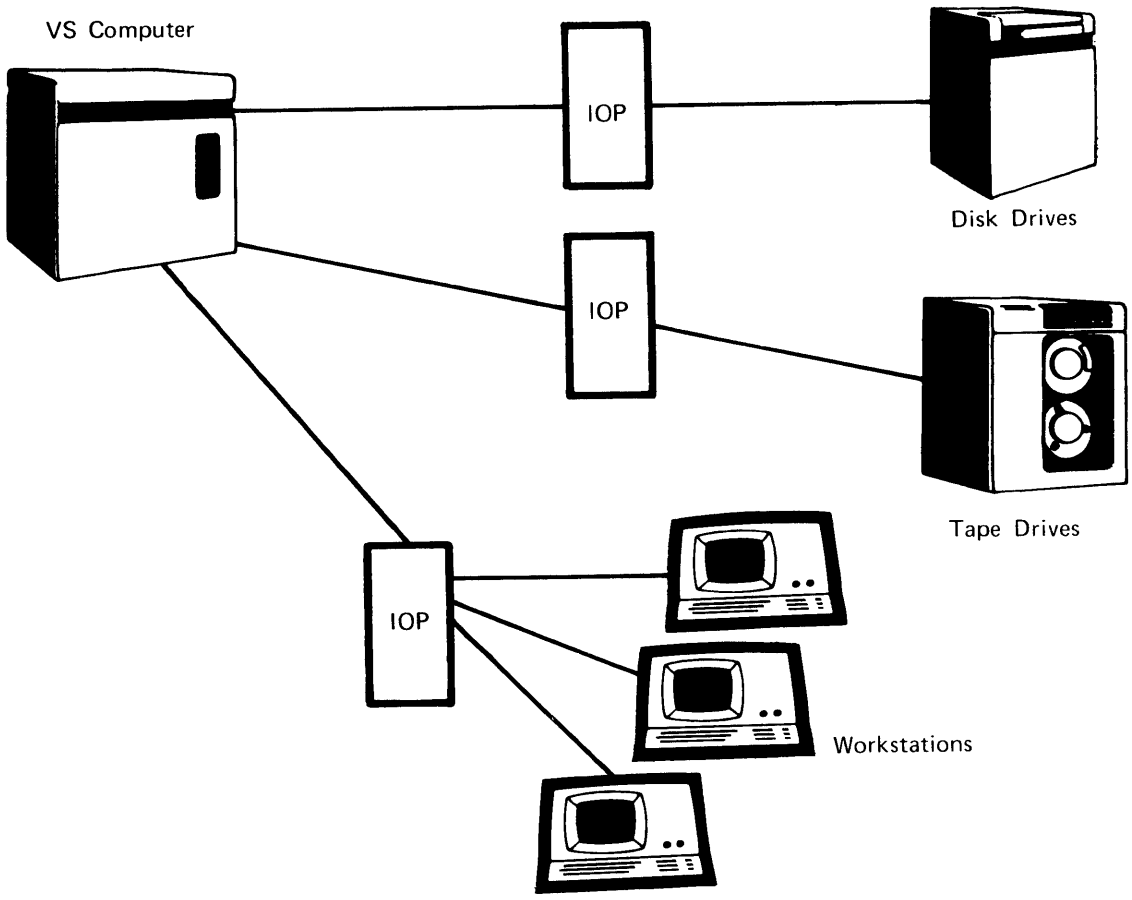

Figure 14. Diagram of VS Systems with IOPs

An important feature of VS input/output processors is that they have their own microprocessors or built-in intelligence. Most computer systems have I/O processors, but few have independent, intelligent IOPs that are specifically designed for each peripheral device. It should be noted that in a VS/IIS configuration, the IOP(s) which control the combined workstations and printers used in conjunction with these workstations must be serial. Two workstation/printer IOP models are available:

- Model 22V07-1 supports up to eight workstations and printers in any combination.
- Model 22V07-2 supports up to 16 workstations and printers in any combination.

SUMMARY

The VS/IIS system is based upon the advanced technology of the VS computer. The VS line of computers actually consists of two major systems: the VS and the VS-100. The VS-100 is a larger and more powerful system than the VS, but functionally the system provides similar capabilities. Both can support the addition of word processing software.

Five workstation models are available. To access the word processing capabilities of the VS/IIS, the 2246C Combined Workstation must be used. The keyboard of the 2246C is similar in appearance to the OIS workstation keyboard with several notable exceptions: The HOME and HELP keys, the numeric keypad (which is optional on an OIS system), the dual functionality of the 16 VS program function keys, and eight additional dual function keys.

The VS/IIS requires the use of serial printers which have both uppercase and lowercase character sets. Seven printer models are available. These include daisy wheel printers, matrix character printers, chain printers, and band printers. The VS/IIS does not currently support the use of the dual head or intelligent image printers, nor does it support the mag card reader or photocomposition peripherals. The twin-sheet feeder can, however, be used on the system when the system is operating in the word processing mode.

The VS/IIS supports the use of both disk and tape drives. (The VS models also include a diskette drive.) Three fixed/removable disk drives are available with capacities of 30, 60, and 90 MB respectively. Two fully removable disk drives are available with total storage capacities of 75 and 288 MB respectively. Two nine-track and one seven-track tape device models can be used with the system.

IOPs monitor the flow of information to the CPU from one or more input/output devices. An important feature of VS IOPs is that they have their own microprocessors built in. Most computer systems have I/O processors, but few have independent IOPs which are specifically designed for each peripheral device.

REVIEW QUESTIONS

The following questions are based on the material presented on the hardware of a VS/IIS system. They are intended to check your understanding of this material. If you have difficulty answering these questions you should go back and review the material before proceeding further in the module.

1. Which of the following is not a state-of-the-art advancement with the VS?

   a. virtual memory
   b. matrix printers
   c. multilanguage support
   d. intelligent I/O processors

2. Which VS computer has the largest storage and I/O capacity?

   a. VS
   b. VS-50
   c. VS-100
   d. Maxi VS

3. Which VS workstation must be used for VS/IIS applications?

   a. 2246C
   b. 2246S
   c. 2246R
   d. 2246P

4. What are the two main reasons why the VS-100 is faster than the VS?

   a. larger storage and virtual memory
   b. cache memory and virtual memory
   c. cache memory and larger data paths
   d. larger data paths and virtual memory

5. Which disk drive model offers the largest amount of storage?

   a. 2265-2
   b. 2280-2
   c. 2280-3
   d. 2265-1

6. Which of the following is the slowest type of printer?

   a. matrix
   b. band
   c. chain
   d. daisy wheel

ANSWERS

1. b is the correct answer.
2. c is correct.
3. a is the correct answer.
4. c is correct.
5. a is the correct answer.
6. d is correct.

VS/IIS SOFTWARE

The preceding section of this module presented a summary of VS/IIS hardware components and discussed important distinctions between VS/IIS hardware and the hardware of a VS. The primary distinction is the use of a combined workstation on the VS/IIS. This workstation allows the user to initiate all system functions from the same terminal. The hardware, however, is only part of the story of the VS/IIS. Wang's software allows the integrated capabilities of the system to operate. All of the extensive VS operating system capabilities and features are supported on the VS/IIS as are all VS telecommunication options. The VS/IIS also provides almost the identical word processing capabilities of the OIS system. What makes the VS/IIS a truly integrated system, however, is its capability to translate information from one mode to another. That is, word processing information can be transformed into data processing information and vice versa.

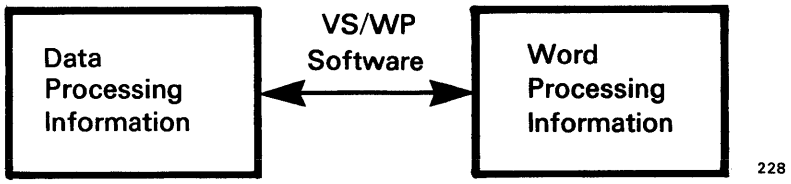

Figure 15. Integrative Capabilities of VS/IIS Software

This section of the module describes the capabilities and features of the software of the VS/IIS. It assumes a relatively complete understanding of VS software. Because the topic of VS software is complex and requires an in-depth treatment, the primary emphasis in this module is on the word processing software on the VS/IIS system. However, the discussion deals with VS system software where it is appropriate for a clear understanding of the integrated capabilities of the system.

Program WP

The software package which, in conjunction with the Combined workstation, enables a VS to support word processing functions, is technically referred to as Program WP.[2] In short, when a user runs Program WP, microcode (machine language which is capable of execution on a microprocessor) is loaded into the memory of the combined workstation. As on the OIS, word processing operations on the VS/IIS are handled directly in the workstation rather than in a CPU.

Program WP also acts as an OIS master emulator, handling word processing transactions (e.g., document storage and retrieval) by interfacing with the VS supervisory and data management system. Using special IOP microcode and the VS operating system, this emulator translates word processing requests into instructions understandable by the VS system. Thus, the microcode and OIS master emulator give the VS/IIS the appearance and the capability of an OIS Processing System (Figure 16).

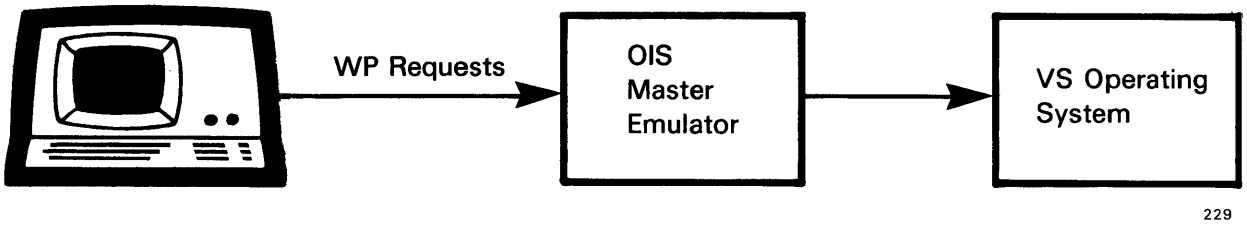

Figure 16. OIS Master Emulator Interfaces Workstation Microcode with VS Operating System

[2]It should be noted that the Initial Support Release of VS/IIS must be run on a VS with Wang VS Operating System Release 4.01.08 or later. Users of the Preliminary Support Release of VS/IIS must update their Operating System to Release 4.01.08 or later and then follow a specified procedure for conversion to the Initial Support Release.

The subject of how the VS/IIS system handles printing is a bit more involved since the VS and OIS systems handle print requests in different ways. You may recall that in an OIS system, because of its distributed intelligence, print requests are sent directly to the printer where they are automatically queued. In the VS system, print requests are handled by the operating system.

When the VS/IIS is configured, any printer that is to be designated as dual purpose (used for both DP data files and WP document files) must be declared USE=WP. At the time the system is Initial Program Loaded (IPL'd) dedicated WP task is given to each WP printer. When a WP print request is initiated, the request goes to the WP task for that printer. This takes that printer from the DP PRTTSK print task and loads the WP printer microcode into the printer. A dedicated task WP serves as an interface between a word processing print request and the VS print facility--PRTTSK. Queued word processing document files will always be printed before data processing data files on a dual-purpose VS/IIS printer. After all word processing document files have been printed the dedicated task WP returns the printer back to the DP PRTTSK.

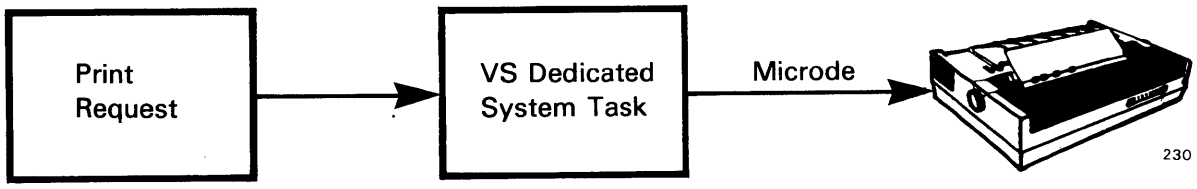

Figure 17. VS System Task Interfaces Print Requests with Printer

VS/IIS from a Word Processing Perspective

The VS/IIS supports word processing Edit, Create, Print, Index, Glossary, Utilities, and Supervisor functions similar to those found on Wang's OIS system. In addition, the standard VS utility programs BACKUP, COPY, and DISPLAY are available for use with word processing document files.

Word processing on the VS/IIS can be invoked in any one of three ways:

- Command Processor - The operator selects the RUN PROGRAM or PROCEDURE function by pressing PF Key 1 and then keys in "PROGRAM = WP." The library and volume need not be specified. When the ENTER key is pressed, the IIS main menu appears on the workstation screen.

- Procedure Language - The operator can create a procedure language file invoking word processing with the statement RUN WP.

- Application Program - The operator can invoke word processing from within an application program in any currently VS-supported language by using the VS LINK MACROINSTRUCTION and SVC.

All of the above methods can be used in conjunction with the VS Security System's USRLOGON file feature to invoke word processing immediately after logon, thereby bypassing the Command Processor screen.

After word processing has been successfully invoked, the first screen which appears is the IIS menu (Figure 18). From this point onward, the VS/IIS system is nearly identical to an OIS in both function and response time. (The primary exception is in the storage and retrieval of documents. Since storage and retrieval are dependent on the VS data management system, speed of document access will depend upon other system users--both word processing and data processing.)

The major exception to the similarity of VS/IIS and OIS in word processing functions is in document filing. A user who attempts any archiving function (Retrieve from Archive, Copy to Archive, etc.) will receive the message "Archive in Use." This does not mean that archiving is not allowed. Filing documents to an archive diskette is accomplished by using the special VS utility COPYWP which has been added to the system to support word processing document filing. The COPYWP utility, which must be run in data processing mode, allows:

- The retrieval of word processing document files from Wang word processing archive diskettes (and vice versa).
- The copying of VS word processing document files to other similar files.
- The conversion of VS print and data files to VS word processing document files (and vice versa).

When the utility COPYWP is used for archiving purposes, the diskette is always reformatted, which means that the contents of the diskette are destroyed. While this is understandably a drawback to using diskette storage for archiving purposes, it should be emphasized that on the VS/IIS, because of its extensive storage capacity, there is not much need for diskette storage. Ample storage space is available and the same function can be served by using the VS BACKUP utility.

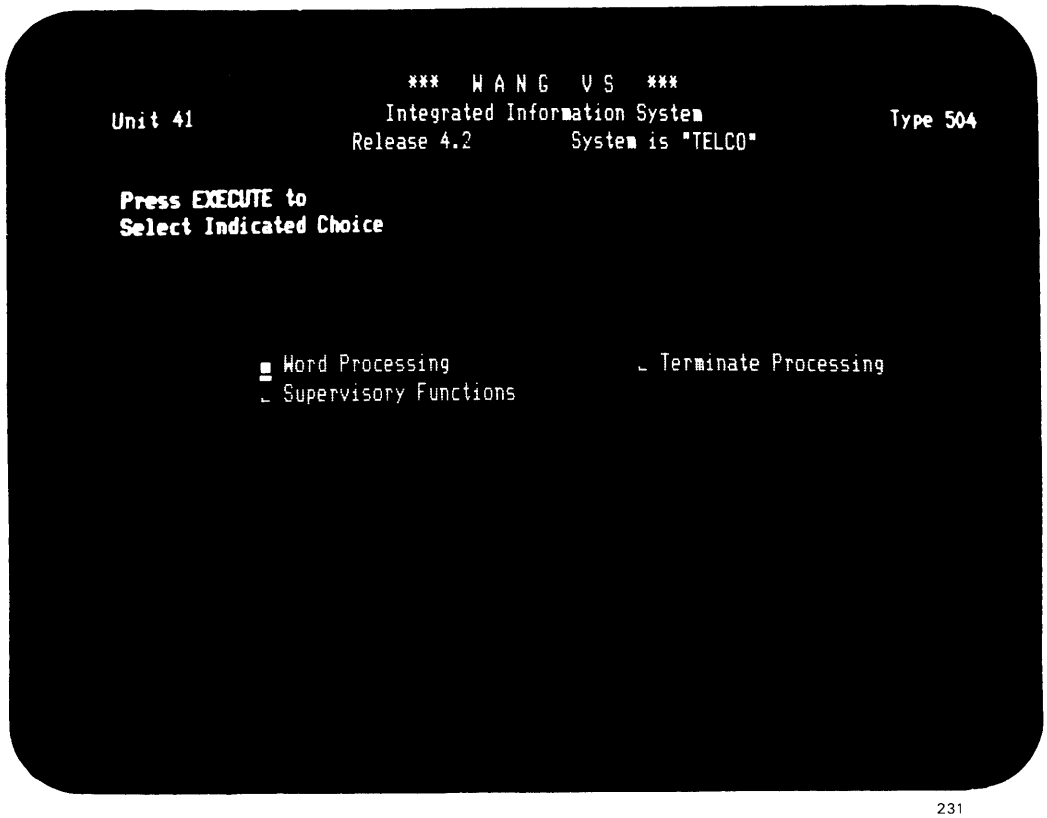

Figure 18. The IIS Main Menu

VS/WP from a Data Processing Perspective

On a VS/IIS system, all the data processing capabilities of the VS are available. Perhaps the simplest way to visualize word processing on the VS/IIS is to consider word processing as a VS application program. The combined workstation is initially in data processing mode for system logons and changes only when Program WP is executed. Several data processing considerations, however, do warrant mention. These include: storage, printing, security and system performance.

Storage - Word processing documents created or entered on the VS/IIS system are cataloged according to the VS cataloging system. They become what are called "Word Processing Document Files." These document files are stored in VS Library DOCMNTXX, where XX refers to the OIS library designation.

A double letter means a lowercase library character. For example:

DOCMNTM = Document Library M

DOCMNTMM = Document Library m

Within the library, documents are denoted by their Document ID number. In sum, each OIS library is represented by a VS library and each document in that OIS library has a corresponding word processing file name equivalent to the ID of the document. For example, a newly-created word processing document with Document ID 0264 in OIS Library B would be cataloged on the VS as File 0264X in Library DOCMNTB. The prototype document for each OIS Library bears the word processing file name of "0000."

Printing - The OIS word processing menu is used for the printing of all word processing documents on the VS/IIS. Print requests for word processing documents do not currently appear on the VS command processor or operator console print queue display. Control of the printing of word processing documents (e.g., cancel) must be accomplished from the OIS menu with the system in word processing mode. Word processing print requests must use VS device numbers to route word processing documents to the proper printing device.

As has been previously stated, a printer can be designated as a dual word processing/data processing printer. On such printers, word processing print files have priority over data processing printing.

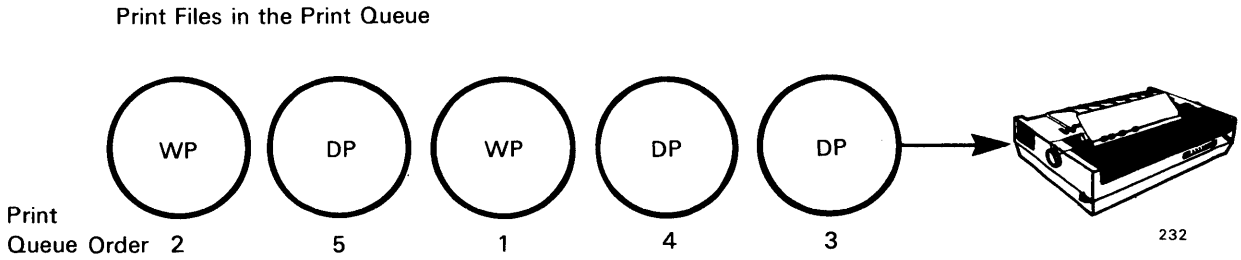

Figure 19. The Word Processing Print Files Have Priority in the Print Queue

In addition, because of a current hardware restriction, the printer will de-select when a change between data processing printing and word processing printing occurs.

Security - Word processing document files fall under the same system of file protection classes and user access privileges as any VS file. A newly created document is assigned a File protection class through any of the means available to VS users (Command Processor, Procedure Language, etc.). The file protection class prohibits users who do not have the appropriate access privileges to that class from accessing the document in word processing mode. The unauthorized user receives an OIS password error message.

All documents in a particular word processing document Library should be placed in the same file protection class. Otherwise, document index operations will terminate when an inaccessible document is referenced.

Creation of a new document always results in access to the prototype document and sometimes to other existing documents in the library. An additional security feature on the system automatically terminates the Create Document function if any of the documents in the library are inaccessible to the user due to access privilege restrictions.

Additional security is provided in word processing mode by making the supervisory function of "Change Document Password" available only to VS system security administrators. System security administrators are the only VS/IIS users capable of invoking the OIS Password Protection security system.

System Performance - As explained previously, the use of word processing in the VS/IIS requires the dedication of a system task for each printer capable of printing word processing documents. In addition, each combined workstation in the system is considered as a workstation task similar to any other data processing terminal.

Since most word processing functions are handled directly in the 32K intelligence for the combined workstation, overall system performance will generally not degrade with increasing word processing use. Only with document storage and retrieval is the issue of system performance of any concern. System performance will actually improve in a relative sense as the number of word processing users increases because of the virtual memory feature of the VS system.

Joint word processing document and data processing file storage has little effect on system performance. If a VS/IIS is used heavily for both data processing and word processing, assignment of separate peripheral storage devices for data and document files can help to decrease any disk access contention. Such a dual storage system will also create a simpler storage environment and will ease backups and other administrative functions.

The VS/WP from an Information Processing Perspective

The true integrative power of the VS/IIS is exhibited in its ability to translate information from one mode to another (word processing information to data processing information and vice versa). There are two ways in which such information integration can be accomplished on the VS/IIS system.

- COPYWP Utility - The VS COPYWP Utility provides direct word processing document to data processing and data processing to word processing file conversion. This utility reformats a file (whether data or document) into a format which is acceptable for processing in the alternative mode. The COPYWP must be used with the system in data processing mode.

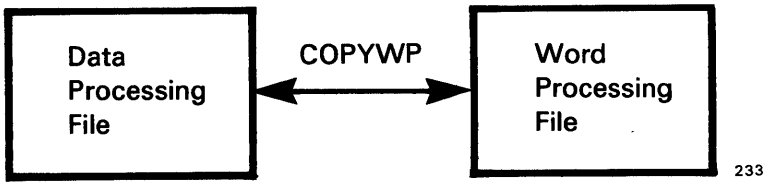

Figure 20. The COPYWP Utility Reformats WP and DP Files

- File Handling Subroutines - A second and more sophisticated integrative process allows access to word processing from within a data processing program. This process is accomplished through the use of word processing file handling subroutines which can be part of a COBOL, BASIC, or Assembler language program. These subroutines allow the user to reference a specific page and line in a word processing document and access information at that location. The accessed information can then be read, modified, or deleted. The VS/IIS supports this type of integration only from a data processing program to a word processing document. It is not currently possible to access a data processing file from within a word processing decision processing program.

SUMMARY

The software on the VS/IIS provides the system with its true integrative capabilities. The extensive capabilities of the VS operating system are combined with the advanced software features of Wang's OIS system. In addition, the software allows the user to translate information from one information mode to another (i.e., word processing to data processing and vice versa).

Program WP is the software package which, in conjunction with the combined workstation, provides the VS/IIS with its word processing capabilities. When the system operates in word processing mode, microcode in the workstation allows the execution of word processing functions. Program WP also acts as an OIS master emulator, translating word processing requests from the workstation into instructions understandable by the VS operating system. A dedicated system task loads and unloads appropriate microcode to printers on the system when a word processing print request is initiated.

Word processing on the VS/IIS can be invoked through the command processor, by procedure language, or through an application program in any currently VS-supported programming language. The IIS menu allows access to word processing capabilities which are almost identical to those of an OIS in both function and response time. Archiving word processing documents on the VS/IIS is handled somewhat differently from on a WPS or OIS system, but there is little need for diskette storage on the VS/IIS because of the enormous on-line storage capabilities available.

All the data processing capabilities of the VS computer system are available on the VS/IIS. Several storage, printing, security, and system performance considerations bear attention when considering the VS/IIS from a data processing perspective. Word processing-data processing information integration can be accomplished in two ways: through the use of the utility COPYWP and through the use of file handling subroutines which can be part of a data processing program.

REVIEW QUESTIONS

The following questions are based on the material presented on the software of a VS/IIS system. They are intended to check your understanding of this material. If you have difficulty answering these questions you should go back and review the material before proceeding further in the module.

1. The name of the software package that enables the VS to support word processing functions is

   a. VS/IIS subroutine.
   b. Program WP.
   c. Subroutine WP for VS.
   d. Program VS/WP.

2. Word processing actions in the VS/IIS are handled

   a. in the CPU.
   b. in the printer.
   c. in the workstation.
   d. either in the CPU or its disk extension.

3. What gives the VS/IIS the appearance and capabilities of an OIS processing system?

   a. COPYWP
   b. VS/IIS subroutine
   c. Program IIS
   d. OIS Master Emulator

4. VS word processing on the VS cannot be invoked by which of the following?

   a. Command Processor
   b. OIS/BASIC
   c. Procedure Language
   d. Application Program

5. Word processing documents cataloged on the VS/IIS are known as

   a. word processing document files.
   b. IIS documents.
   c. word processing records.
   d. IIS files.

ANSWERS

1. b
2. c
3. d
4. b
5. a

TELECOMMUNICATIONS

As an integrated information processing system, the VS/IIS not only provides extensive data processing and word processing functions but also supports a range of telecommunications capabilities. Telecommunications (TC) plays an increasingly important role in businesses today. In the future, TC undoubtedly will play an even greater role in the automated office. With telecommunciations, large amounts of information can be transferred almost instantaneously over standard or leased telephone lines. This capability allows increased accuracy and flexibility in information handling, better control over corporate-wide operations, and reduced overall costs.

The VS computers support a range of telecommunications networks, including the following:

- VS to remote workstation/printer locations
- VS system to VS system
- Emulation of non-Wang computers
- Mailway electronic mailing system

Each of these is described below.

VS to Remote Workstation/Printer Locations - VS workstations and printers can access a VS computer system from physically remote locations via comunication lines attached to an appropriate IOP in the VS CPU (Figure 21). The remote workstation (Model 2246R) has built-in communications and printer controllers. Only data processing operations can be performed from a remote workstation. It is possible to configure a VS/IIS with one or more remote workstations; the operations of these workstations, however, are confined to data processing functions.

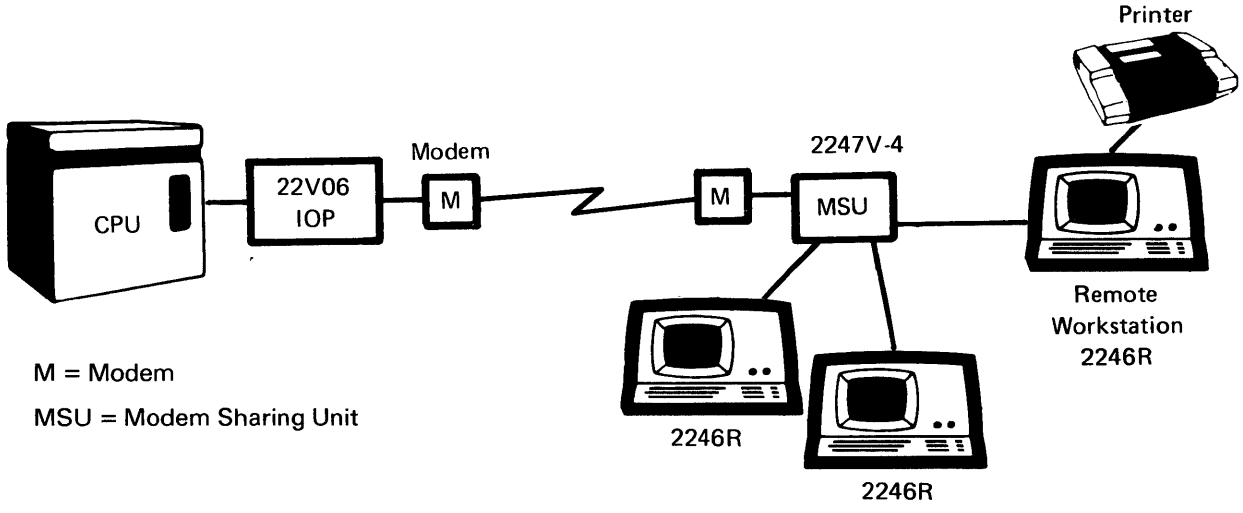

Figure 21. Sample Configuration for Remote Workstations

VS System to VS System - The program VSCOPY supports transmission of data and program files in batch mode from one VS computer to another via telecommunications lines. (See Figure 28.) Through this program, messages can be sent from an operator on one VS system to an operator running VSCOPY on another VS system. This capability allows an organization to use several VS computers, each serving a particular user group or set of applications. By interconnecting the VS systems, the users of each system can share each other's data files and program libraries. VS to VS communications can be initiated at a 2246C Combined Workstation, but only when the workstation is operating in data processing mode.

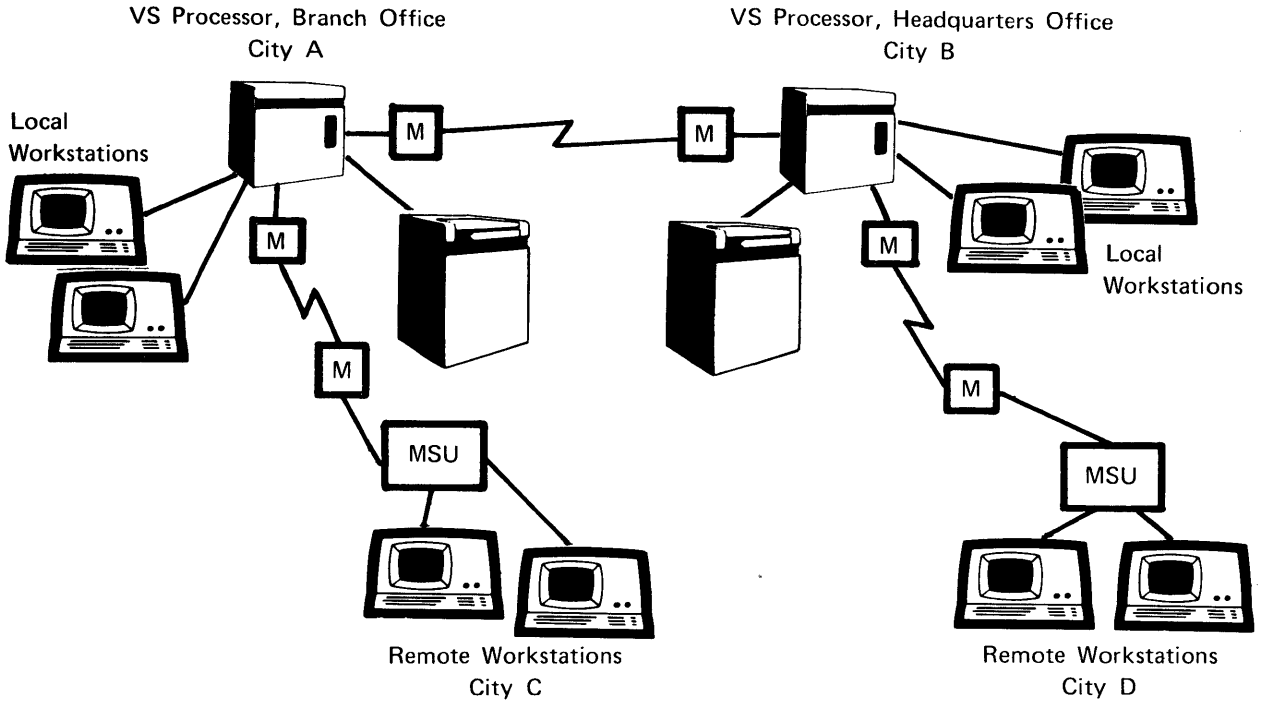

Figure 22. VS to VS Network

Emulation of Non-Wang Computers - Through VS telecommunications, a VS system can communicate with another manufacturer's "host" computer system. This enables the VS computer to function within distributed processing networks (Figure 23). Both batch and interactive emulation are supported and can be initiated from a 2246 Serial or 2246 Combined Workstation. To use a 2246C for this process, the system must be operating in data processing mode.

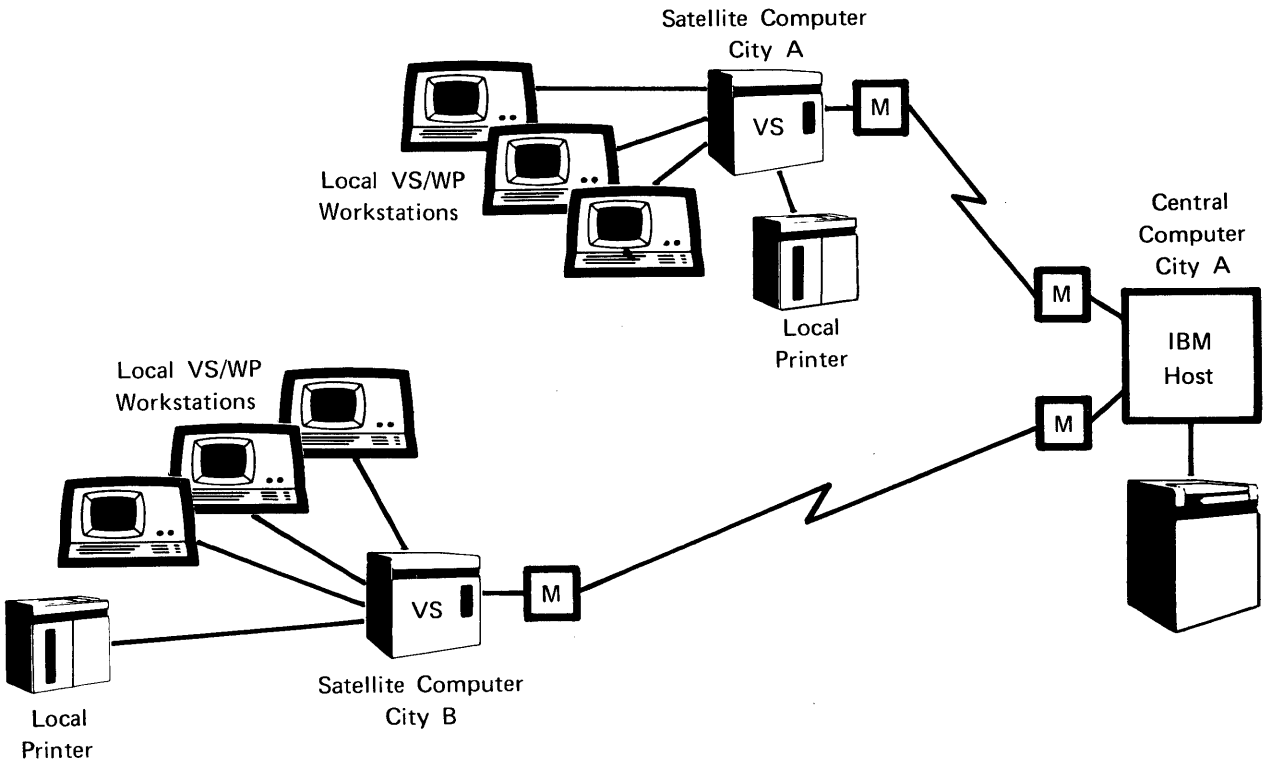

Figure 23. VS to Host Computer

- 2780/3780 Batch Emulation - The VS system supports emulation of IBM's 2780 and 3780 remote batch data communications terminals which are designed for use with the IBM 360 and 370 computer systems. VS 2780/3780 emulation is a software package that permits VS computers to communicate batch data to and from IBM computers and other devices which support 2780 and/or 3780 protocols. The emulation software makes it possible for the VS to appear to the "host" computer as though it were a 2780 or 3780 batch terminal. When appropriately programmed, the host computer can also interact with the VS in emulation mode.

- 3270 Emulation - The IBM 3270 is an interactive, non-intelligent terminal display system. Through the use of Wang's 3270 emulation software, workstations on a VS system can interact with IBM and other host computers which support 3270 protocols.

Mailway Electronic Mail - This is a Wang innovation which greatly facilitates mailing operations through the use of an automated electronic mailing system. Mailway electronic mail is a software package available for the VS computer line. In conjunction with telecommunications, it automatically routes, transmits, tracks, and receives documents from Wang WPS, OIS, and VS systems (Figure 24).

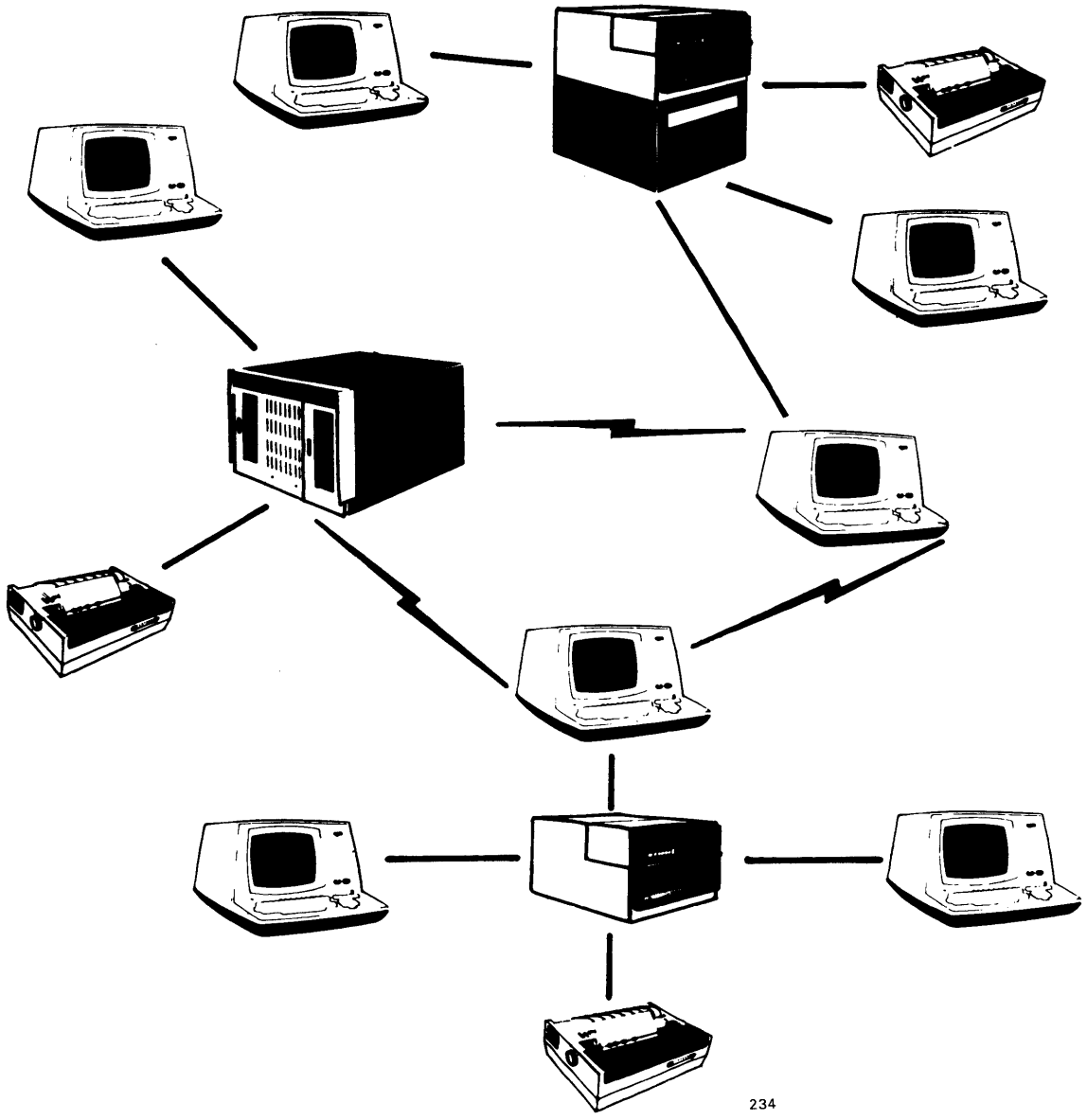

Figure 24. Sample Mailway Electronic Mail Configuration

SUMMARY

A VS/IIS system is truly an integrated system not only because of its combined data processing and word processing capabilities but also because of the range of telecommunications available.

Remote workstations located in a separate part of the building, in another building, or anywhere in the world can access the data processing capabilities of a VS computer system. Remote workstations do not support the use of the word processing capabilities of the VS/IIS. These can only be accessed through a 2246C Combined Workstation.

One VS computer system can communicate with another VS computer through the use of the VSCOPY utility and telecommunications lines. This permits the interconnection of several VS systems, each of which might serve a particular application or geographic location. VS to VS communication can be initiated from the 2246C Combined Workstation.

The VS system supports batch IBM 2780/3780 and IBM 3270 interactive emulation. This capability allows the VS system to be connected to large distributed processing networks in which particular applications are distributed between the VS and the host computer. The 2246C can serve as the initiation point for batch or interactive emulation.

Mailway electronic mail greatly facilitates and simplifies mailing operations. It allows a VS system to be linked with OIS and WPS systems in an electronic mailing system.

VS/IIS MODULE SUMMARY

The IIS represents a forward step in Wang's march toward office automation innovations. Wang's leadership in the word processing and data processing fields puts it at the forefront of the industry in developing integrated information processing systems. Presently Wang offers two main IIS entries: OIS/BASIC, which is based on the Office Information Systems (OIS) and a Wang-enhanced version of the popular BASIC programming language; and the VS/IIS, which incorporates both the power of the VS computer system and the extensive capabilities of Wang's word processing software. Telecommunications is an important option for both the OIS/BASIC and VS/IIS systems.

The VS/IIS system offers customers a number of important advantages. The system is user-oriented, versatile, cost-effective, and growth-oriented. The bottom line advantage of the VS/IIS is that it enhances overall organizational productivity. A list of these advantages follows. This list, which first appeared near the beginning of this module, is repeated here because of its importance.

USER-ORIENTED
- Use by non-technical personnel
- Interactive
- Fill-in menus, conversational prompts/questions
- All functions initiated at same workstation
- Easy-to-use workstation
- Single data base for multiple users

VERSATILE
- Supports large number of users
- Seven programming languages
- Sophisticated word processing software
- Extensive range of peripherals
- Large storage capacity
- Telecommunications

GROWTH-ORIENTED
- Modular design
- Easy expansion and upgradability
- Four models of VS and eight models of VS-100
- Peripherals include printers, disk drives, tape drives, and communication devices
- Industry compatibility

COST-EFFECTIVE
- Multifunctionality in one system
- Maximum use of peripheral devices
- Telecommunications capabilities
- File conversion utilities avoid duplication of effort
- Enhancement of management decision-making

PRODUCTIVITY-ENHANCING

Multiple users for multiple functions simultaneously
Direct and immediate access to needed information
Background processing
Print spooling
Programming features

The VS/IIS is targeted primarily for the medium- to large-sized business and organization marketplace. It is particularly well suited for customers who have both extensive word processing and data processing requirements. Several important considerations should be taken into account in determining if a VS/IIS system is the most appropriate IIS solution for a particular customer. These include:

- Relative word processing/data processing needs
- Types of desired applications
- Customer attitudes
- Cost/customer purchasing process
- Implementation factors
- Future needs.

VS/IIS sales are usually made at the top management level, either through the financial vice president (or equivalent administrator) or through an executive steering committee. The most important message to deliver to top management about the VS/IIS system is that it increases the organization's overall productivity.

In support of both pre- and post-sale accounts, Wang offers a wide range of home office and local resources. Home office resources include:

- IIS Marketing Group
- Field Marketing Support Group
- Technical Information Center
- Systems Support Center
- Product documentation.

Local resources include:

- District/Branch Manager
- District Analyst
- Marketing Support Representative
- Customer Engineer
- Area/District Communication Specialist
- Software Vendors
- Satisfied Wang Customers.

The VS/IIS system is based upon the advanced technology of the VS computer. The VS line of computers consists of two major systems: the VS and VS-100. The VS-100 is a larger and more powerful system than the VS, but functionally the systems provide similar capabilities. Both can support the addition of the word processing software which, together with telecommunications, provides the VS/WP system with its integrated capabilities.

To access the word processing capabilities of the VS/IIS, the 2246C Combined Workstation must be used. The keyboard of the 2246C is similar in appearance to the OIS workstation keyboard with several notable exceptions: the HOME and HELP keys, the numeric keypad, the dual functionality of the 16 VS program function keys, and eight additional dual function keys. Seven printer models are available. These include daisy wheel printers, matrix character printers, chain printers, and band printers. Both disk and tape drives can be used for storage purposes. (The VS models also include a diskette drive.) Three fixed/removable disk drives are available with capacities of 30, 60, and 90 MB respectively. Two fully removable disk drives are available with total storage capacities of 75 and 288 MB respectively. Two nine-track and one seven-track tape device models can be used with the system.

The VS/IIS combines the extensive capabilities of the VS operating system software and the extreme functionality of Wang's word processing software. In addition to supporting both data and word processing functions, the software allows the user to translate information from one information mode to another (i.e., word processing to data processing and vice versa).

Word processing on the VS/IIS can be invoked through the command processor, by procedure language or through an application program in any currently VS-supported programming language. The IIS menu allows access to word processing capabilities which are almost identical to those of an OIS in both function and response time. All the data processing capabilities of the VS computer system are available on the VS/IIS. Several storage, printing, security, and system performance considerations bear attention, however, when considering the VS/IIS from a data processing perspective. Word processing-data processing information integration can be accomplished in two ways: through the use of the utility COPYWP and through the use of file handling subroutines which can be part of a data processing system.

Configuring a VS/IIS is very similar to configuring any VS system. All the general guidelines of VS configuration are followed. In addition, several specific considerations need to be made in VS/IIS configuration. At least one workstation in the system must be a 2246S or 2246P to serve as the system's operator console. Each 2246C Combined Workstation and word processing printer requires one port in a serial IOP. Document storage requirements are determined in a manner similar to that used for determining OIS document storage needs. In computing necessary main memory size and disk space for virtual memory paging, a 2246C Combined Workstation is treated identically to other types of VS workstations. Finally, in determining the total number of system tasks, each 2246C workstation (like any workstation in the system) and each printer designated for word processing printing must be considered as a separate task.

A VS/IIS system is truly an integrated system not only because of its combined data processing and word processing capabilities but also because of the range of telecommunications available. Remote workstations located in a separate part of the building, in another building, or anywhere in the world can access the data processing capabilities of a VS computer system. One VS computer system can communicate with another VS computer through the use of the VSCOPY utility and telecommuncations lines, allowing the interconnection of several VS systems, each of which might serve a particular application or geographic location. The VS system supports batch IBM 2780/3780 and IBM 3270 interactive emulation. This capability allows the VS system to be connected to large distributed processing networks in which particular applications are distributed between the VS and host computer. In addition, Wang's new Mailway electronic mail system is available with the VS/IIS.

Wang's Integrated Information Systems are a major step forward in the information processing industry. The VS/IIS provides customers not only with the powerful data processing capabilities of the VS computer and VS telecommunications options but also with the word processing capabilities which have made Wang the number one company in CRT-based word processing systems.

REVIEW QUESTIONS

The following questions are based on the material presented on the hardware, software, configuration, and telecommunications of a VS/IIS system. They are intended to check your understanding of this material. If you have difficulty in answering these questions you should go back and review the material.

1. The total number of workstations which can be supported on a VS-100 system is

   a. 16.
   b. 32.
   c. 64.
   d. 128.

2. One of the primary reasons for the faster speed of the VS-100 over the VS is

   a. binary storage.
   b. cache memory.
   c. hard disk storage.
   d. automated workstation keystrokes.

3. How many kinds of workstations are available for use on VS and VS-100 systems?

   a. two
   b. three
   c. four
   d. five

4. Is the following statement TRUE or FALSE?

   The 2246C Combined Workstation keyboard is more similar in appearance to an OIS workstation keyboard than to a 2246C or VS workstation.

5. Which of the following printers is NOT available on a VS/IIS system?

   a. intelligent image
   b. chain
   c. daisy wheel
   d. band

6. Is the following statement TRUE or FALSE?

   The primary storage system for word processing documents on a VS/IIS system should be diskette storage.

7. The IOP(s) which control(s) the combined workstations in a VS/IIS must be

   a. serial.
   b. parallel.
   c. remote.
   d. radial.

8. The word processing microcode on the VS/IIS system executes in

   a. workstation memory.
   b. the IOP.
   c. the OIS master emulator.
   d. the CPU.

9. In the VS/IIS system a dedicated system task is allowed for

   a. each IOP.
   b. each disk and tape drive storage facility.
   c. every peripheral device in the system.
   d. each WP or WP/DP printer.

10. Which of the following cannot be used for invoking word processing on the VS/IIS system?

    a. Application program
    b. Procedure language
    c. Utility VSCOPY
    d. Command Processor

11. Is the following statement TRUE or FALSE?

    On a WP/DP designated printer in a VS/IIS system, WP documents are always given higher priority than DP printing.

12. Which of the following statements is NOT TRUE?

    a. VS to VS communication can only occur when the VS/IIS system is operating in data processing mode.
    b. Remote workstations have their own built-in communications controller.
    c. 2780/3780 batch emulation can only be used when the VS/IIS system is in word processing mode.
    d. Only a VS can operate as a distribution center in a Mailway Electronic Mail network.

ANSWERS

1. d is the correct answer. The VS-100 supports up to 128 workstations while the VS supports up to 32.

2. b is the correct answer.

3. d is the correct answer. The five workstations are: 2246P (Parallel), 2246S (Serial), 2246C (Combined), 2246R (Remote), and 2266S/ss66C (Archiving).

4. True.

5. a is the correct answer.

6. False. Although the VS models have a diskette drive unit attached to the CPU, the extensive on-line disk storage capabilities of the VS/IIS system decrease the need for off-line diskette storage of word processing documents.

7. a is the correct answer.

8. a is the correct answer.

9. d is the correct answer.

10. c is the correct answer. VSCOPY is used in invoking TC in a VS to VS network.

11. True.

12. c is the correct answer. All TC operations occur with the system in data processing mode.

COURSE EVALUATION FORM

Course Title _____

Your Job Title _____

Length of Time in Present Position _____

Length of Time in Related Field _____

Please indicate the number (1-5) which best describes your opinions of the following aspects of the course. A rating of "1" indicates STRONG AGREEMENT; "5" indicates TOTAL DISAGREEMENT.

STYLE OF PRESENTATION

_____ logically organized

_____ well-written

_____ understandable language

_____ maintained interest

_____ well-paced

_____ appropriate and realistic examples or case studies

EXERCISES

_____ sufficient quantity and frequency

_____ well-integrated with course content

_____ facilitated and reinforced learning

_____ focussed on important areas

_____ degree of difficulty appropriate for subject matter

MODULE TESTS

_____ clearly written questions

_____ tested material presented

_____ appropriate degree of difficulty

AUDIO/VISUALS

_____ sufficient number

_____ high-quality

_____ well-integrated with text

_____ clarify important points made in text

OVERALL COURSE IMPRESSIONS

_____ materials are job-related

_____ technically accurate

_____ material provides a logical flow from previous course(s) in this series (if applicable)

Please feel free to make additional comments, especially about any statement with which you indicated total disagreement.

fold here

- -

Jim Walsh, Director
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Wang Laboratories, Inc.
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