WANG

VS

Software Bulletin

Release 6.20

VS
Software Bulletin
Release 6.20

1st Edition — January 1984

800-3114-01

WANG LABORATORIES, INC., ONE INDUSTRIAL AVENUE, LOWELL, MA 01851 • TEL. (617) 459-5000, TWX 710-343-6769, Telex 94-7421

Disclaimer of Warranties and Limitation of Liabilities

The staff of Wang Laboratories, Inc., has taken due care in preparing this manual; however, nothing contained herein modifies or alters in any way the standard terms and conditions of the Wang purchase, lease, or license agreement by which this software package was acquired, nor increases in any way Wang's liability to the customer. In no event shall Wang Laboratories, Inc., or its subsidiaries be liable for incidental or consequential damages in connection with or arising from the use of the software package, the accompanying manual, or any related materials.

NOTICE:

All Wang Program Products are licensed to customers in accordance with the terms and conditions of the Wang Laboratories, Inc. Standard Program Products License; no ownership of Wang Software is transferred and any use beyond the terms of the aforesaid License, without the written authorization of Wang Laboratories, Inc., is prohibited.

Warning: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

PREFACE

This bulletin describes Release 6.20 of the VS Operating System. Operating system components that have changed since general Release 6.10 are described.

The bulletin is organized in the following way:

- Chapter 1 provides a summary of the changes and additions to the operating system for Release 6.20.
- Chapter 2 describes enhancements to the operating system.
- Chapter 3 summarizes Release 6.20 SYSGEN procedure.
- Chapter 4 describes changes to utilities and system software.
- Chapter 5 describes enhancements to networking operations.
- Chapter 6 discusses new devices supported by Release 6.20.
- Chapter 7 lists corrected software anomalies.

This bulletin is intended for all VS users. Before reading this bulletin, you should be familiar with the VS environment, as described in the VS Programmer's Introduction (800-1101). In addition, topics covered in the following manuals may be helpful to you in understanding related features of Release 6.20.

VS System Administrator's Reference	800-1144-02
VS System Operator's Reference	800-1102-08
VS System Utilities Reference	800-1303-04
VS Operating System Services Reference	800-1107-06
VS Data Management System (DMS) Reference	800-1124-01
VS DMS/TX Reference	800-1128-01
VS Principles of Operation	800-1100-04
VS Multi-Station Data Sheet	800-2309-01
VS Multi-Station User's Reference	800-1149-01
VS Network Configuration and Operations Guide	800-1317-03

CONTENTS

CHAPTER 1 OVERVIEW OF RELEASE 6.20

1.1 Introduction 1-1
1.2 Operating System Enhancements 1-1
1.3 Release 6.20 SYSGEN Procedure 1-2
1.4 System Software Enhancements 1-2
1.5 Networking Operations 1-3
1.6 New Devices 1-3

CHAPTER 2 OPERATING SYSTEM ENHANCEMENTS

2.1 Paging Enhancements 2-1
Page Block - VS50, VS80 2-1
Page Pool - VS25, VS45, VS85, VS90, VS100 2-2
Page Pool Commitment Ratio 2-3
Monitoring Page Pool Activity 2-4
Volume Assignment Algorithm 2-5
2.2 Automatic Logoff 2-8
Implementation 2-8
2.3 Version Checking 2-9
Implementation 2-9
Operator's Console Changes 2-11
2.4 IPL Changes 2-13
Configuration Files Recalled 2-13
Inhibiting Logons 2-13
Automatic Activation of Remote Devices 2-14
2.5 Control Mode Dump Facility 2-14
2.6 Task Dump Enhancement 2-16
2.7 Memory Parity Error Recovery 2-16
2.8 VTOC Performance Enhancement 2-17
2.9 More System Queue Entries 2-17
2.10 Remote Device Support 2-17

CHAPTER 3 RELEASE 6.20 SYSGEN PROCEDURE

3.1 Introduction 3-1
3.2 GENEDIT General Configuration Screen 3-1
3.3 VS25 and VS45 Device Adapter Configuration 3-1
3.4 Automatic Activation of Remote Devices 3-4
3.5 Maximum Number of Open Files 3-5

CHAPTER 4 SYSTEM SOFTWARE ENHANCEMENTS

4.1 BACKUP 4-1
BACKUP Through a Procedure 4-2
4.2 Compress-In-Place (CIP) 4-2
4.3 COPY 4-4
Relative Files 4-4
Shared Files 4-5
4.4 Data Management System (DMS) 4-7
The WRITE Function Request 4-7
Relative File Organization 4-8
Shared Consecutive Files 4-10
4.5 DISKINIT 4-11
4.6 DISPLAY 4-13
Relative Files 4-13
Shared Files 4-13
4.7 DMS/TX 4-15
4.8 IOELOG 4-15
4.9 IOTRACE 4-16
Running IOTRACE 4-16
IOTRACE Processing 4-18
4.10 POOLSTAT 4-18
4.11 SORT 4-20
4.12 SORTINT 4-21
4.13 STABLEMT 4-22
4.14 Stand-Alone Utility System 4-22
Stand-Alone Utility Selection Screen 4-23
Running CIP 4-23
4.15 Symbolic Debugger 4-25
4.16 VS Graphics Facility 4-25
System Requirements 4-25
4.17 VS Multi-Station 4-26
System Requirements 4-27

CHAPTER 5 NETWORKING OPERATIONS

5.1 Local WangNet Peripheral Band 5-1
Peripheral Band Devices 5-1
Manufacturing ID and Channel Selection 5-2
Configuration 5-2
5.2 Point-to-Point Transport 5-3
System Requirements 5-4

CONTENTS (continued)

CHAPTER 6 NEW DEVICES

6.1 4200 Series Workstations 6-1
4205 Workstation 6-2
4220 Workstation 6-2
4230 Workstation 6-2
4230A Workstation 6-2
Workstation Characteristics 6-2
Specifications 6-3
6.2 6300GM Graphics Workstation 6-4
6.3 2509V Serial 9-Track Tape Drive 6-5
Features 6-5
Specifications 6-5
6.4 2220 Disk Drive 6-6
6.5 DW/OS-55 Daisy Printer 6-6
Features 6-7
Specifications 6-8
6.6 Telecommunications Support 6-10
6.7 IOPs and Device Adapters 6-10

CHAPTER 7 CORRECTED SOFTWARE ANOMALIES

7.1 Introduction 7-1
7.2 Operating System 7-1
7.3 BACKUP 7-1

FIGURES

Figure 2-1 Set System Parameters Screen 2-4
Figure 2-2 Control Workstations Screen 2-6
Figure 2-3 Volume Assignments Screen 2-7
Figure 2-4 Control Logon/Logoff Screen 2-9
Figure 2-5 Version Warning Screen 2-10
Figure 2-6 System Options Menu 2-11
Figure 2-7 System Versions Screen 2-12
Figure 2-8 System Status Screen 2-13
Figure 2-9 System Configuration Screen 2-14
Figure 2-10 Sample Control Mode Dump Screen 2-15
Figure 2-11 Control Mode Dump Device Address Screen 2-15
Figure 3-1 GENEDIT General Configuration Screen 3-2
Figure 3-2 VS25/45 IOP Selection Screen 3-2
Figure 3-3 Remote Workstation Automatic Activation Screen 3-4
Figure 3-4 TC IOP Device Selection Screen 3-5
Figure 4-1 BACKUP Mount Screen 4-1
Figure 4-2 CIP Input Definition Screen 4-3
Figure 4-3 CIP Mount Screen 4-4
Figure 4-4 COPY Options Screen 4-5
Figure 4-5 COPY Input Definition Screen 4-6
Figure 4-6 COPY Lock Screen 4-6
Figure 4-7 Relative File Structure 4-8
Figure 4-8 DISKINIT Initialize Screen 4-11
Figure 4-9 Specify Page Pool Screen 4-12
Figure 4-10 DISPLAY Input Definition Screen 4-14
Figure 4-11 DISPLAY Lock Screen 4-14
Figure 4-12 Machine Check Error Summary Screen 4-15
Figure 4-13 IOTRACE Input Definition Screen 4-16
Figure 4-14 Condition Code Traps Screen 4-17
Figure 4-15 Pool Utilization Screen 4-19
Figure 4-16 Stand-Alone Utility Selection Screen 4-23
Figure 4-17 CIP Volume Specification Screen 4-24
Figure 4-18 CIP Verification Screen 4-24
Figure 6-1 4200 Series Workstation 6-1
Figure 6-2 DW/OS-55 Daisy Printer 6-6

TABLES

Table 3-1 Valid VS25/45 Device Adapters and IOP Addresses 3-3
Table 4-1 DMS Function Requests for Relative Files 4-9

CHAPTER 1
OVERVIEW OF RELEASE 6.20

1.1 INTRODUCTION

Release 6.20 of the VS Operating System includes several new features and functional changes. A summary of the major changes follows.

1.2 OPERATING SYSTEM ENHANCEMENTS

Release 6.20 includes changes in the allocation of Segment 2 paging files. A volume can optionally contain a page block (for the VS50 and VS80) or a page pool (for the VS25, VS45, VS85, VS90, and VS100). The use of the page block or page pool option keeps the Segment 2 paging files contiguous and thus reduces disk access time. A new assignment algorithm and user control for special cases allow the more efficient assignment of paging files to volumes.

Release 6.20 provides the option to automatically log off workstations that have been inactive for a specified length of time. Automatic logoff is in effect for all DP tasks on the workstations using this option.

The system now checks the version numbers of operating system program files at IPL time to detect incompatibilities that may interfere with system operation. Through the Operator's Console, you can check the version numbers of the system nucleus and the critical operating system components.

The IPL procedure has been enhanced. The system now remembers the names of the configuration files specified for the last IPL from that disk. The IPL screen provides an option to inhibit logons for all workstations. The IPL procedure automatically activates any remote workstations and remote printers that have been defined through GENEDIT.

The Control Mode Dump facility has been enhanced for VS25, VS45, VS85, VS90, and VS100 systems.

Task dumps have been expanded to include Segment 0 control blocks.

For VS25, VS45, VS85, VS90, and VS100 systems, Release 6.20 provides enhanced recovery from certain memory parity errors.

To enhance VTOC performance for crash- and media-tolerant volumes, Release 6.20 retains the bit map block, once read, in memory.

The size of the System Queue file has been increased to accommodate a maximum of 2048 entries. The System Task can now handle 75 printers, and it allocates space for 128 remote systems.

Release 6.20 supports remote devices (i.e., remote workstations and remote printers). Full support requires new workstation PROMs and microcode, new IOP PROMs and microcode, and a hardware ECO.

1.3 RELEASE 6.20 SYSGEN PROCEDURE

GENEDIT has been enhanced with the following features:

- The General Configuration screen now prompts you to specify the number of WangNet workstation lines.
- You now specify the device adapter configuration for the VS25 and VS45.
- To enable automatic activation of remote workstations and remote printers, GENEDIT now allows you to define the parameters for remote devices in a configuration file.
- Through the System Options menu, you can now establish a maximum of 9999 open files per task. The previous maximum was 99 files.

1.4 SYSTEM SOFTWARE ENHANCEMENTS

Release 6.20 includes enhancements to the following utilities: BACKUP, COPY, DISKINIT, DISPLAY, IOELOG, and SORT. In addition, the Symbolic Debugger has been enhanced.

The Data Management System (DMS) includes support for relative files (on the VS25, VS45, VS85, VS90, and VS100) and shared consecutive files (on all systems). DMS/TX now releases all records held by a task during program-initiated transaction rollback.

Compress-In-Place (CIP), a new utility, enables you to consolidate free extents on nonsystem disks without performing a full volume backup and restore. For system disks, CIP is available as an option of the VS Stand-Alone Utility System for the VS25, VS45, VS85, VS90, and VS100.

IOTRACE, a new utility, monitors the I/O trace table and records I/O information for a range of devices, based on criteria you define.

POOLSTAT, a new utility, enables you to monitor the utilization of the page pools on a system.

SORTINT, a new utility, is an international version of the SORT utility. It enables you to sort up to 20 files into a single, ordered output file according to standard ASCII or an external collating sequence. SORTINT also provides the option to reformat the output record. STABLEMT, a new utility, enables you to create or modify files that define an external collating sequence.

Release 6.20 provides internal support for the following optional software: the VS Graphics Facility and the VS Multi-Station.

1.5 NETWORKING OPERATIONS

Release 6.20 supports the Local WangNet Peripheral Band. The Local WangNet Peripheral Band enables a VS CPU to communicate with its peripheral devices through the WangNet local cable, rather than by separate cables from each device to the CPU.

Release 6.20 includes support for WSN (Wang Systems Networking) Point-to-Point transport. Point-to-Point transport supports wide-area communications between suitably equipped Wang systems over dedicated or switched communication lines.

1.6 NEW DEVICES

Release 6.20 supports the following new devices: the 4205 workstation, the 4220 workstation, the 4230 workstation, the 4230A workstation, the 6300GM Graphics workstation, the 2509V serial 9-track tape drive, the 2220 disk drive, and the DW/OS-55 daisy printer. It also includes additional TC support and supports new IOPs and device adapters.

CHAPTER 2
OPERATING SYSTEM ENHANCEMENTS

2.1 PAGING ENHANCEMENTS

Release 6.20 of the VS Operating System enhances the allocation of Segment 2 paging files by the introduction of a page block option (for the VS50 and VS80) or page pool option (for the VS25, VS45, VS85, VS90, and VS100) and by a new volume assignment algorithm. Refer to the VS Operating System Services Reference for a discussion of memory segments and paging.

The use of the page block or page pool option keeps the Segment 2 paging files contiguous. When you allocate the page block or pool, you can locate it near the most active areas of the volume. The contiguity of paging areas and the ability to control their placement can reduce seek times and thus significantly improve system throughput.

2.1.1 Page Block - VS50, VS80

You allocate a page block to a volume through the DISKINIT utility; Section 4.5 summarizes the changes to DISKINIT. Use the following formula to establish the initial size of the page block (in MB):

```
PAGE BLOCK SIZE = [3 + (AVERAGESEG2 * MAXUSERS)] / VOLUMES
```

The formula includes 3MB to accommodate system tasks. Enter the following values for the variables in the formula:

Variable	Value
AVERAGESEG2	The average Segment 2 size (in MB) currently used in your system. Use the default Segment 2 size specified in GENEDIT or, if adjustments have been made for specific tasks or User IDs, calculate the actual average. When in doubt, overestimate the value.
MAXUSERS	The number of tasks (interactive and non-interactive) that are supported during a peak period.

Variable	Value
VOLUMES	The number of volumes to be enabled with page blocks.

The maximum size that can be assigned to a page block is 64MB.

When paging is enabled for a volume that contains a page block, the system allocates paging files within the page block as each task is initiated. Through the Manage Disks function of the Operator's Console or of the Command Processor, you enable or disable paging for a volume. If none of the active page blocks have sufficient contiguous space, or if there are no volumes enabled with page blocks, the system creates discrete paging files, as before.

2.1.2 Page Pool - VS25, VS45, VS85, VS90, VS100

For the VS25, VS45, VS85, VS90, and VS100, the page pool, while similar to the page block, only allocates pages as needed. Thus, in most cases, you can reserve considerably less space for the page pool than you needed for paging files in previous releases.

When paging is enabled for a volume that contains a page pool, tasks are assigned to the page pool as each task is initiated. The system determines where, within the page pool, a task's pages reside, and it only allocates pages as needed. Because the page pool does not require disk storage for unused Segment 2 pages, the Segment 2 paging disk storage requirements are the same when users with different Segment 2 sizes run the same program under identical system conditions. For example, if a program uses 64KB of Segment 2, a user with a Segment 2 size of 256KB and a user with a Segment 2 size of 512KB both use only 64KB of paging space on disk when running that program.

You allocate a page pool through the DISKINIT utility; Section 4.5 summarizes the changes to DISKINIT. Use the following formula to establish the initial size of the page pool (in MB):

```
PAGE POOL SIZE = [5 + (1/2 * AVERAGESEG2 * MAXUSERS)] / VOLUMES
```

The formula includes 5MB to accommodate system tasks and to provide a small margin of safety. Enter the following values for the variables in the formula:

Variable	Value
AVERAGESEG2	The average Segment 2 size (in MB) currently used in your system. Use the default Segment 2 size specified in GENEDIT or, if adjustments have been made for specific tasks or User IDs, calculate the actual average. When in doubt, overestimate the value until you gain experience through actual use of the page pool.

Variable	Value
MAXUSERS	The number of tasks (interactive and non-interactive) that are supported during a peak period.
VOLUMES	The number of volumes to be enabled with page pools.

For example, if most tasks use 512KB (0.5MB) of Segment 2, if there are 60 tasks at peak usage, and if one volume is enabled for paging, the formula is as follows:

```
PAGE POOL SIZE = [5 + (1/2 * .5MB * 60)] / 1 = 20MB page pool
```

After you establish a page pool and monitor its activity, you can reduce its size through DISKINIT to save additional space if actual use is light, or you can increase the size of the page pool to provide a satisfactory margin of safety if actual use nears the pool's capacity.

Although DISKINIT allows you to assign 64MB to a page pool, a page pool uses a maximum of 32MB.

2.1.3 Page Pool Commitment Ratio

The page pool commitment ratio is the allowed ratio of the total Segment 2 sizes of active tasks to the size of the page pool, expressed as a percentage. For example, a commitment ratio of 200% enables a page pool to accommodate tasks with total Segment 2 sizes that are equal to twice the physical size of the page pool. The commitment ratio applies to all active page pools on the system.

The commitment ratio is 200% by default. To modify the commitment ratio, you use the Set System Parameters screen (refer to Figure 2-1). To access this screen, press PF4 from the System Options menu of the Operator's Console.

Enter a value between 100 and 999 in the RATIO field; the default is 200. The system retains the value of the commitment ratio across IPLs.

CAUTION

Changes to the page pool commitment ratio can have a significant impact on the system. Therefore, do not modify the commitment ratio without considering the effects of the change.

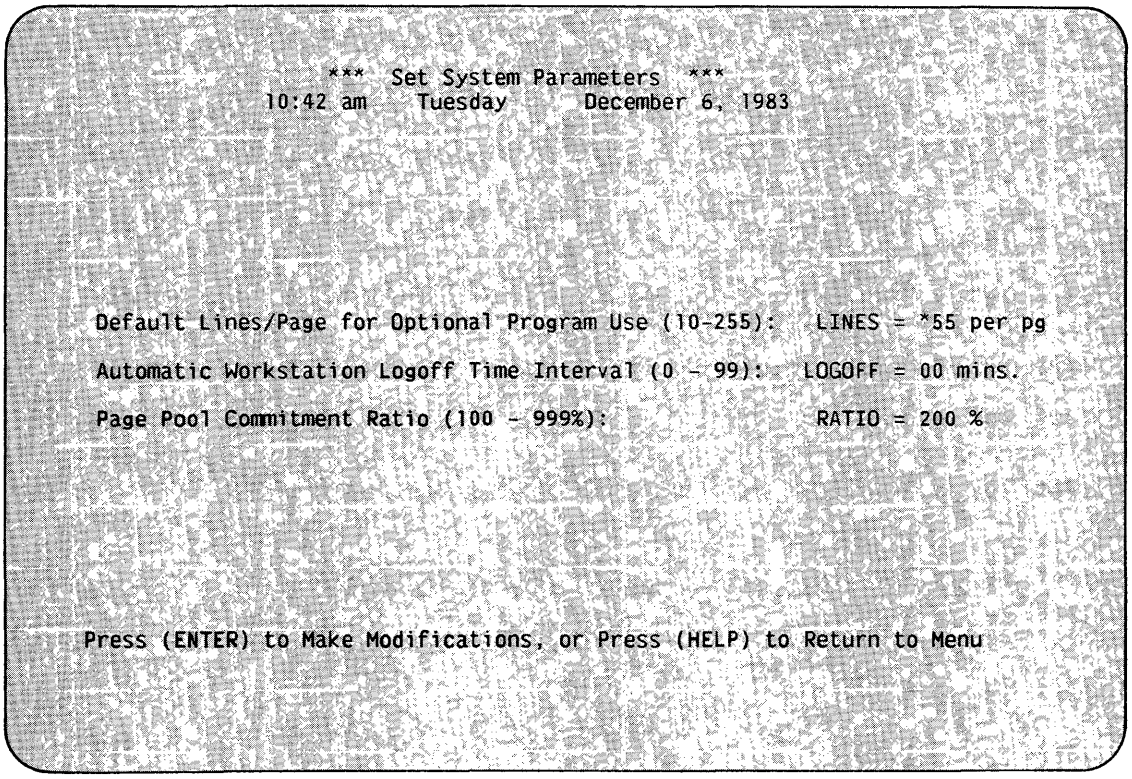

Figure 2-1. Set System Parameters Screen

2.1.4 Monitoring Page Pool Activity

The system monitors the use of the page pools and issues warnings when a pool reaches 75%, 87.5%, and 100% of physical capacity. In addition, a new utility, POOLSTAT, allows you to view these statistics at any time; refer to Section 4.10 for more information about POOLSTAT.

If a page pool approaches capacity, it is recommended that you reduce page pool activity before the pool is completely allocated. Performance is then significantly degraded as more pages are frozen in memory. First, you can reduce the current level of pool activity by requiring tasks assigned to the pool to complete or cancel. To determine which tasks are using the affected page pool, press PF11 from the Control Workstations screen of the Operator's Console. You can then find out which of those tasks are causing heavy paging I/O by pressing PF7 from the Control Interactive Tasks screen of the Operator's Console.

To prevent a pool from approaching capacity again, you can lower the commitment ratio or enable for paging another volume that contains a page pool. You must then require one or more tasks currently assigned to that page pool to log off and log on again. The Segment 2 pages of those tasks are thus moved from the affected pool to another volume or into discrete paging files on the same volume.

If a page pool remains close to capacity over a period of time, you may need to enlarge it through the Relabel function of DISKINIT or establish additional page pools on the system. These long-term solutions eliminate the need for operator intervention and retain the savings in disk space provided by the use of page pools rather than discrete paging files for each task.

2.1.5 Volume Assignment Algorithm

Enhancements for Release 6.20 allow the more efficient assignment of paging files to volumes through an improved assignment algorithm and user control for special cases.

In making an assignment, the system checks the following:

- Whether the volume is enabled for paging
- Whether there is available space on the volume
- Whether the task has been assigned to the volume
- Whether the volume has a page block or pool
- Whether the page block has sufficient contiguous space for the task's Segment 2 paging file or whether the page pool is fully committed
- Whether the volume currently has the fewest number of tasks assigned

If no page blocks or pools are available and if you do not choose to control paging assignments, the system spreads all paging files evenly among the eligible volumes that have available space.

For the VS50 and VS80, if a page block is available, a task's paging file is allocated within the page block if there is sufficient contiguous space for the paging file. Note that, as users log on and off, a page block may become fragmented and lack the contiguous space needed for a particular user's paging file. If there is more than one volume with a page block, the paging files are evenly distributed between them. If none of the active page blocks have sufficient contiguous space for a task's paging file, the existing method of paging file allocation is used.

For the VS25, VS45, VS85, VS90, and VS100, if a page pool is available, tasks are assigned to the pool until it is fully committed (i.e., until the total Segment 2 sizes of the tasks assigned to the pool exceed the pool's physical size multiplied by the commitment ratio). If there is more than one volume with a page pool, the system assigns a task to the pool with the fewest tasks. After a task is assigned to a page pool, the system allocates from the pool all Segment 2 pages required by the task. If all of the page pools are fully committed, the existing method of paging file allocation is used.

A control mechanism allows you to override the default assignment algorithm and to assign each interactive task to a volume to solve special problems. Through the Control Workstations screen of the Operator's Console (refer to Figure 2-2), you can assign foreground tasks by their workstations. Press PF11 from this screen to access the Volume Assignments screen (refer to Figure 2-3). To modify the volume assignment, position the cursor next to an entry and press PF10. The Assigned Paging Volume column is then highlighted. Enter the volume name and press ENTER.

The volume assignment takes effect when a user next logs on to that workstation. If the assigned volume has a page block or pool, the system then assigns the user's Segment 2 to the page block or pool; otherwise, it creates a separate paging file on that volume. The system retains the paging volume assignments across IPLs.

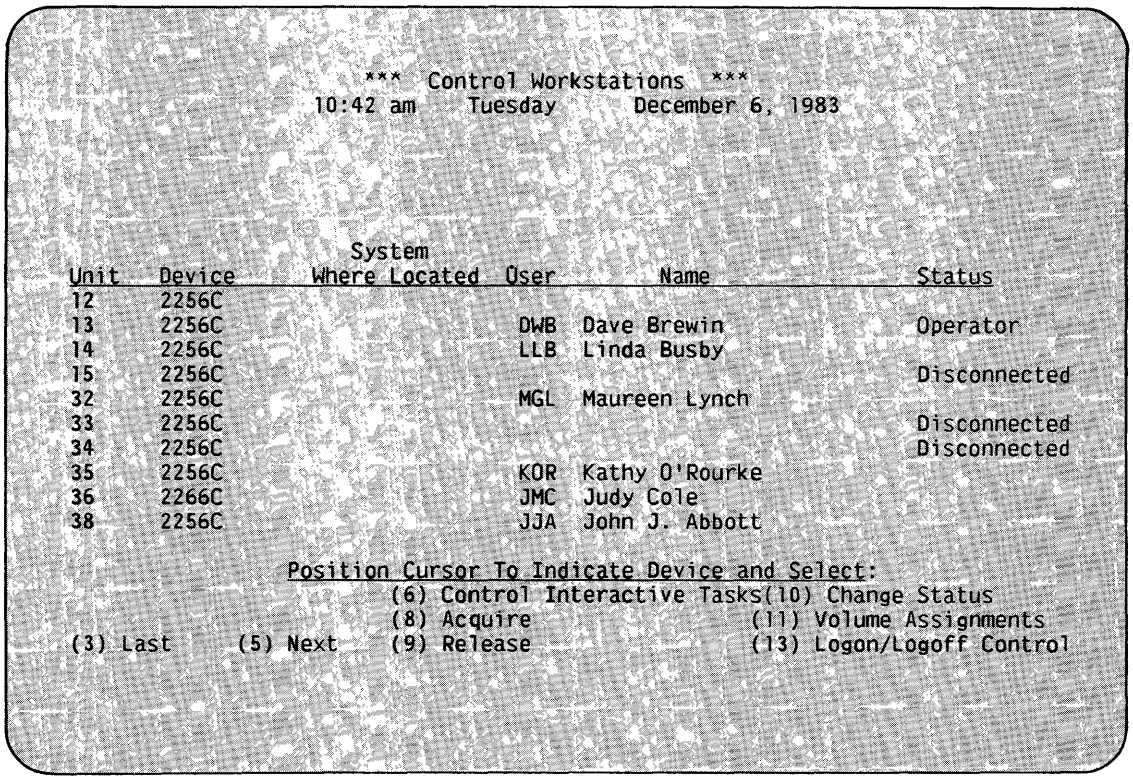

Figure 2-2. Control Workstations Screen

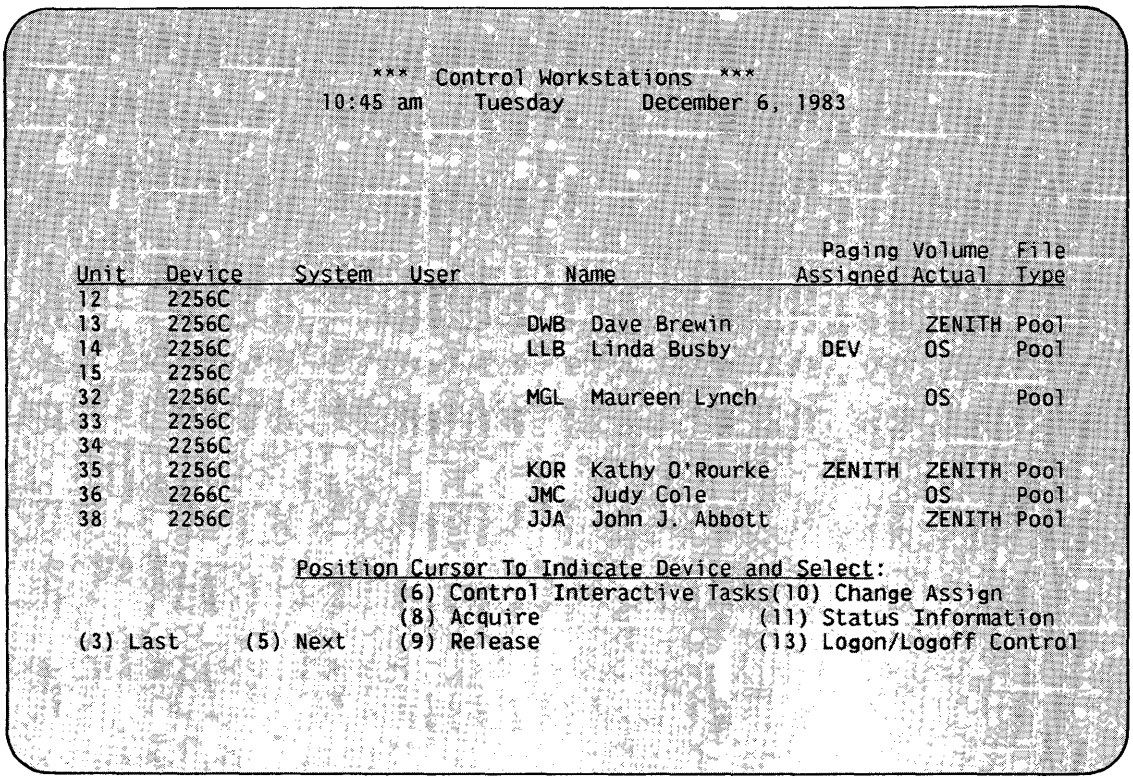

Figure 2-3. Volume Assignments Screen

In Figure 2-3, the actual volume being used for Unit 14 is different from the assigned volume. The system does not use the assigned paging volume if the volume is not mounted, if it is not enabled for paging, or if it has insufficient available space.

This control mechanism enables you to compensate for situations where the majority of I/O activity may not be caused by paging. If, for example, a volume contains an extremely active data file, you may want to offset that activity by disabling paging on that volume or by placing a number of paging files on another volume. You can place paging files on a particular volume by assigning certain workstations to the volume. Once the I/O activity is balanced, the default algorithm can take over to keep it even.

CAUTION

Use the volume assignment control mechanism for special situations only. If applied indiscriminately, it may degrade rather than improve performance.

Paging assignments are made by volume names, not by device numbers. This feature allows you to mount volumes enabled for paging on any device. If a task is assigned to a volume that is not mounted, the pages for the task are assigned to an eligible volume with a page block or pool, if present, or to the eligible volume with the fewest number of paging files.

2.2 AUTOMATIC LOGOFF

Release 6.20 of the VS Operating System has been enhanced with the option to automatically log off inactive workstations. Individual workstations can be enabled and disabled with this feature. Automatic logoff is disabled by default for a workstation.

The system forces the cancellation and logoff of a DP task running on a workstation selected for automatic logoff if it does not receive an unsolicited interrupt (e.g., PF key, HELP key, or ENTER key) during the specified interval. Automatic logoff is not in effect when a workstation is in WP mode.

Automatic logoff is in effect for all DP tasks on the selected workstations. Thus, for example, a program that continuously displays the time of day on a selected workstation is cancelled and logged off if the system does not detect a user response during the time interval. Extremely long compilations or library copies, for example, may be subject to automatic logoff if you run them from a selected workstation. It is recommended, therefore, that the system administrator carefully control the application of this feature.

Release 6.20 remembers the logoff time limit and the status of workstations (i.e., whether automatic logoff is enabled or not) across IPLs.

2.2.1 Implementation

To initiate the automatic logoff feature, you use the Set System Parameters screen (refer to Figure 2-1) to establish the time limit. To access this screen, press PF4 from the System Options menu of the Operator's Console.

To establish the time limit, enter a value in the LOGOFF field. Any value between 0 and 99 or NO is allowed. A value of 0 or NO indicates that the function is disabled, and the system does not check inactivity time.

After setting the time limit, you then access the Control Logon/Logoff screen (refer to Figure 2-4) by pressing PF13 from the Control Workstations screen. Press PF7 to enable or disable the automatic logoff function for each workstation.

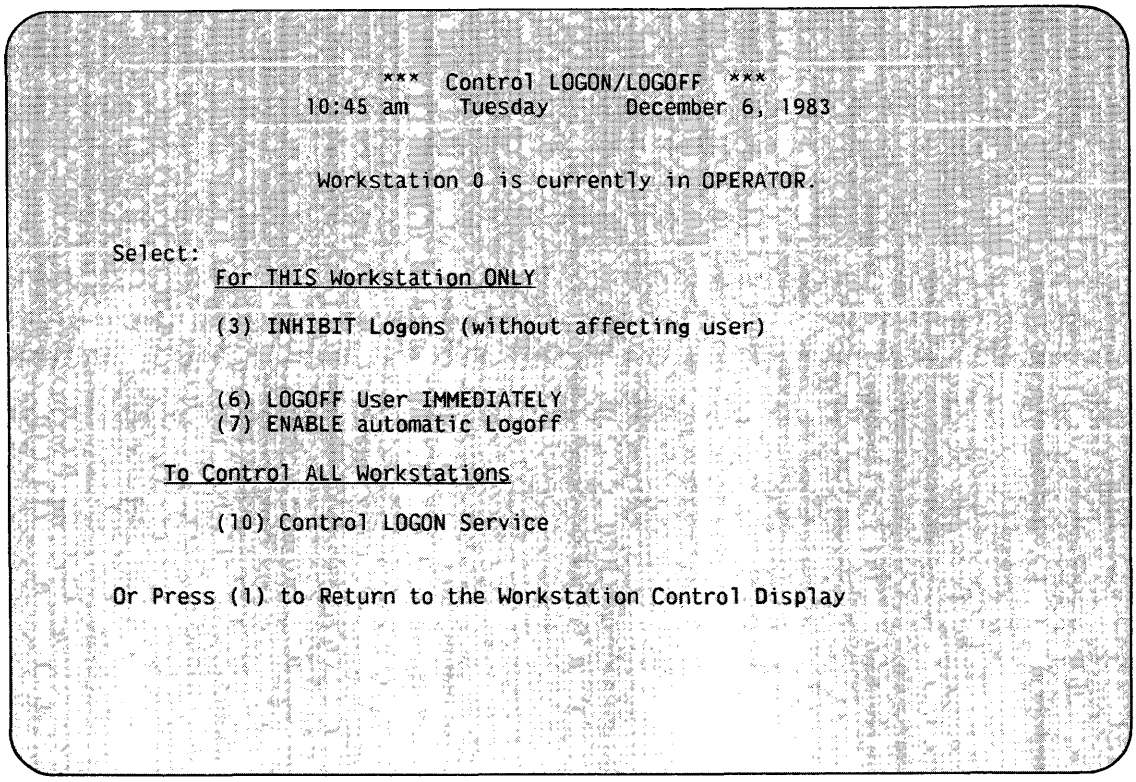

Figure 2-4. Control Logon/Logoff Screen

2.3 VERSION CHECKING

Release 6.20 of the VS Operating System has been enhanced with a mechanism to check the version numbers of operating system program files. The check is performed at system initialization time and determines if any of the critical operating system components are obsolete or incompatible. The system issues a warning when incompatibilities may cause problems with system operation. It halts the IPL when the incompatibilities are known to interfere severely with system operation.

In addition, changes have been made to screens on the Operator's Console to allow you to check the version number of the system nucleus and the critical operating system components.

2.3.1 Implementation

If no critical incompatibilities exist, the system initialization process proceeds unchanged. If a noncritical component has no version number or too low a version number, the system initialization process displays the Version Warning screen (refer to Figure 2-5) on the Operator's Console.

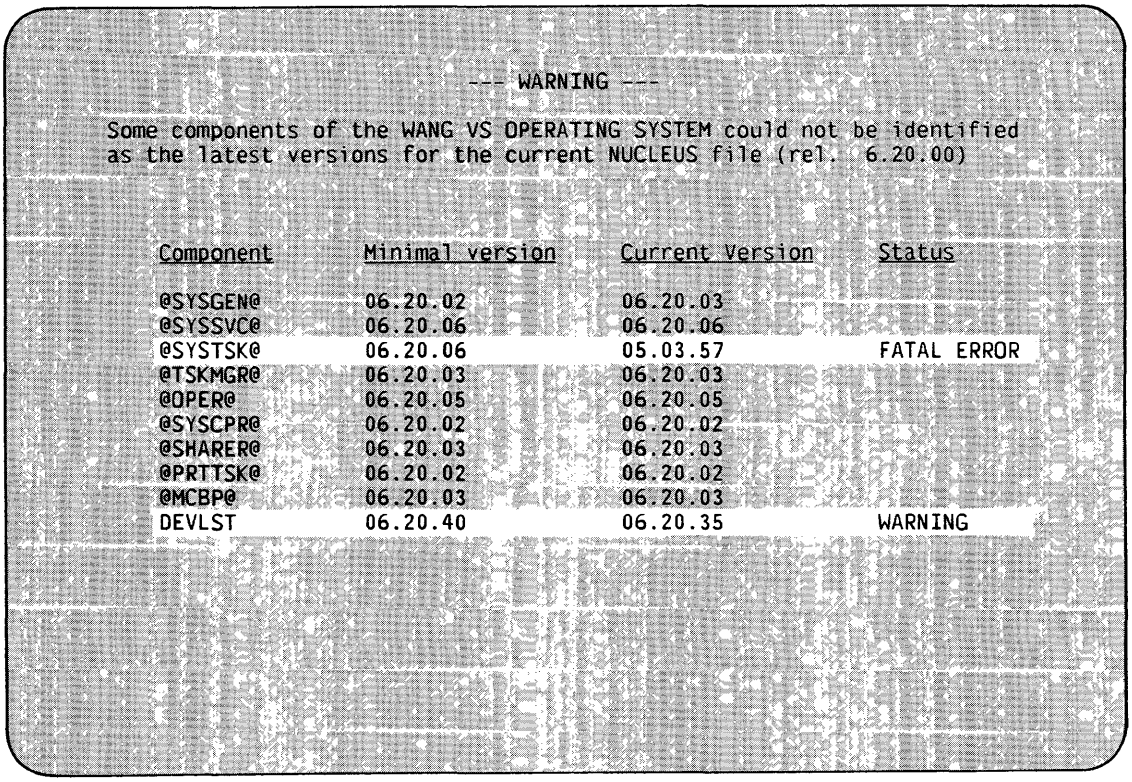

Figure 2-5. Version Warning Screen

The Version Warning screen lists all components checked. If any component is causing a version number problem, the screen entry for that component blinks. The current version of the nucleus is listed at the top of the screen. Component information listed includes the component name, the minimal (oldest) version that will run with the current nucleus, and the current version number for that component and its status.

The status field can contain one of the following designations:

Status	Definition
(blank)	No problems are detected.
WARNING	A version problem exists with this component, but it is not critical enough to halt system initialization.
FATAL ERROR	System initialization cannot continue. You must acquire a current, compatible version of the component and then re-IPL.

If the system cannot determine a component's version number, the Current Version field displays "(unknown)" as the version number. If no fatal problems exist, the final line, "You may continue the system generation by pressing ENTER," is displayed. If you press ENTER when the screen contains a fatal entry, the system enters Control mode.

If the system detects a version number problem with the component @SYSSVC@, it immediately enters Control mode; the Version Warning screen is not displayed. Depending on the relative version numbers of @SYS000@ and @SYSSVC@, one of the following Control mode stops is displayed:

- PRE-6.20 @SYS000@ WITH 6.20 (OR HIGHER) @SYSSVC@ (PCW 00000032 FFFFFF00)
- CURRENT @SYS000@ CANNOT SUPPORT CURRENT @SYSSVC@ (PCW 00000041 FFFFFF00)

2.3.2 Operator's Console Changes

Changes have been made to two screens of the Operator's Console, and one new screen has been added. These changes allow you to check version numbers at any time. The first change is in the System Options menu. To access this screen, press PF14 from the Operator's Console menu. A new function, Display System Versions (PF7), has been added to this screen. Refer to Figure 2-6.

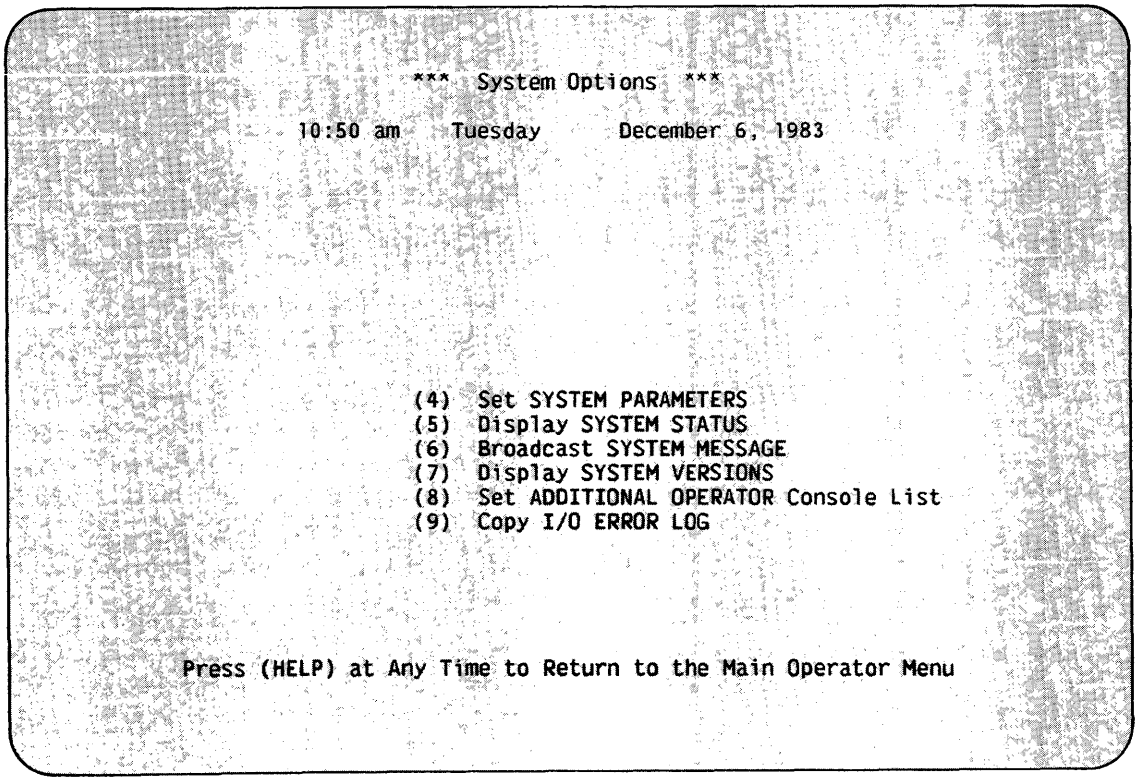

Figure 2-6. System Options Menu

If you press PF7, a new screen, the System Versions screen, is displayed. Refer to Figure 2-7. The first line on this screen lists the configuration file name, or it states that no configuration file has been used. This latter situation can occur if you IPL with one workstation and one disk. It is possible that the configuration file listed has been modified or deleted since the last system initialization.

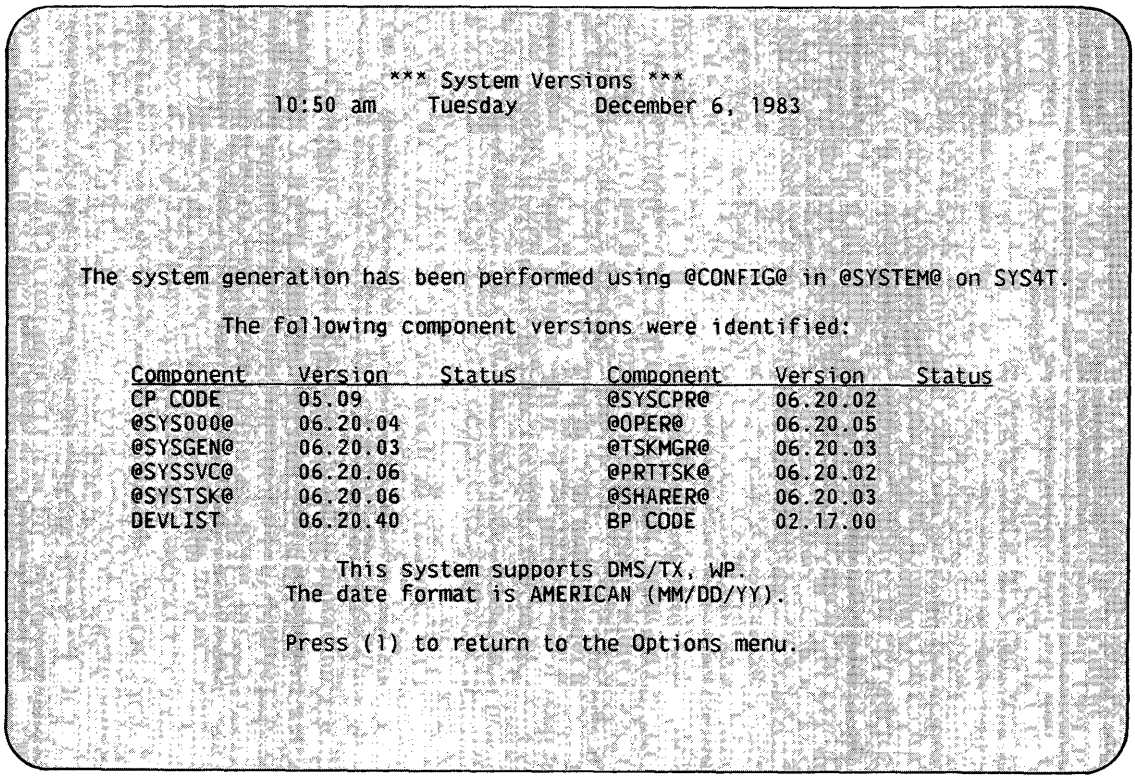

Figure 2-7. System Versions Screen

In addition to the configuration file information, the name, version number, and current status of each component is listed. Note that the component BP CODE only appears for VS25 or VS45 systems. The status field can contain the designation (blank) or (low). The lines at the bottom of the screen list supported software and the system date format.

Operator action messages are displayed on this screen. Press PF1 to return to the System Options menu.

Finally, the System Status screen no longer displays system version information. Refer to Figure 2-8. You can now press PF1 from this screen to return to the System Options menu. Operator action messages are now displayed on this screen.

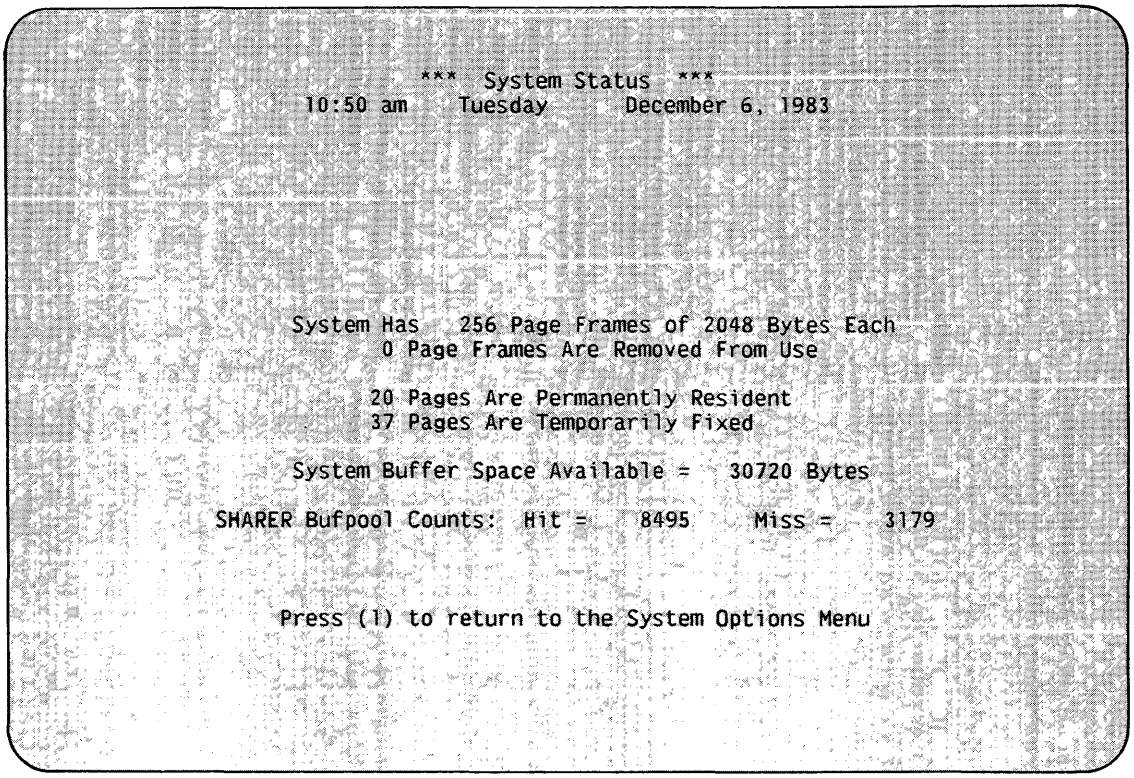

Figure 2-8. System Status Screen

2.4 IPL CHANGES

Three changes have been made to the IPL procedure for Release 6.20 of the VS Operating System. The changes cut down the number of steps you must perform when IPLing your system.

2.4.1 Configuration Files Recalled

Configuration file names are now remembered between IPLs. Previous releases defaulted to @CONFIG@ for the SYSFILE name; you had to specify a file name if you were using a different one. Previous releases also required you to enter the configuration file name for remote devices. Release 6.20 defaults to the file names specified for the last IPL from that disk.

2.4.2 Inhibiting Logons

The System Configuration screen (refer to Figure 2-9) now gives you the option of inhibiting logons for all workstations. If you respond YES to this prompt, all workstations, except Workstation 0, are logon-inhibited at the completion of the IPL. If you respond NO, the workstations remain in the same state they were in prior to the IPL. The default is NO.

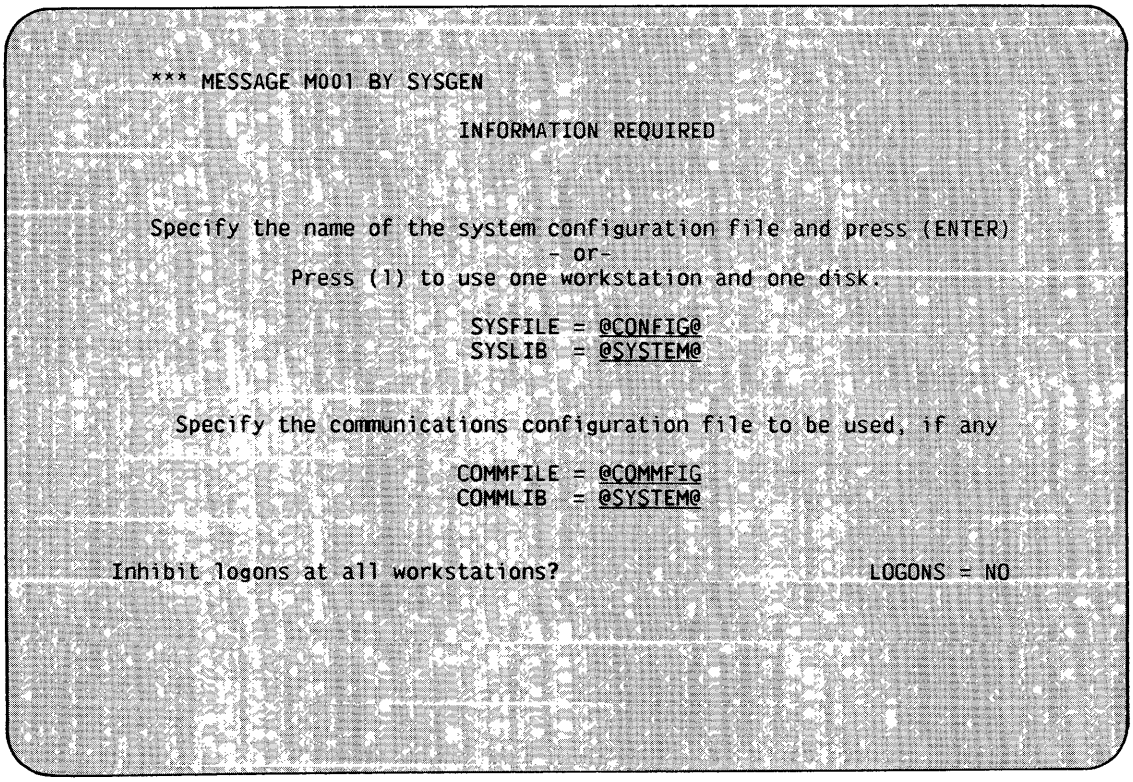

Figure 2-9. System Configuration Screen

2.4.3 Automatic Activation of Remote Devices

The IPL procedure automatically activates any remote workstations and remote printers that have been defined. Section 3.4 explains how to define remote workstation parameters through GENEDIT.

2.5 CONTROL MODE DUMP FACILITY

Release 6.20 of the VS Operating System includes enhancements to the Control Mode Dump facility for VS25, VS45, VS85, VS90, and VS100 systems. Two new screens help you to perform a Control mode dump.

When a system experiences a fatal error, Workstation 0 displays a message that describes the error. With Release 6.20, additional messages further define the error and detail the steps necessary to initiate a Control mode dump (refer to Figure 2-10).

After you perform these steps, Workstation 0 displays the screen shown in Figure 2-11. This screen prompts you to accept the default address for the output device or to enter another address. The dump program copies the contents of main memory to the volume mounted on the device that you specify.

After you enter the above information and mount the output volume if necessary, the dump program proceeds as in previous releases.

```
control mode W   00004B14 47000000
          ↑              ↑

Fatal System error:     WS50-Program check with nothing running

Your Wang VS Operating System has encountered a situation that makes
it necessary to take a control mode dump of main memory.

To do this, the following steps are required:

    1)  Write down the FATAL SYSTEM ERROR message.

    2)  Type a M above the first arrow (↑) on line 1.

    3)  Use the space bar to move the cursor to the right until it is
        above the next arrow (↑).

    4)  When the cursor is in position, type in a 0 (zero).

    5)  Press the ENTER key.

    6)  Type a X above the first arrow (↑) on line 1 and press the
        ENTER key.
```

Figure 2-10. Sample Control Mode Dump Screen

```
At this point it is necessary to indicate the output device address
for the dump program.

Use the default device address or enter another one:  0023

Press the ENTER key.

Mount the dump device and the dump program will begin.
```

Figure 2-11. Control Mode Dump Device Address Screen

2.6 TASK DUMP ENHANCEMENT

System task dumps have been expanded to include Segment 0 control blocks. A system task dump now includes the entire resident GetMem pool and the pages of the nonresident GetMem pool allocated by the system. This enhancement enables Wang field personnel to obtain Segment 0 information without having to perform a Control mode dump.

2.7 MEMORY PARITY ERROR RECOVERY

For VS25, VS45, VS85, VS90, and VS100 systems, Release 6.20 of the VS Operating System handles memory parity errors as follows:

- It determines the address, data, and ECC (Error Correction Code) byte and enters them in the system error log. It enters zeros in the log if it cannot determine the failing address.

- If the address of the parity error is available from the microcode, one of the following occurs:

  - If the failing page or the PC (Program Counter) is in the resident operating system (i.e., resident Segment 0), the system enters Control mode with a message flashing on Workstation 0.

  - If the failing page is in the active user task (user Segment 1, system Segment 1, or user Segment 2), the task crashes, but the system continues to run.

  - In other cases (i.e, if the failing page is in the nonresident Segment 0 code or data areas), the task crashes if the failing page has not been modified. If the failing page has been modified, the system enters Control mode with a message flashing on Workstation 0.

- If the microcode cannot determine the address of the parity error, one of the following occurs:

  - If the privileged bit is on in the current PCW (Program Control Word), the system enters Control mode with a message flashing on Workstation 0.

  - If the privileged bit is off, the active task crashes, but the system continues to run.

2.8 VTOC PERFORMANCE ENHANCEMENT

In previous releases of the VS Operating System, each VTOC operation on a crash- or media-tolerant volume required the bit map block to be read from the disk. Release 6.20 now retains the bit map block, once read, in memory. This enhancement eliminates the additional I/O overhead for READFDR, READVTOC, and OPEN (for existing files) operations and reduces the overhead for other operations.

> **WARNING**
>
> This enhancement makes it imperative that you logically mount and dismount volumes when you physically change the disk packs. Otherwise, the use of the bit map from a previously mounted volume may result in data or VTOC corruption.

2.9 MORE SYSTEM QUEUE ENTRIES

The size of the System Queue file (i.e., the file named QUEUE in the library @SYSWORK on the System volume) has been increased. The System Task uses this file to hold the Print, Job, and File Transfer queues and some system-related information that is retained across IPLs. The larger size of the System Queue file enables the System Task to handle a greater number of printers, remote systems, and queue entries.

The System Task can now handle 75 printers. Previously, the System Task handled a maximum of 50 printers.

The System Task now allocates space for 128 remote systems. Previously, it allocated space for 32 remote systems.

The System Queue file now contains a maximum of 2048 entries. The previous maximum was 855 entries.

2.10 REMOTE DEVICE SUPPORT

Release 6.20 includes the remote device support from Release 5.1. The remote device support in Release 6.20 is functionally identical to that in 5.1.73 except for the implementation of automatic activation. Remote device support includes the following features:

- The definition of remote devices is retained throughout the activation and deactivation process. Thus, you do not have to enter the definition of a remote device each time you deactivate it.

- Through the Manage Devices function of the Command Processor, a remote workstation without Operator privileges can control the printer that is physically attached to it.

- Print scheduling information for an activated remote printer is retained across IPLs and throughout the activation and deactivation process.

Full support requires new workstation PROMs and microcode, new IOP PROMs and microcode, and a hardware ECO.

CHAPTER 3
RELEASE 6.20 SYSGEN PROCEDURE

3.1 INTRODUCTION

The SYSGEN procedure has changed for Release 6.20. The following sections summarize the enhancements to GENEDIT. For details of the Release 6.20 SYSGEN procedure, see the VS System Administrator's Reference.

3.2 GENEDIT GENERAL CONFIGURATION SCREEN

The GENEDIT General Configuration screen (refer to Figure 3-1) now requests that you specify the number of WangNet workstation lines to be configured. If you specify more lines than can be supported in the configuration, only the maximum number supported is generated when you create the configuration file. GENEDIT notifies you of this by displaying a message just before the configuration file is created.

3.3 VS25 AND VS45 DEVICE ADAPTER CONFIGURATION

You must now specify the device adapter configuration for the VS25 and VS45. This section describes the screens that allow you to select and modify the device adapter configuration for your system.

The VS25/45 IOP Selection screen allows you to specify the number and type of device adapters in the system. GENEDIT automatically displays the default device adapters required to support the devices you specified on the GENEDIT General Configuration screen. A sample IOP Selection screen for a VS25 or VS45 system is shown in Figure 3-2.

```
                    *** WANG VS GENEDITOR ***

            Please select your general configuration:

                    016  WORKSTATIONs
                     04  PRINTERs
                     04  DISKs
                     00  TAPEs
                     02  TC LINEs

                    000  NON-INTERACTIVE TASKs


                    000  WANGNET workstation lines


                    Press (ENTER) to continue

                         (16) RESTART
                         (30) SYSTEM MENU
```

Figure 3-1. GENEDIT General Configuration Screen

```
                    *** WANG VS GENEDITOR ***

              Your general configuration minimally requires
                   the following I/O processors (IOPs):

  IOP Dev#   ID      Type

   2    0   25V27    Serial Dev Adapter
   0   16   25V02    Small Disk IOP
   1   20   25V55    Fxd Disk Dev Adapter
   3   22   25V76    TC Device Adapter
   4
   5   54   25V50    Disk Device Adapter
   6
   7
                                 Press (ENTER) to continue

                          (1)  Add    IOP      (4)  Change Dev#
                          (2)  Delete IOP      (5)  Show IOPs
                          (3)  Change IOP      (32) General menu
```

Figure 3-2. VS25/45 IOP Selection Screen

The default device adapters in Figure 3-2 are listed in ascending order by device numbers. However, device adapter IDs must match the correct IOP addresses. You can modify the default parameters by adding, deleting, changing, or rearranging device adapters on the IOP Selection screen as long as device adapter assignments match the correct IOP addresses. Table 3-1 lists all valid VS25 and VS45 device adapters and their IOP addresses.

Table 3-1. Valid VS25/45 Device Adapters and IOP Addresses

IOP Sequence	Device Adapter	Description
0	25V02	Small disk (diskette) controller (default)
1	25V55	Fixed disk (34MB) controller (default)
	25V50-0	Fixed disk (76MB) controller
2	25V27	Serial controller (default)
	25V37	Intelligent SIO controller
	25V67	Wang Band controller
3	25V76	TC controller (default)
4	Unassigned	
5	25V50	Cartridge Module Disk (CMD)/ Storage Module Disk (SMD) controller (default)
6	Unassigned	
7	Not assigned	

If you enter an invalid device adapter assignment, an error message is displayed on your screen so that you can correct the entry. For example, if you enter a 25V37 device adapter ID for IOP 1, the error message THIS SLOT REQUIRES HARD DISK CONTROLLER ONLY is displayed. Choose the correct fixed disk device adapter ID and modify the entry on the VS25/45 IOP Selection screen.

When the VS25/45 IOP Selection screen (Figure 3-2) is satisfactory, press ENTER to write the desired IOP configuration to the configuration work file. This step leads you to a series of screens that displays each IOP and its supported devices.

3.4 AUTOMATIC ACTIVATION OF REMOTE DEVICES

To enable automatic activation of remote workstations and remote printers, GENEDIT now allows you to define the parameters for remote devices in a configuration file. If you indicate through the GENEDIT IOP device selection screens that telecommunications (TC) devices are attached to your system, the Remote Workstation Automatic Activation screen (refer to Figure 3-3) is displayed just before you complete the configuration file. This screen asks you if you wish to define parameters for remote devices.

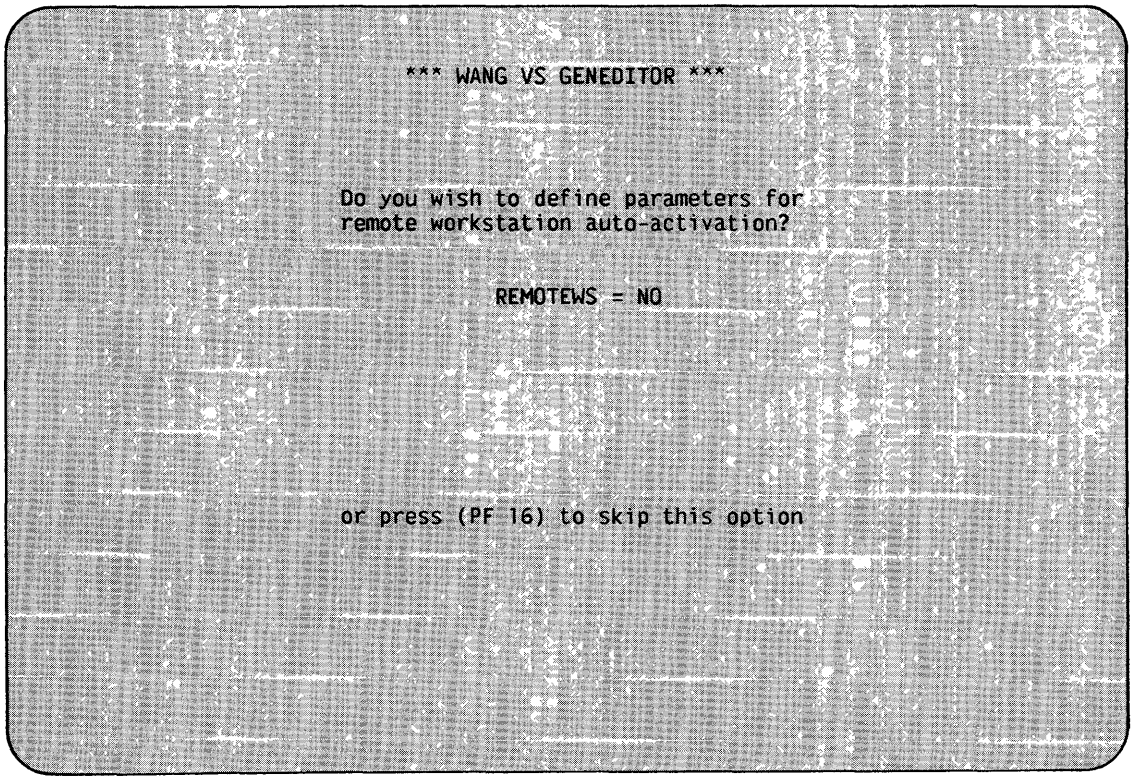

Figure 3-3. Remote Workstation Automatic Activation Screen

Press PF16 to continue without enabling automatic activation.

Enter YES and press ENTER to define automatic activation parameters. At this time, the following message is displayed:

Retrieving the device list for the next TC IOP. Please wait.

The IOP Device Selection screen (refer to Figure 3-4) is then displayed. This screen lists the devices that have been defined for each TC IOP and prompts you for the line name and routing address of each device. At this time, you can define a remote device as a generic TC device to prevent activation of it, or you can specify a valid device type, along with the line name and routing address necessary to activate it. Remote devices must be defined as valid device types and given line names and routing addresses in order for automatic activation to take place at IPL time. Press PF2 to display a list of all valid TC IOP device types.

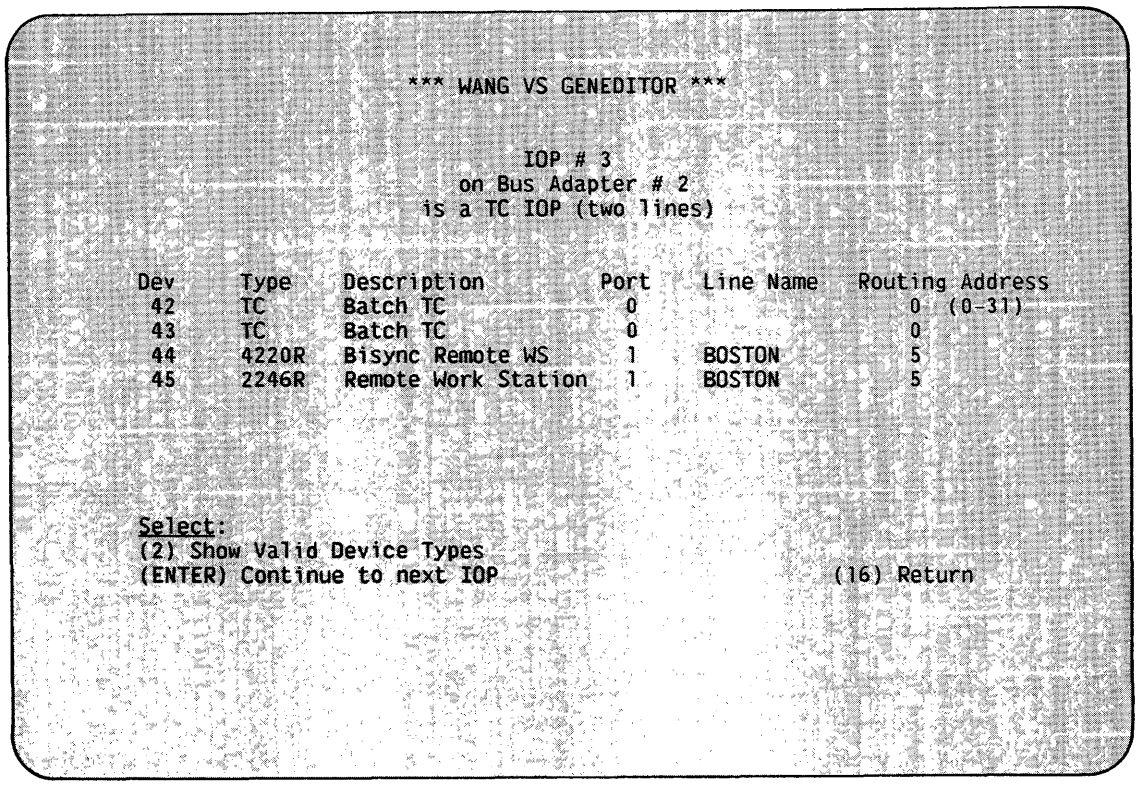

Figure 3-4. TC IOP Device Selection Screen

When you are satisfied with the information displayed, press ENTER to continue with the GENEDIT procedure for completing the configuration file.

3.5 MAXIMUM NUMBER OF OPEN FILES

Through the System Options menu of GENEDIT, you can now establish a maximum of 9999 open files per task. The previous maximum was 99 files. Note that the amount of available system memory limits the actual number of files that a task can open at a particular time.

CHAPTER 4
SYSTEM SOFTWARE ENHANCEMENTS

4.1 BACKUP

Release 6.20 includes several enhancements to the BACKUP utility. For more information about BACKUP, refer to the VS System Operator's Reference.

The Mount screen has changed. The new screen asks for a TYPE specification when you mount a disk volume. Values are F (Fixed) or R (Removable). The default specification is R. Figure 4-1 illustrates the Mount screen.

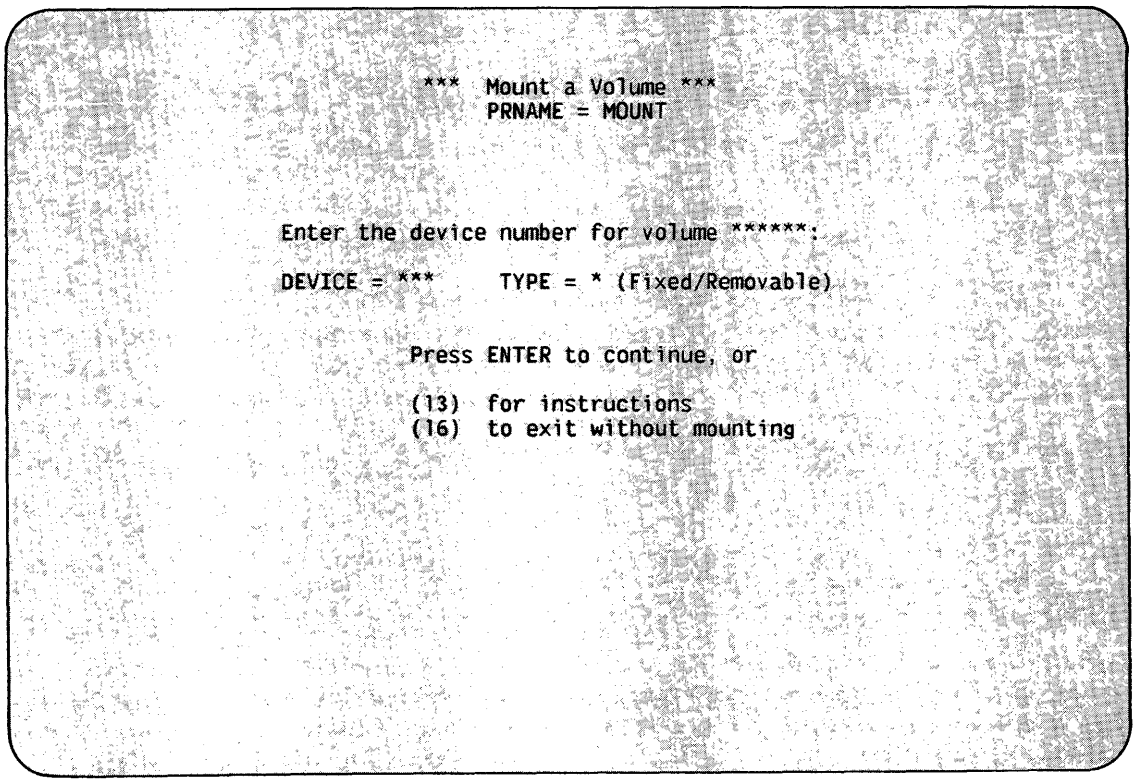

Figure 4-1. BACKUP Mount Screen

You can no longer back up the libraries @SYSPAGE, @SYSDUMP, or @SYSPOOL. You can use TAPECOPY if you need to copy these libraries.

The VOLCOPY option of BACKUP now includes support for 288MB and 620MB dual-port disk drives.

4.1.1 BACKUP Through a Procedure

Version 5.0 of BACKUP was designed to support procedures written for use with Version 4.0. However, in two cases, you may need to modify procedures written for earlier versions of BACKUP.

You can no longer specify ENTER CONFLICT within a procedure to avoid the display of possession conflict errors at the workstation. If you do not wish these errors displayed, specify ERRDISP = NO as part of the INPUT GETPARM.

If you specify DUPFILES = PROMPT in the OPTIONS GETPARM, you cannot also use the procedure to scratch duplicate files as they occur. Instead, you must scratch the files before you run BACKUP, specify DUPFILES = SCRATCH in the OPTIONS GETPARM to scratch all of the duplicate files, or specify SCRATCH on the Duplicate File screen as each duplicate file arises. If you wish to choose an option besides SCRATCH for handling duplicate files, you can specify DUPFILES = PROMPT and then interactively choose the appropriate option for each duplicate file on the Duplicate File screen. You cannot proceduralize the Duplicate File screen.

4.2 COMPRESS-IN-PLACE (CIP)

Release 6.20 includes a new utility, Compress-In-Place (CIP). CIP enables you to consolidate free extents on nonsystem disks without performing a full volume backup and restore. It provides useful free space and improves performance by reducing disk seek time. Refer to the VS System Utilities Reference for detailed information on CIP.

CIP enables you to compress only nonsystem volumes, those that you can obtain exclusively. CIP must be run by a task with a Segment 2 size of at least 512KB. For system volumes, CIP is available as an option of the VS Stand-Alone Utility System on the VS25, VS45, VS85, VS90, and VS100; refer to Section 4.14 for more information.

NOTE

Before you run CIP, it is recommended that you run LISTVTOC to ensure that the VTOC is intact. If the VTOC has been damaged, do not use CIP. Instead, run the Backup and Restore options of the BACKUP utility.

When you run CIP, the Input Definition screen asks you to specify the volume you wish to compress. The volume must be mounted for exclusive use. Figure 4-2 illustrates the Input Definition screen.

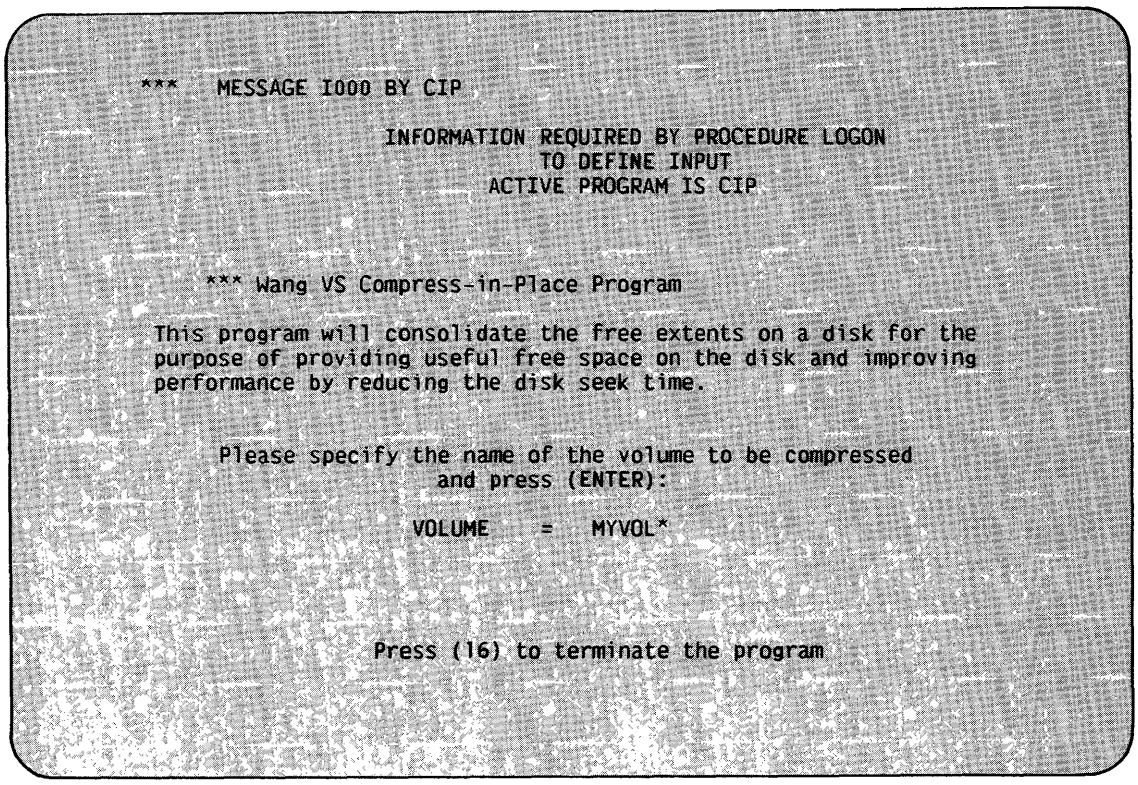

Figure 4-2. CIP Input Definition Screen

After specifying the volume name, press ENTER. If the volume that you specified is not mounted, the Mount screen prompts you to specify the device where you will mount the disk and waits for you to mount it. Press ENTER after the disk is mounted. Figure 4-3 illustrates the Mount screen.

When the compress operation is complete, CIP displays the Input Definition screen again. You can then run CIP again, or you can exit from CIP.

Several error messages are possible with this utility. If an I/O error occurs, CIP displays a message that includes the error I/O status word in hexadecimal digits. You must press ENTER to acknowledge the error, and CIP is then cancelled.

CIP is not appropriate if a volume contains a large number of files. Currently, the limit is approximately 26,000 extents per disk. A message informs you if your files exceed the limit, and you must press ENTER to acknowledge the condition. In this case, you must do a full backup and restore to compress the volume.

You can minimize disk fragmentation if you run BACKUP to fully compress the disk and then use CIP on a regular basis.

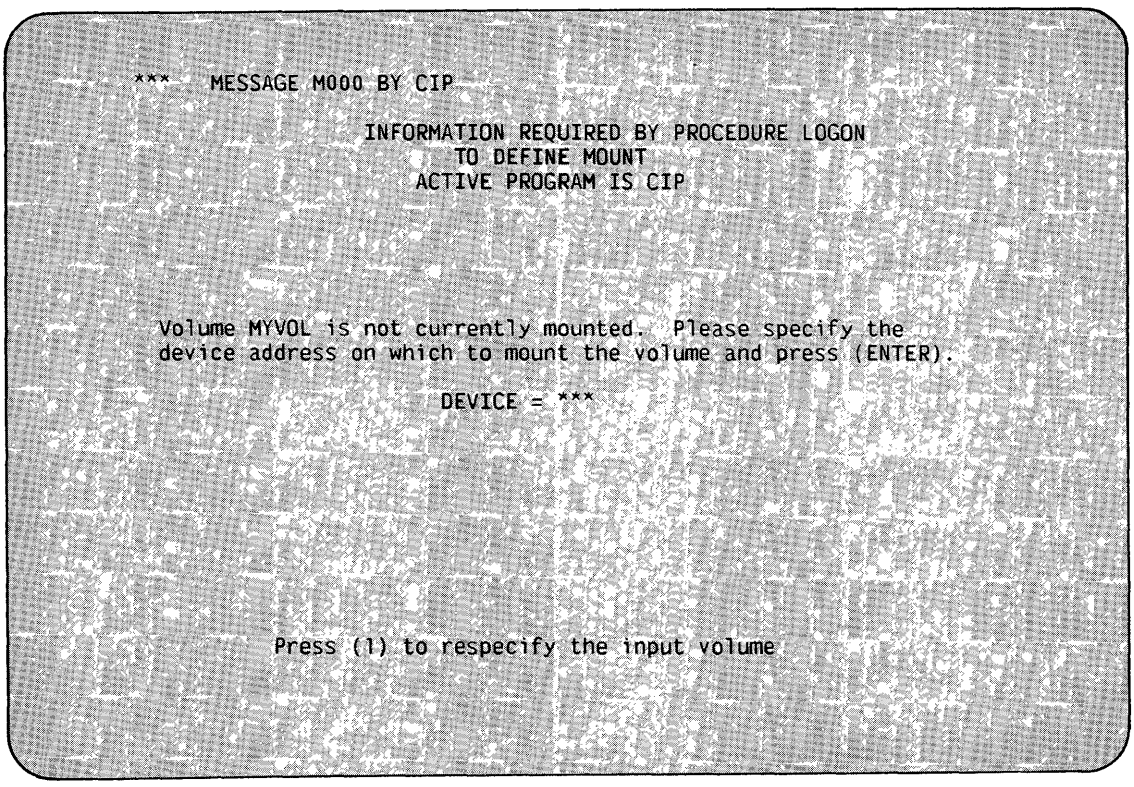

Figure 4-3. CIP Mount Screen

If the volume is not crash- or media-tolerant and the CIP utility is cancelled abnormally, run LISTVTOC to be sure the VTOC is intact. The data will always be intact in this case. If the VTOC has been damaged, run the Backup and Restore options of the BACKUP utility to restore the disk.

4.3 COPY

Two screens have been changed in the COPY utility. The Options screen now enables you to specify a relative file organization for the output file. The Input Definition screen now includes the MODE field. You use this field to specify whether the input file will be opened in Shared or Input mode. Refer to the VS System Utilities Reference for more information about COPY.

4.3.1 Relative Files

You can now specify relative file organization in the FILEORG field on the Options screen (refer to Figure 4-4). If REORG is equal to YES for a relative file, the Record Access Method (RAM) is used to copy the file. A RAM copy also occurs if you change a relative file to a consecutive or indexed file or if you change a consecutive or indexed file to a relative file. If a relative file is copied to a relative file without reorganization, a BAM (Block Access Method) copy is made.

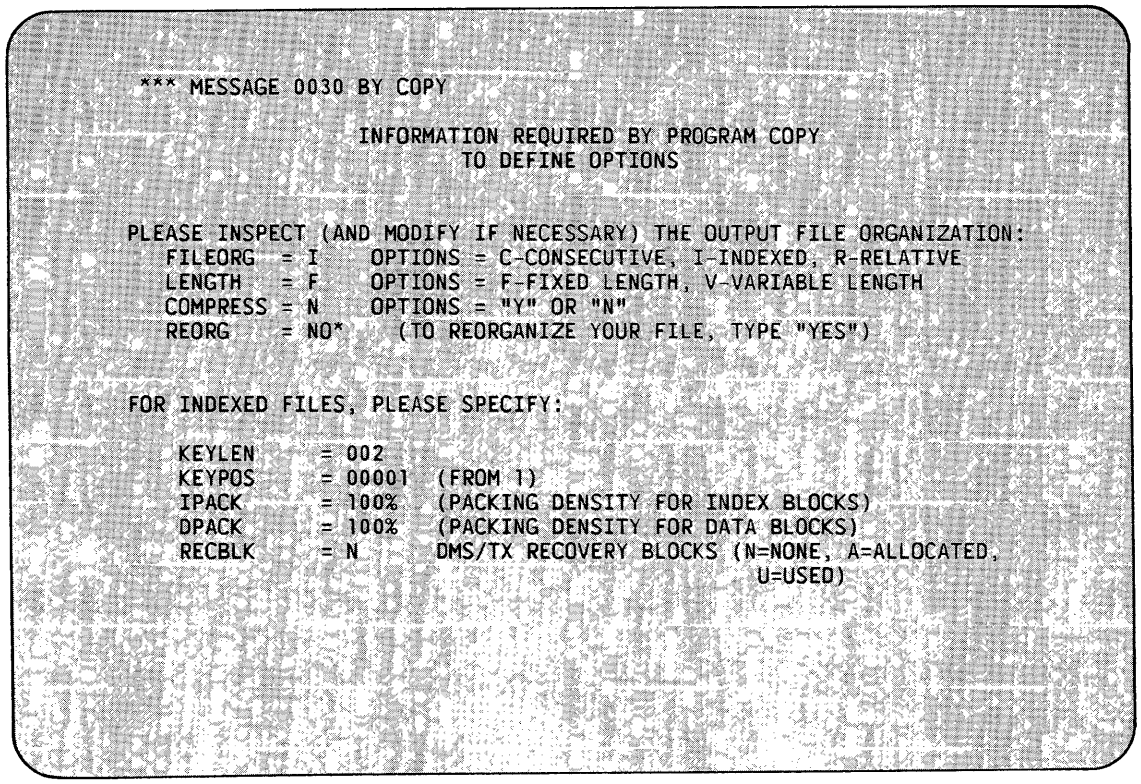

Figure 4-4. COPY Options Screen

4.3.2 Shared Files

A new field, MODE, on the Input Definition screen (refer to Figure 4-5) enables you to specify whether COPY will open indexed and consecutive files in Shared or Input mode. Enter INPUT or SHARED in the MODE field; the default is INPUT. If you specify Shared mode for a library or volume copy, COPY opens all indexed and consecutive files in Shared mode; it opens all other files in Input mode.

If you specify SHARED, COPY displays the Lock screen (refer to Figure 4-6). The LOCK field enables you to request that the file be locked during the copy operation. Enter YES or NO; the default is YES. If you lock a file, no changes to the file can occur while you are copying it. If you specify NO, no lock is placed on the file, and there is no need to specify the TIMEOUT and BYPASS options.

If a file is held for update by another user, the TIMEOUT field specifies the length of time that COPY waits to open the file in Shared mode with a lock. You can specify a timeout for a file if LOCK is equal to YES. Enter a value from 0 to 255 seconds; the default is 10 seconds.

```
*** MESSAGE C001 BY COPY

                INFORMATION REQUIRED BY PROGRAM COPY
                        TO DEFINE INPUT


    WANG VS COPY PROGRAM

    PLEASE ASSIGN "INPUT"          (TO BE USED AS INPUT BY THE PROGRAM)

    PLEASE SPECIFY THE COPY OPTION DESIRED:
       COPY     = FILE***          (OPTIONS = FILE, LIBRARY, OR VOLUME)

    PLEASE SPECIFY THE FILE INFORMATION NEEDED:
       FILE     = ******** IN LIBRARY = JMCDATA* ON VOLUME = ZENITH

    PLEASE SPECIFY THE MODE IN WHICH TO OPEN THE FILES TO BE COPIED:
       MODE     = INPUT*           (OPTIONS = INPUT OR SHARED)


                          Press PF16 to terminate COPY.
```

Figure 4-5. COPY Input Definition Screen

```
*** MESSAGE 0057 BY COPY

                INFORMATION REQUIRED BY PROGRAM COPY
                        TO DEFINE LOCK



PLEASE ENTER THE FOLLOWING OPTIONS TO PROCESS A FILE IN SHARED MODE.

SHOULD A LOCK BE PLACED ON THE FILE BEFORE COPYING?    LOCK     = YES (YES, NO)
  IF YES, NO CHANGES TO THE FILE CAN BE MADE DURING
  THE COPY.  IF NO, CHANGES TO THE FILE CAN BE MADE.

IF LOCK= YES, SPECIFY TIMEOUT AND BYPASS:

HOW MANY SECONDS SHOULD THE TIMEOUT BE?                TIMEOUT  = 10* SECONDS

IF THE TIMEOUT EXPIRES, SHOULD THE FILE BE BYPASSED?   BYPASS   = NO* (YES, NO)
```

Figure 4-6. COPY Lock Screen

The BYPASS field allows you to specify whether a file should be skipped when a timeout expires. This feature is especially useful for background tasks. Values for BYPASS are YES and NO; the default is NO.

If BYPASS is NO during a background task and the timeout expires, that copy is cancelled. If BYPASS is NO during a foreground task and the timeout expires, the Lock screen reappears with the message

FILE XXXXXXXX IN XXXXXXXX ON XXXXXX IS HELD BY USER XXX.

You can then redefine the LOCK, TIMEOUT, and BYPASS options and press ENTER to continue with the copy operation. You can also press PF1 to skip the particular file on which the timeout occurred, or you can press PF16 to terminate the copy operation if you are copying a library or volume.

If BYPASS is YES for foreground or background tasks, the copy operation proceeds, but the output will not contain a copy of the file for which the timeout occurred.

The Record Access Method (RAM) is always used to copy shared files.

4.4 DATA MANAGEMENT SYSTEM (DMS)

Release 6.20 includes the following enhancements to the Data Management System (DMS):

- The WRITE function request now enables you to add records to consecutive files in I/O or Shared mode.
- DMS supports the relative file organization on the VS25, VS45, VS85, VS90, and VS100.
- DMS supports the shared I/O update of consecutive disk files.

The sections that follow summarize these enhancements. For further information, refer to the VS Data Management System (DMS) Reference.

4.4.1 The WRITE Function Request

You can now use the WRITE function request to add new records to consecutive files in I/O or Shared mode. For consecutive files, a WRITE performs the same function in Output, Extend, I/O, and Shared modes; it writes a record to the end of the file. When DMS writes a record to a consecutive file in I/O or Shared mode, it does not change the current record pointer value.

4.4.2 Relative File Organization

DMS now supports the relative file organization on the VS25, VS45, VS85, VS90, and VS100. Relative file structure is in many respects similar to consecutive file structure. A relative file consists of consecutive storage areas called record slots. DMS assigns each of these record slots a Relative Record Number (RRN). Each record slot can contain one data record.

The principal difference between consecutive files and relative files is that you can create the space for a record in a relative file without actually placing any data in that record space. You can subsequently use these empty record slots as places to insert records in the relative file.

All record slots in a relative file are of a user-specified fixed length. The length of the data within the record slot can vary from zero bytes up to the maximum record size. The first two bytes of every record slot are a system-generated record length field. DMS uses this field to determine if a slot is empty or if it contains a record.

DMS allows you to access records either sequentially or directly by Relative Record Number (RRN). When reading sequentially, a program reads the data records in the file in the order of their physical sequence in the file. Direct access allows the program to access a particular record in a relative file by specifying the record's RRN; the first record in a file is RRN 1.

In the relative file shown in Figure 4-7, the first and fourth records are empty record slots; the record length is 00. The second and fifth records contain variable-length records. The record length is equal to the length of the data plus the 2-byte record length field. The third record is a zero-length record. The record length field indicates that a record is present, but that record consists of only the 2-byte record length field.

00	28ABCDEFGH IJKLMNOPQR STUVWXYZ	02	00	05ABC

Figure 4-7. Relative File Structure

When reading a relative file sequentially, DMS skips over empty record slots and reads only actual data records. When accessing a relative file directly, you can access both empty record slots and record slots that contain data. DMS views zero-length records as data records although they contain no actual data. You can use zero-length records to reserve record slots.

Table 4-1 lists the DMS function requests that RAM (Record Access Method) supports for relative files.

Table 4-1. DMS Function Requests for Relative Files

Function Request	Input Mode	Output Mode	I/O Mode	Extend Mode
READ	No modifier REL HOLD		No modifier REL HOLD	
WRITE	No modifier	No modifier	No modifier EOF	
REWRITE			No modifier REL	
START	EQ GT GE LE LT	OUTPUT EXTEND IO	OUTPUT EXTEND IO EQ GT GE LT LE	OUTPUT EXTEND IO
DELETE			No modifier REL EOF	

You can add or delete records within a relative file. However, you must allocate space before adding a record; deleting a record does not reduce the size of the file. You add a record to a relative file by placing it in an empty record slot or by adding it to the end of the file.

If you try to add a record with an RRN higher than any of the RRNs in the relative file's current space allocation, DMS automatically allocates as many additional extents as are needed (up to a total of 13 extents) to include the RRN of the new record.

If the relative file contains variable-length records, you can modify a record by locating and replacing the record with a record of equal, greater, or lesser length; the new record's length must not be greater than the maximum record length for the file. Compressed-length records are not supported. Records can be deleted from relative files; the deletion of a record leaves an empty record slot available for the addition of a new record.

You can use all three file access methods - RAM (Record Access Method), BAM (Block Access Method), and PAM (Physical Access Method) - to process relative files. In RAM you can create hashing algorithms or direct addressing methods to associate a unique record value with an RRN for rapid record access. Because the number of record slots per block is consistent, you can perform BAM or PAM access to locate the block containing a particular record. These features make relative files particularly well suited for applications that require rapid access to individual records by record location.

You should choose the relative file organization if speed of access and the ability to modify and delete existing records are major considerations. Relative files are supported on disk in COBOL and Assembly language.

4.4.3 Shared Consecutive Files

Release 6.20 of the VS Operating System includes support for shared I/O update of consecutive disk files. This enhancement allows multiple users to concurrently update a consecutive file by modifying or adding records. Shared I/O mode is supported for all types of consecutive files. The records in the consecutive files can be fixed-length, variable-length, or compressed-length.

Consecutive files opened for shared I/O should not be confused with log files. A log file is a consecutive disk file that multiple users can concurrently open in Shared mode to sequentially write records to the log. Release 6.20 continues to support log file processing as before; in addition, you can now close a log file and then reopen it as a shared file for I/O processing. However, users cannot concurrently process a file as a log file and as a consecutive file opened for shared I/O.

The holding of resources in shared consecutive files is similar to the holding of resources in indexed files. You can use a READ HOLD function request to issue implicit holds and a START HOLD function request to issue explicit holds.

You can issue explicit holds for an entire file, a group of records in a file, or a single record. An unmodified START HOLD function request holds an entire consecutive file. To hold a group of records, you supply a Relative Record Number (RRN) to the KEYAREA field and perform an explicit hold (e.g., START HOLD RANGE). DMS holds all existing records with an RRN greater than the RRN you specified. It also prevents other users from writing additional records to the end of the file. To explicitly hold an individual record, you supply the record's RRN to the KEYAREA field and issue a START HOLD EQ function request. This function request is only used for shared consecutive files opened for update.

Most indexed file sharing operations can now specify both indexed and consecutive file resources. You can perform an explicit hold of a list of resources; the list can contain both consecutive and indexed file resources. You can hold consecutive file records for retrieval. You explicitly release the held resources by issuing a separate START RELEASE function request for each consecutive or indexed file. Extension rights are supported for shared I/O processing of both consecutive files and indexed files.

Release 6.20 supports shared update processing of consecutive files in RPG II and Assembly language. The DMS sharing of consecutive files does not affect DMS/TX sharing of indexed file resources.

4.5 DISKINIT

The DISKINIT utility has been enhanced to support the allocation of a page block (for the VS50 and VS80) or a page pool (for the VS25, VS45, VS85, VS90, and VS100). For more information about the paging enhancements, refer to Section 2.1.

When you initialize, reformat, or relabel a disk, DISKINIT prompts you to indicate whether you want to allocate a page block or pool. Figure 4-8 illustrates the Initialize screen. Enter YES or NO in the PAGEPOOL field. The default is YES if the volume already contains a page block or pool; otherwise, the default is NO.

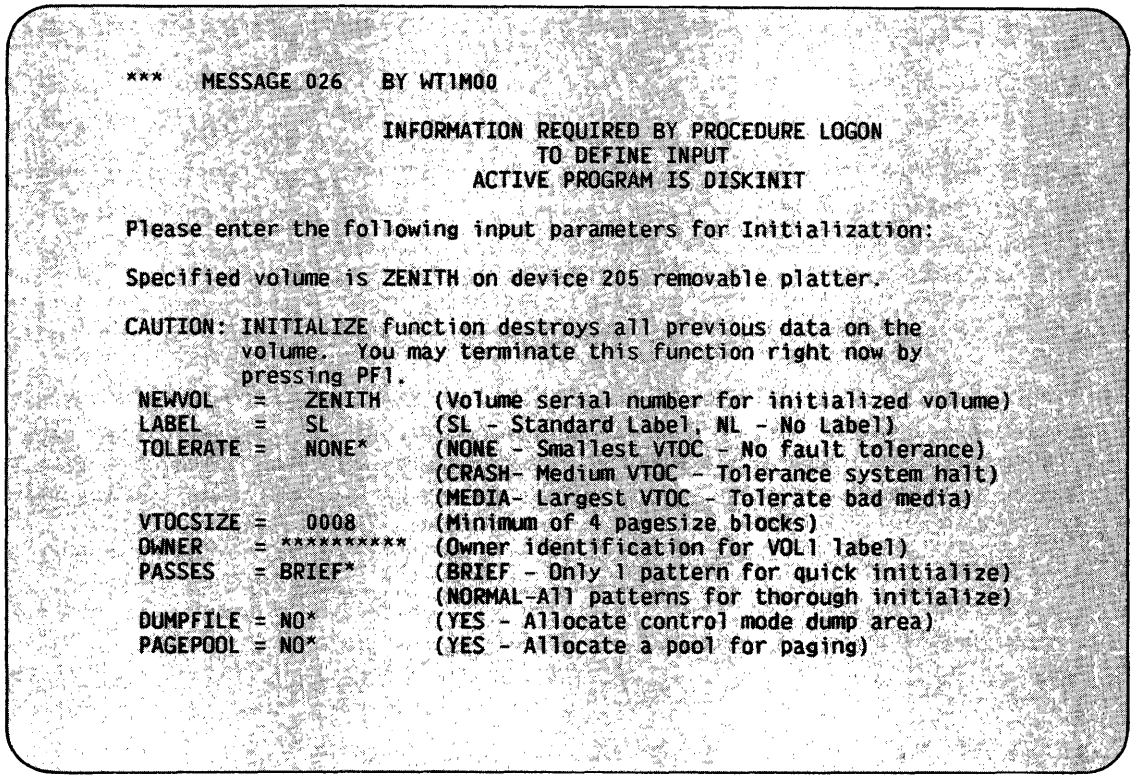

Figure 4-8. DISKINIT Initialize Screen

If you answer YES, the Specify Page Pool screen prompts you to specify the size and location of the page block or pool. Figure 4-9 illustrates the Specify Page Pool screen.

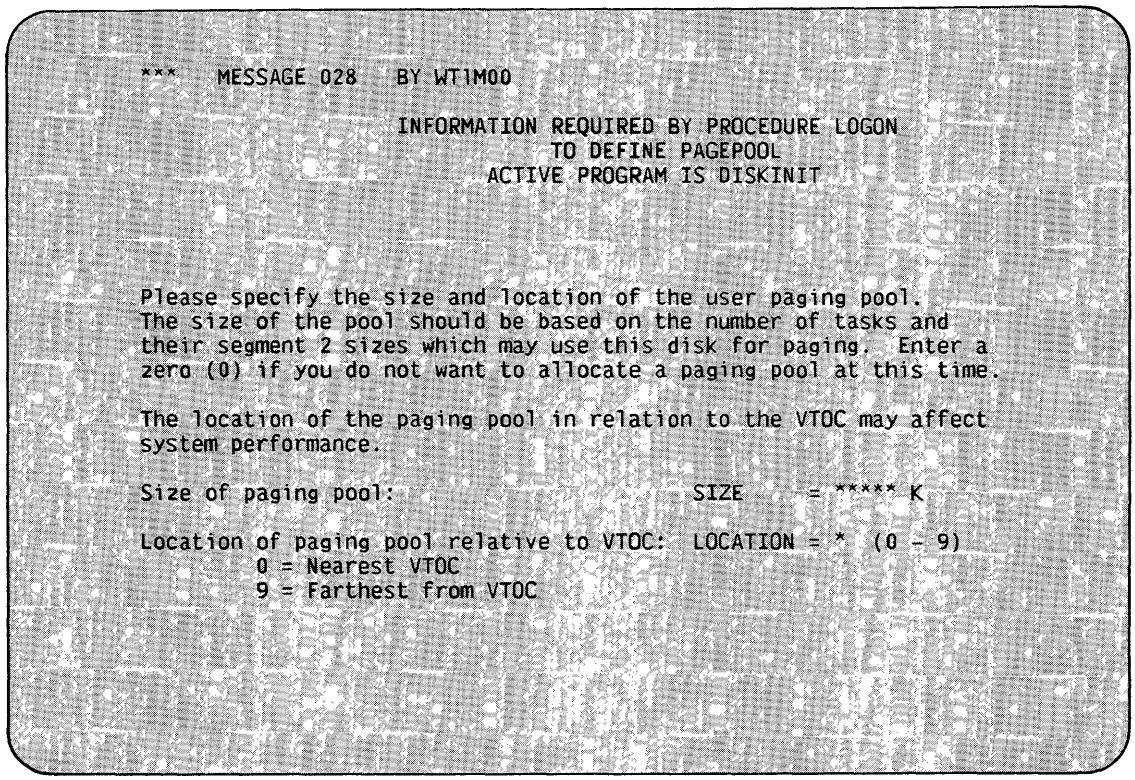

Figure 4-9. Specify Page Pool Screen

The size of the page block can range from 1 to 65,536 kilobytes. The size of the page pool can range from 1 to 32,767 kilobytes. If the volume already contains a page block or pool, the default is the size of the current page block or pool. If you specify a size of zero, DISKINIT does not create a page block or pool.

Enter an integer between 0 and 9 for the location of the page block or pool relative to the VTOC. A value of 0 indicates a location nearest to the VTOC; a value of 9 indicates a location farthest from the VTOC. If a volume already contains a page block or pool, the default is the location of the current page block or pool. You should locate the page block or pool near the most active areas of the volume. For example, if the VTOC is the most active part of the volume, specify 0 as the relative location.

DISKINIT allocates the page block or pool in a single extent. If there is not sufficient space to do this, DISKINIT displays a message and allocates as large a page block or pool as possible. Because DISKINIT looks for an extent in the specified location, you may want to specify another location relative to the VTOC in order to allocate a page block or pool of the requested size.

For more more information about DISKINIT, refer to the VS System Utilities Reference.

4.6 DISPLAY

The DISPLAY utility has been enhanced to support relative files and shared files. The VS System Utilities Reference describes the DISPLAY utility in detail.

4.6.1 Relative Files

Relative files can be displayed in Record or Block mode. The record number displayed is always the RRN (Relative Record Number). If a record in a relative file contains no data and the file is displayed in Record mode, the RRN is listed with a blank space where the record would be. In Report mode, the phrase "<MISSING RECORD>" indicates an empty record slot; the phrase "<EMPTY RECORD>" indicates a zero-length record (a record that is present but contains no data).

4.6.2 Shared Files

A new field, MODE, on the Input Definition screen (refer to Figure 4-10) enables you to specify whether DISPLAY will open indexed and consecutive files in Shared or Input mode. Enter INPUT or SHARED in the MODE field; the default is INPUT.

If you specify SHARED, the Lock screen (refer to Figure 4-11) prompts you to indicate whether you want the file to be locked. Enter YES or NO in the LOCK field; the default is NO. If you lock a file, no changes to the file can occur while you are displaying it. If you specify NO, no lock is placed on the file, and there is no need to specify the TIMEOUT and BYPASS options.

If a file is held for update by another user, the TIMEOUT field specifies the length of time that DISPLAY waits to open the file in Shared mode with a lock. You can specify a timeout for a file if LOCK is equal to YES. Enter a value from 0 to 255 seconds; the default is 10 seconds.

The BYPASS field allows you to specify whether the file should be skipped if the timeout expires. Values for BYPASS are YES and NO; the default is NO.

If BYPASS is YES and the timeout expires, DISPLAY skips the file. If BYPASS is NO and the timeout expires, the Lock screen reappears with the message

FILE XXXXXXXX IN XXXXXXXX ON XXXXXX IS HELD BY USER XXX.

You can then redefine the LOCK, TIMEOUT, and BYPASS options and press ENTER to continue with the display operation. You can also press PF1 to skip the file on which the timeout occurred.

The Record Access Method (RAM) is always used to display shared files.

```
***  MESSAGE 0000 BY DISPLY

                INFORMATION REQUIRED BY  PROGRAM  DISPLAY
                             TO DEFINE INPUT

            *** Wang VS File Display Utility ***

 To display a file, enter the name and location of the file to be displayed.

         FILE     = ******** in LIBRARY  = JMCDATA* on VOLUME   = ZENITH

 Select the access mode to be used when displaying the file.

         ACCESS   = RECORD       (RECORD / BLOCK)

 Specify whether the file should be opened in input or shared mode.

         MODE     = INPUT*       (INPUT / SHARED)

                  (Press PF16 to exit the DISPLAY program.)
```

Figure 4-10. DISPLAY Input Definition Screen

```
*** MESSAGE 0031 BY DISPLY

              INFORMATION REQUIRED BY PROGRAM DISPLAY
                           TO DEFINE LOCK


Please ENTER the following options to process a file in shared mode.

Should a lock be placed on the file to be displayed?    LOCK    = NO* (YES/NO)
  If YES, no changes to the file can be made while it
  is displayed.  If NO, no changes to the file can be made.

If LOCK= YES, specify TIMEOUT and BYPASS:

How many seconds should the TIMEOUT be?                 TIMEOUT = 10* SECONDS

If the timeout expires, should the file be bypassed?    BYPASS  = NO* (YES/NO)
```

Figure 4-11. DISPLAY Lock Screen

4.7 DMS/TX

Program-initiated transaction rollback now releases all records held by the task. For more information about DMS/TX, refer to the VS DMS/TX Reference.

4.8 IOELOG

Release 6.20 of the VS Operating System now records machine check errors in the I/O error log. The Nonstandard I/O Error Log screen of the IOELOG utility now displays the number of machine check errors. If you position the cursor next to this entry and press ENTER, IOELOG displays the Machine Check Error Summary screen (refer to Figure 4-12).

```
                *** Wang VS I/O Error Log Program ***

                          MACHINE CHECK ERRORS

Range:   9/30/83  @ 17:31  TO 10/14/83  @ 8:32

     DATE          TIME    MACHINE CHECK TYPE     ADDRESS      DATA      ECC

   9/30/83      @  17:31   MEMORY PARITY ERROR    00003504     40455671  20
   9/30/83      @  18:18   IOP ERROR
   9/30/83      @  14:10   MEMORY PARITY ERROR    00020012     99811F20  FF
  10/01/83      @  15:39   MEMORY PARITY ERROR    00050911     AC009011  CC
  10/01/83      @  20:15   IOP ERROR
  10/01/83      @  20:15   IOP ERROR



PRESS THE APPROPRIATE PF KEY TO PERFORM THE DESIRED ACTION:
(1)  RETURN                                   (13) INFORMATION (15) PRINT
```

Figure 4-12. Machine Check Error Summary Screen

The I/O error log reports two types of machine check errors: memory parity errors and IOP errors. A memory parity error occurs when data is transmitted incorrectly. If an error that involves one bit occurs, the microcode detects the error and makes corrections. If the error involves two or more bits, the microcode detects the error but cannot correct it. The Machine Check Error Summary screen displays memory parity errors that involve two or more bits. An IOP error occurs when an IOP cannot move data into or out of the devices needed to process the data.

4.9 IOTRACE

In previous releases of the VS Operating System, you could examine information in the I/O trace table only through debug processing or through a Control mode dump. There are times when it is desirable to selectively capture a history of the I/Os issued to one or more devices for later analysis. This option is especially useful for attempts to solve intermittent problems related to device I/O.

IOTRACE, a new utility included with Release 6.20, monitors the I/O trace table and records I/O information for a range of devices, based on criteria you define. You can minimize the effect on the normal operating environment by running IOTRACE from a procedure submitted as a background task.

4.9.1 Running IOTRACE

When you run IOTRACE, the Input Definition Screen (refer to Figure 4-13) prompts you to enter the range of devices you want to trace. IOTRACE displays a default range tailored to your system; you can accept the default range or enter a different range in the pseudoblanks. Enter the lowest numbered device in the LOWDEV field and the highest numbered device in the HIGHDEV field. If you wish to trace only one device, enter that number in both fields.

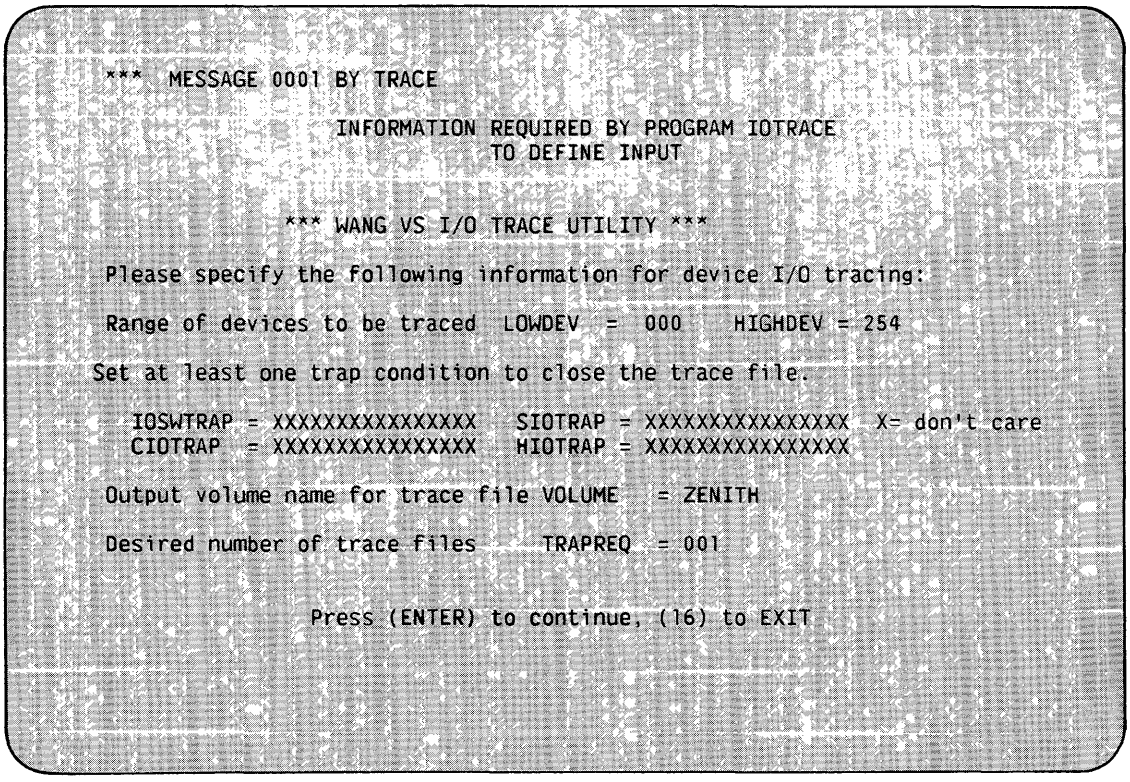

Figure 4-13. IOTRACE Input Definition Screen

You must set one or more trap conditions. To set traps on the IOSW (I/O Status Word), SIO (Start I/O) instruction, CIO (Control I/O) instruction, or HIO (Halt I/O) instruction, you specify mask values for comparison against the designated I/O types. Enter the desired test values in hexadecimal characters. IOTRACE does not verify that the input values are valid hexadecimal characters.

The VOLUME field allows you to enter the name of the volume that will contain the trace files. The default is the System volume. The volume that you specify must have enough free space to store files.

Finally, you can specify a maximum number of trace files to be created. Enter the number in the TRAPREQ field; the default is 1. If IOTRACE creates the number of files that you specify, IOTRACE processing ends, and the Command Processor menu reappears.

After specifying the range of devices, the traps desired, the output volume, and the number of trace files, press ENTER. IOTRACE then displays the Condition Code Traps screen (refer to Figure 4-14).

```
*** MESSAGE 0020 BY TRACE

                INFORMATION REQUIRED BY PROGRAM IOTRACE
                          TO DEFINE CCTRAPS


Each IOCW entry in the trace table contains the condition code
 returned by the instruction which issued the I/O.

Enter (Y) for any condition code to be trapped.

The trace file closes when the trap condition occurs.

CONDITION TYPE        START I/O      CONTROL I/O     HALT I/O
DEVICE BUSY           SIODB = N      CIODB = N       HIODB = N
IOP BUSY              SIOIB = N      CIOIB = N       HIOIB = N
IOP NOT OPERATIONAL   SIOIN = N      CIOIN = N       HIOIN = N

            Press (ENTER) to continue, (1) to RETURN
```

Figure 4-14. Condition Code Traps Screen

The Condition Code Traps screen enables you to further define the trap conditions. To set a trap for one or more of the conditions, specify Y and press ENTER. The condition stored in the IOCW (I/O Command Word) element of the trace table is the condition code from the SIO, CIO, and HIO instructions. For more information about these instructions, refer to the VS Principles of Operation.

4.9.2 IOTRACE Processing

When you press ENTER from the Condition Code Traps screen, IOTRACE begins to monitor the I/O trace table and to test the entries in the table against the criteria that you specified. IOTRACE tests the trace table entries in the following order:

- The device for this I/O must be within the specified device range.
- If you specified a mask value for this type of I/O, IOTRACE compares the mask value to the IOSW or IOCW of the trace table entry. A match triggers a trap.
- If you specified a condition code, IOTRACE compares that code against the condition code of the trace table entry. A match triggers a trap.

When a trap occurs, IOTRACE stops testing and captures the next 50 to 100 I/Os from all devices in the system trace table. This ensures that any problem triggered by the trap is recorded. IOTRACE records these I/Os in a trace file, and this file is then closed and named. The file name consists of the day in the current month and the time stamp. For example, if a trace occurs at 3:23 pm and 15 seconds, on the eighth day of the month, the file name is 08152315. The trace file resides in the library @IOTRACE on the specified volume.

When the trace file closes, all masks are enabled and IOTRACE continues to monitor the system trace table until it creates the number of trace files that you specified. IOTRACE processing then ends, and the Command Processor menu reappears.

For more information about IOTRACE and a description of the trace file format, refer to the VS System Utilities Reference.

4.10 POOLSTAT

POOLSTAT, a new utility included with Release 6.20, enables you to monitor the utilization of page pools on VS25, VS45, VS85, VS90, and VS100 systems. Section 2.1 discusses page pools.

When POOLSTAT processing begins, the Pool Utilization screen (refer to Figure 4-15) displays the utilization of up to three page pools.

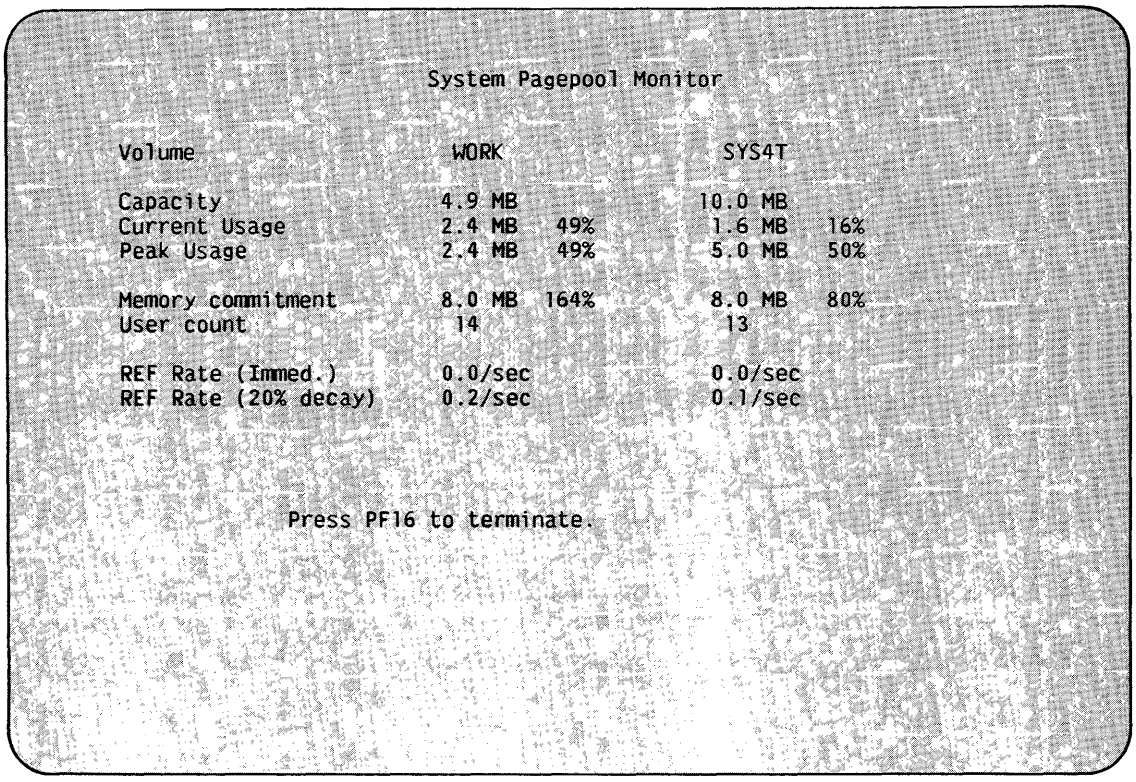

Figure 4-15. Pool Utilization Screen

For each page pool, the Pool Utilization screen provides the following information:

Field	Description
Volume	The name of the volume on which the page pool resides
Capacity	The actual size of the page pool
Current Usage	The amount of space being used by tasks assigned to the page pool, and the percentage of the pool capacity that this represents
Peak Usage	The maximum amount of space used by tasks assigned to the page pool since the pool was initialized, and the percentage of the pool capacity that this represents

Field	Description
Memory Commitment	The total of the Segment 2 sizes currently assigned to the page pool, and the percentage of the pool capacity that this represents
User Count	The current number of tasks assigned to the page pool
REF Rate (Immediate)	The number of I/Os to the pool during the last second
REF Rate (20% Decay)	The average pool I/O rate weighted in favor of the last five seconds

If a page pool has been assigned a capacity greater than 32MB, the Pool Utilization screen displays an asterisk next to the page pool's capacity and advises you that the excess capacity will not be used.

It is recommended that you run POOLSTAT when you first establish a page pool on your system. The statistics on current and peak usage can help you to determine if the page pool capacity is adequate for the paging requirements of the tasks assigned to the page pool.

4.11 SORT

The SORT utility has been enhanced with two new features. First, you can now press PF16 from the Program Options menu to exit the SORT utility without cancelling.

Second, SORT now supports consecutive and indexed input files in Shared mode. A new field, SHARED, on the Input Definition screen enables you to specify whether SORT will open the input file in Shared mode. Enter YES or NO in the SHARED field; the default is YES. If you specify YES, SORT opens the file in Shared mode. If you specify NO, SORT opens the file in Input mode, as before.

If you specify Shared mode for an input file, the Lock screen prompts you to indicate whether you want the file to be locked. Enter YES or NO in the LOCK field; the default is YES. If you lock a file, no updates to the file can occur while you are sorting it. If you specify NO, no lock is placed on the file, and there is no need to specify the TIMEOUT and BYPASS options.

If a file is held for update by another user, the TIMEOUT field specifies the length of time that SORT waits to open the file in Shared mode with a lock. You can specify a timeout for a file if LOCK is equal to YES. Enter a value from 0 to 255 seconds or NO; the default is 10 seconds. If you specify NO in the TIMEOUT field, there is no timeout, and SORT waits indefinitely until it can lock the file.

The BYPASS field allows you to specify whether the file should be skipped if the timeout expires. Values for BYPASS are YES and NO; the default is NO.

If BYPASS is YES and the timeout expires, SORT skips the file. If BYPASS is NO and the timeout expires, the Lock screen reappears with the message

File XXXXXXXX in XXXXXXXX on XXXXXX is held by user XXX

You can then redefine the LOCK, TIMEOUT, and BYPASS options and press ENTER to continue with the sort operation. You can also press PF1 to skip the file on which the timeout occurred.

For more information about SORT, refer to the VS System Utilities Reference.

4.12 SORTINT

SORTINT, a new utility, is an international version of the SORT utility. You can use SORTINT to sort up to 20 files into a single, ordered output file according to standard ASCII or an external collating sequence. SORTINT also provides the option to reformat the output record. SORTINT supports all of the standard features of the SORT utility except for tape input and output, shared consecutive files, and the Merge function.

SORTINT enables you to perform the following functions:

- Sort a single file according to standard ASCII or an external collating sequence.
- Sort up to 20 files into a single, ordered output file according to standard ASCII or an external collating sequence.
- Select specified records from one or more input files and sort them into a single output file according to standard ASCII or an external collating sequence.
- Produce an output file that contains only the primary index key field from each record in the input file. You specify the sort order for the primary index key field.
- Produce an ordered output file of 3-byte records to be used by RPG II programs.
- Reformat the record layout of the output file. By reformatting the output record, you can, for example, modify the length and sequence of fields in the record or include only selected fields in the record.

The ability to sort according to an external collating sequence enables you to accommodate international character sets or sort orders other than standard ASCII. SORTINT prompts you to specify the name of the file that defines the external collating sequence. Through the STABLEMT utility, you can create or modify files that define external collating sequences; for more information, refer to Section 4.13.

SORTINT requires a 200% overhead in disk space. Because DMS does not support external collating sequences, you cannot use an output file sorted according to an external collating sequence as input to other processes (e.g., KEYFILE creation).

For more information about SORTINT, refer to the VS System Utilities Reference.

4.13 STABLEMT

STABLEMT, a new utility, enables you to create or modify files that define an external collating sequence. You can then direct the SORTINT utility to sort files according to the collating sequence that you defined rather than according to standard ASCII sequence. For more information about SORTINT, refer to Section 4.12.

The file that contains an external collating sequence consists of two translation tables. The primary collating sequence table is a simple one-to-one translation table that assigns a weight to each hex code representing a character. Characters with greater weights sort after characters with lower weights. Two characters with the same weight sort equal to each other; for example, you can sort ç equal to the character c by assigning the same weight to the characters.

You also have the option to define a two-to-one or one-to-two translation table. A two-to-one translation table specifies pairs of characters that are to be sorted as a single character; for example, you can sort the characters ch as a single character between the characters c and d. A one-to-two translation table specifies a single character that is to be sorted as two characters; for example, you can sort ä as the characters ae. You cannot define both a two-to-one and a one-to-two translation table as part of an external collating sequence.

For more information about STABLEMT, refer to the VS System Utilities Reference.

4.14 STAND-ALONE UTILITY SYSTEM

Compress-In-Place (CIP), a new utility, and COLDSTART are now offered as options of the Stand-Alone Utility System. The Stand-Alone Utility System is designed primarily for use on a VS25 or VS45, but can also be used on the VS85, VS90, and VS100. See the VS System Administrator's Reference for detailed information on the Stand-Alone Utility System.

CIP enables you to consolidate free extents on the system disk without performing a full volume backup and restore. It provides useful free space and improves performance by reducing disk seek time. An on-line version of CIP is available for nonsystem disks; refer to Section 4.2 for more information.

4.14.1 Stand-Alone Utility Selection Screen

The Stand-Alone Utility Selection screen (refer to Figure 4-16) is the first screen you see after loading the system microcode, CIP, and COLDSTART into main memory from the FORMAT diskette. Press PF2 to enter COLDSTART or PF3 to enter CIP.

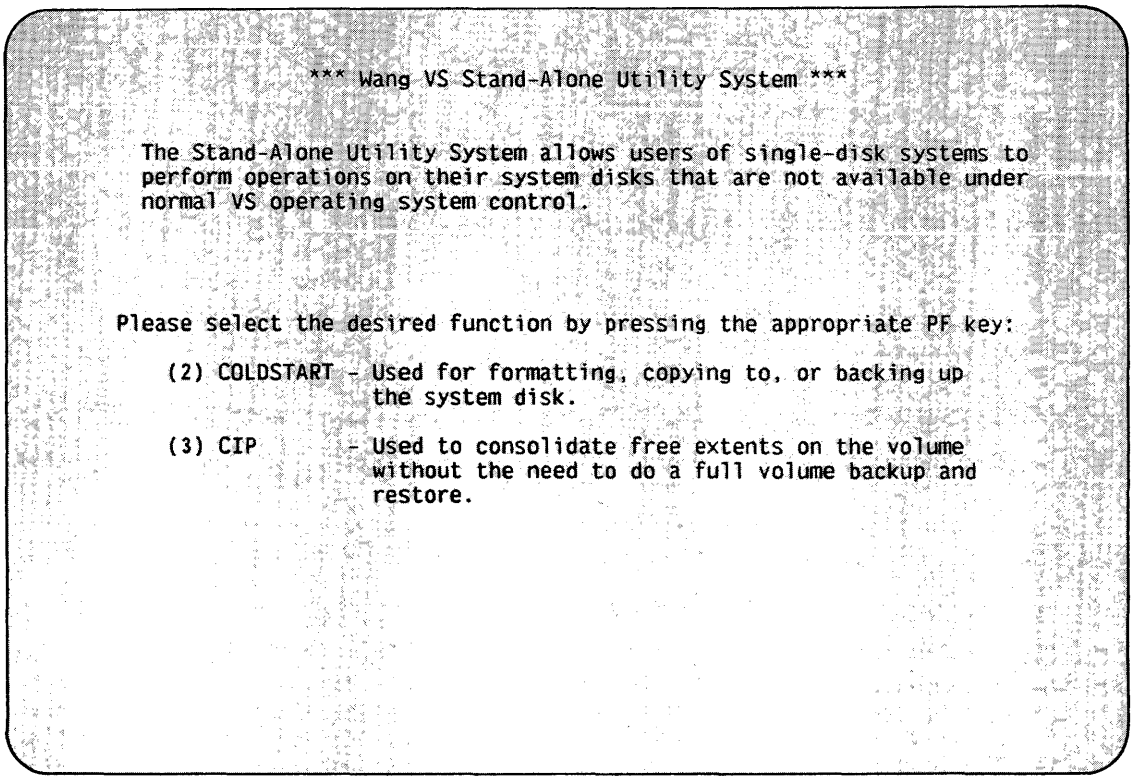

Figure 4-16. Stand-Alone Utility Selection Screen

4.14.2 Running CIP

The CIP Volume Specification screen (refer to Figure 4-17) is displayed when you press PF3 from the Stand-Alone Utility Selection screen. Enter the name of the volume you want to compress and press ENTER.

The CIP Verification screen (refer to Figure 4-18) asks you to confirm the compress operation for the specified volume. If you press PF1, CIP returns you to the Volume Specification screen. If you press ENTER, CIP displays the following message: Compress of volume SYSTEM in progress.

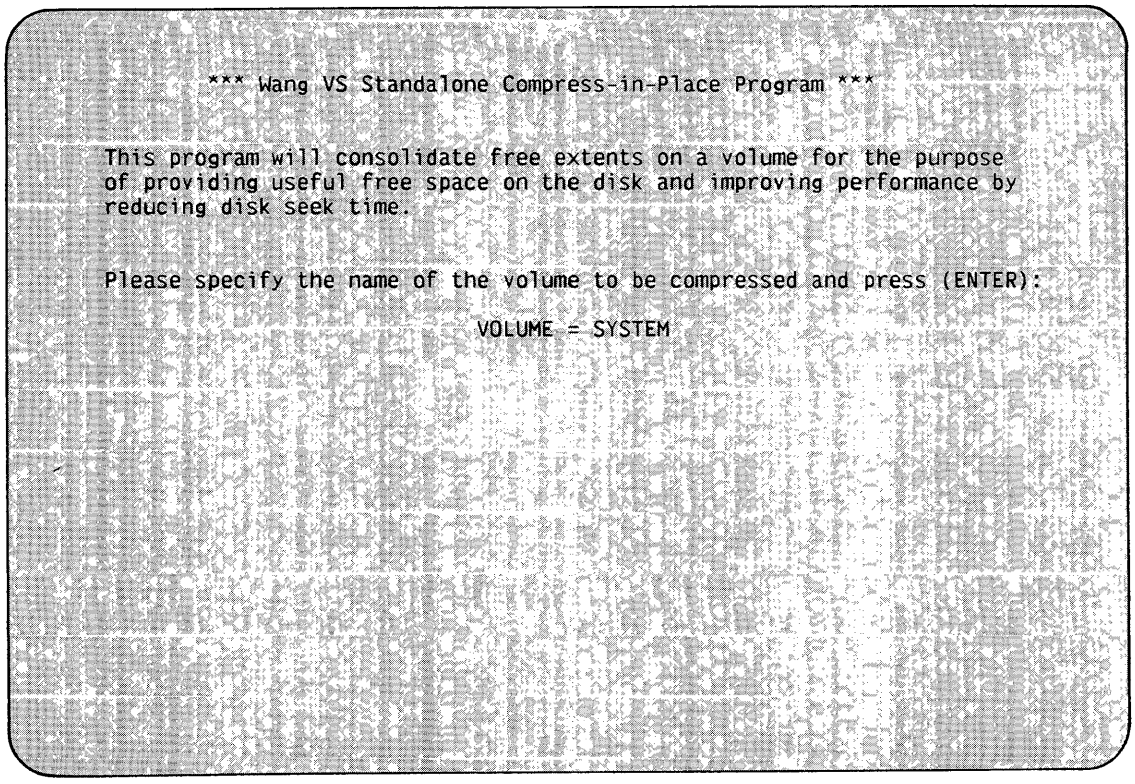

Figure 4-17. CIP Volume Specification Screen

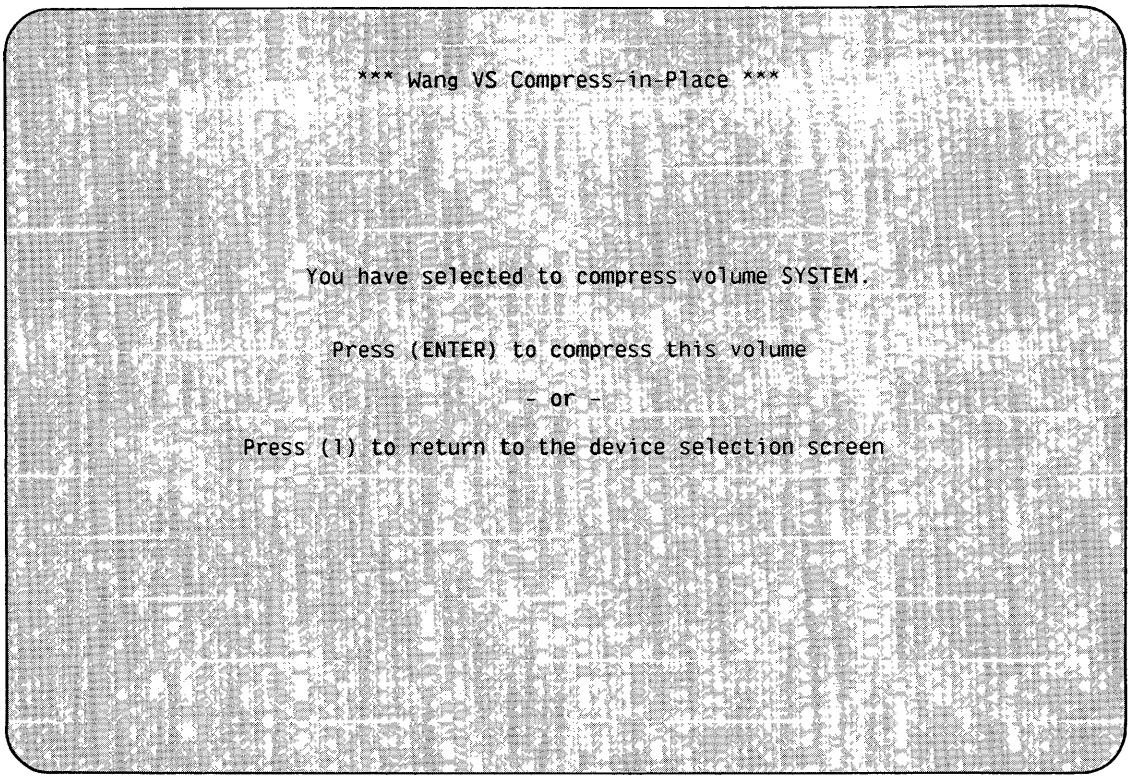

Figure 4-18. CIP Verification Screen

After the compress operation is complete, CIP displays the following message: Volume SYSTEM has been successfully compressed. At this time, you must re-IPL the system to perform other operations.

4.15 SYMBOLIC DEBUGGER

The Debug screen of the Symbolic Debugger now includes an option to obtain a Segment 0 memory dump. Enter Y (Yes) or N (No); the default is N. Using this option, Wang field personnel can obtain system information without affecting the system's operation. Because this option produces additional print blocks that do not help in debugging a user program, accept the default in normal circumstances.

4.16 VS GRAPHICS FACILITY

Release 6.20 provides internal support for the VS Graphics Facility. The VS Graphics Facility is an interactive software package that produces report-quality charts on data from a variety of sources. The VS Graphics Facility enables you to produce the following types of charts:

- Line charts - straight line or staircase
- Bar charts - simple, stacked, or clustered
- Pie charts - simple or exploded
- Surface (or area) charts
- Scatter charts
- Word charts

The VS Graphics Facility makes extensive use of default values in all phases of chart specification. You can accept the default values, or you can easily modify them to customize every aspect of the chart's appearance. Because the VS Graphics Facility is menu-driven, you can alter the chart format with a minimum of keystrokes.

4.16.1 System Requirements

The VS Graphics Facility runs on the VS25, VS45, VS85, VS90, and VS100. To display charts created through the VS Graphics Facility, you must use a 6300GM Graphics workstation. You can use the 5577 High-Density Matrix printer to obtain a black and white copy of the charts you create.

The IOP for the 6300GM Graphics workstation must be serial, and it must support clustered devices. When you use GENEDIT to configure a 6300GM Graphics workstation, you must use two consecutive devices on the same port. The first device is 6300GM, and the second device is 6300GM2.

To run the VS Graphics Facility, a user or background task must have a Segment 2 size of 1024KB.

The VS Graphics Facility requires Version 2.7.7 of the Procedure Interpreter, Version 1.2.10 of INFO, and Version 1.6.5 or later of WP.

4.17 VS MULTI-STATION

Release 6.20 provides internal support for the VS Multi-Station package. The VS Multi-Station package transforms a standard VS workstation into a personalized, multiwindowed workstation. The VS Multi-Station enhances productivity by allowing you to customize the keyboard and to process multiple interactive tasks simultaneously.

The VS Multi-Station supports the following features, which combine to create an efficient, productive, and personal workstation environment:

- Windowing -- Allows you to run and display up to four interactive programs concurrently.

- Personal keyboard definition -- Enables you to determine the meaning and the function of each key.

- An expanded set of key functions -- Provides you with more options when assigning functions to workstation keys.

- A Glossary language -- Allows programmers to define new, expanded key functions that operate under program control. Glossary programs can automate repetitive keyboard operations and can perform conditional and text-manipulating operations. After a programmer defines a Glossary program, any user can invoke the program.

- Enhanced control of workstation features -- Allows you to control the alarm, blinking fields, and tab operation and to select type-ahead through a utility.

- International options -- Allows you to alter the character set, define key combinations for accented characters, and modify the default capitalization rules.

The number of windows on a particular VS Multi-Station is determined when the system is configured. You define all other VS Multi-Station features through an interactive and easy-to-use utility known as the Personality Editor. The collection of features a user selects in the Personality Editor is called the user's workstation personality. The user's workstation personality can be loaded whenever that user logs on to any VS Multi-Station and can be changed at any time. The VS Multi-Station features are specific to each user and are not a fixed part of the workstation.

By separating the keyboard definition from the physical workstation and by providing multiple windows, the VS Multi-Station creates a powerful and flexible office tool.

4.17.1 System Requirements

The VS Multi-Station package requires Release 6.20 or a subsequent release of the VS Operating System. It can run on any of the following VS workstations: 2256C, 4230, 5300/VS-IIS64 Ergo 3, 2866C4 Ergo 2, and the Wang PC in VS emulation mode with PC-PM041 Local Communications. Refer to the VS Multi-Station Data Sheet and the VS Multi-Station User's Reference for details.

You define a VS Multi-Station through GENEDIT. A VS Multi-Station with four windows is defined as four separate device numbers. However, because the VS Multi-Station is only one physical device, each device number is assigned to the same port. All VS Multi-Stations, regardless of the workstation model, have the device type MULTIWSx, where x ranges from 0 to 3. The task with device type MULTIWS0 corresponds to Window 1; MULTIWS2 corresponds to Window 3. You must assign the device types in ascending order; the device numbers do not have to be consecutive.

NOTE

You cannot define the main Operator's Console (device number 0 and port number 0) as a VS Multi-Station.

While a VS Multi-Station only occupies one port on an IOP, it can run as many tasks as it has windows. The maximum number of tasks on the system is unchanged, but the number of physical workstations that can be supported is directly reduced by each additional window on a VS Multi-Station.

You can run VS Word Processing and VS Alliance only from Window 1 of a VS Multi-Station.

CHAPTER 5
NETWORKING OPERATIONS

5.1 LOCAL WANGNET PERIPHERAL BAND

Release 6.20 includes support for the Local WangNet Peripheral Band. The Local WangNet Peripheral Band supports communications between a VS CPU and its peripheral devices through the WangNet local cable, rather than by separate cables from each device to the CPU.

The Peripheral Attachment service on this band provides six channels (or frequency ranges) for communications between Wang systems and their peripheral devices.

5.1.1 Peripheral Band Devices

For a VS CPU to use the Peripheral Attachment service, a WangNet Controller IOP (Model 25V67 for the VS25 and VS45, Model 22V57W for the VS50 and VS80, or Model 22V67W for the VS85, VS90, and VS100) must connect it to the WangNet cable. A WangNet Controller IOP contains a built-in modem and provides a single radio-frequency (rf) connection to the WangNet cable through a WangNet user outlet. It is through this connection that the CPU communicates with those of its peripheral devices that are on the WangNet cable. In addition to the rf connection, a WangNet Controller IOP also provides four serial device ports for the direct attachment of up to four serial devices, including local workstations, printers, or DLPs (a VS-TC or a CIU).

Currently, the only workstations that you can connect directly to a WangNet user outlet for Peripheral Band communications are the WangNet Ergo II (Series 5200W) and WangNet Ergo III (Series 5300W) workstations. These workstations (also known as WangNet combined workstations), have a built-in rf modem that can be set to the same channel as their CPUs.

VS peripheral devices other than the Ergo II and Ergo III workstations must be connected to a Wang Netmux to use the Peripheral Attachment service. This device has eight serial device ports, to which any VS peripheral device (other than a CIU or TCB1) can be attached.

5.1.2 Manufacturing ID and Channel Selection

Before you configure your system for the Peripheral Band Service, you must obtain the manufacturing ID for each peripheral device (Netmux or Ergo workstation) that you want to connect to the WangNet cable. In addition, you must determine which of the six Peripheral Band channels your system will use, and you must then set the serial device modems for that channel.

Manufacturing IDs

In a standard VS system configuration, a peripheral device is connected to its CPU through a direct cable attachment. The device number of a peripheral device is the number assigned in GENEDIT to the serial device port on the IOP to which its cable is connected.

With the Peripheral Band, peripheral devices are also assigned device numbers. To be configured for the Peripheral Band, however, each device must be associated with a manufacturing ID as well. A manufacturing ID is a 16-character hexadecimal number. Peripheral devices that are attached to a Netmux use the ID of that Netmux. Before you configure your system for the Peripheral Attachment Service, obtain the manufacturing IDs for all the peripheral devices you will connect to a WangNet user outlet; this includes Netmuxes and Model 5200W and 5300W workstations. The methods for obtaining manufacturing IDs for each type of device are described in the VS Network Configuration and Operations Guide.

Channel Selection

A single Peripheral Band configuration provides six separate channels, numbered 00 through 05. Before you configure your system, you must determine which channel your CPU and its serial devices are to use. You must then configure this channel number on the system's WangNet Controller IOP and set it on each device that you are connecting to a WangNet user outlet. Instructions for setting channel numbers for each type of device are described in the VS Network Configuration and Operations Guide.

5.1.3 Configuration

After you obtain the manufacturing IDs for each Netmux and Ergo workstation that you are configuring and select the correct channel setting for the devices and the CPU, you are ready to configure your system for the Peripheral Attachment service.

The configuration of a single VS system for Peripheral Band is done solely within GENEDIT by adding the appropriate IOP(s) to the system configuration and then specifying the devices for that IOP. If a CIU and VS-TCs are connected to the WangNet Controller IOP (through one of the four local ports), you must specify the VS network name in GENEDIT, and you must use COMMFIG to configure the communications parameters for the system in the network.

To configure a VS for Peripheral Band communications, refer to the instructions in the VS Network Configuration and Operations Guide.

When you configure or reconfigure the system, new assignments do not take effect until you IPL the system with the new GENEDIT (configuration) file.

Additional points to consider when you configure a VS for Peripheral Band include the following:

- All peripheral devices that a WangNet Controller IOP serves must be on the same channel.

- A Netmux port is configured for a specific device type. If a device is connected to a port that has been defined for another type of device, you must change the description field for that port to reflect the new device.

- A Netmux or Ergo workstation cannot be initialized or logically attached to a VS unless it is listed in the active GENEDIT file for that VS.

- A VS80 can support only one WangNet Controller IOP. A VS100 can support up to four WangNet Controller IOPs as long as each controller uses a different channel.

- The total number of devices that each IOP can support is 32. This number is divided among the four local ports (if you use all four) and the rf port. For example, a VS that uses only three of its four local ports can support up to 29 rf device numbers.

5.2 POINT-TO-POINT TRANSPORT

Release 6.20 includes support for WSN (Wang Systems Networking) Point-to-Point transport. Point-to-Point transport supports wide-area communications between suitably equipped Wang systems over dedicated or switched communication lines.

Within a dedicated WSN Point-to-Point environment, any Wang VS, Office Information System (OIS), Alliance® system, 2200 system, or Wang Professional Computer (PC) can be connected by a full-duplex, dedicated line to another Wang system. The two systems can then communicate at speeds ranging from 2,400 to 19,200 bits per second (bps).

Within a switched WSN Point-to-Point environment, any Wang system can use half-duplex, switched telephone lines to access and communicate with any other Wang system. Switched, point-to-point communication takes place at data rates between 2400 and 9600 bps. Manual and auto-dial capabilities are both supported.

Alliance® is a registered trademark of Wang Laboratories, Inc.

The WSN Point-to-Point transport provides a communications path for such WSN services as File Transfer and VS Terminal Emulation (VSTE). File Transfer enables users to exchange word processing documents and data files between their systems. (The types of files that can be exchanged depend on the communicating systems.) VSTE enables users to log on to a remote VS and run interactive programs and procedures.

A communications session between two Wang systems on a point-to-point link requires a virtual circuit (logical path) between the systems. A VS can support up to 24 virtual circuits per link.

Like all other WSN transports, the Point-to-Point transport has network functions that are transparent to users. This transparency frees users of properly installed and configured systems from concerns about physical line connections and other network issues. In most cases, a user or application can access another system on the network by supplying the name of that system (or its telephone number, if manual dialing is used).

5.2.1 System Requirements

To communicate over a point-to-point link, a VS must be equipped with a communications controller connected to a modem. The modem can be a null modem or a full- or half-duplex modem. Connection must be through an industry-standard RS-232-C/V.24 connector and an RS-366 connector (for auto-dial support). The type of modem used depends on the distance between connected systems, the type of link (switched or dedicated), and the line speeds accommodated by the transmission medium.

A communications controller acts as the network interface for the system it serves. Wang controllers have internal memory, a dedicated microprocessor, and capabilities for restart diagnostics and loopback tests. One communications controller per system supports one active link. A controller can support transmission rates between 2,400 and 19,200 bps, depending on modem and line requirements.

For all VS systems, the communications controller for point-to-point support is the Model VS-TC with 64KB memory. VS-TCs are installed in an external Telecommunications Processor (TCP) chassis (Model VS-6554) that is equipped with rear panel connectors and front panel assembly. A TCP can contain up to four controllers and uses its own power supply, either a 115-VAC or 230-VAC line. Each VS-TC requires a Model VS-FP6554 TCP front panel assembly, a Model VS-RS-232 TCP rear panel modem connector, and an RS-366 connector for auto-dial support.

An alternative to the VS-TC is available for the VS25 and VS45. Each of these systems can have its own Model 25V76 built-in controller.

CHAPTER 6
NEW DEVICES

6.1 4200 SERIES WORKSTATIONS

Release 6.20 of the VS Operating System includes support for the following 4200 Series workstations: the 4205, the 4220, the 4230, and the 4230A. The 4210 workstation is supported by Release 6.10 and all subsequent releases.

The 4200 Series workstations are low-cost, interactive workstations, ergonomically designed for convenience and flexibility in the office environment. Figure 6-1 illustrates a 4200 Series workstation.

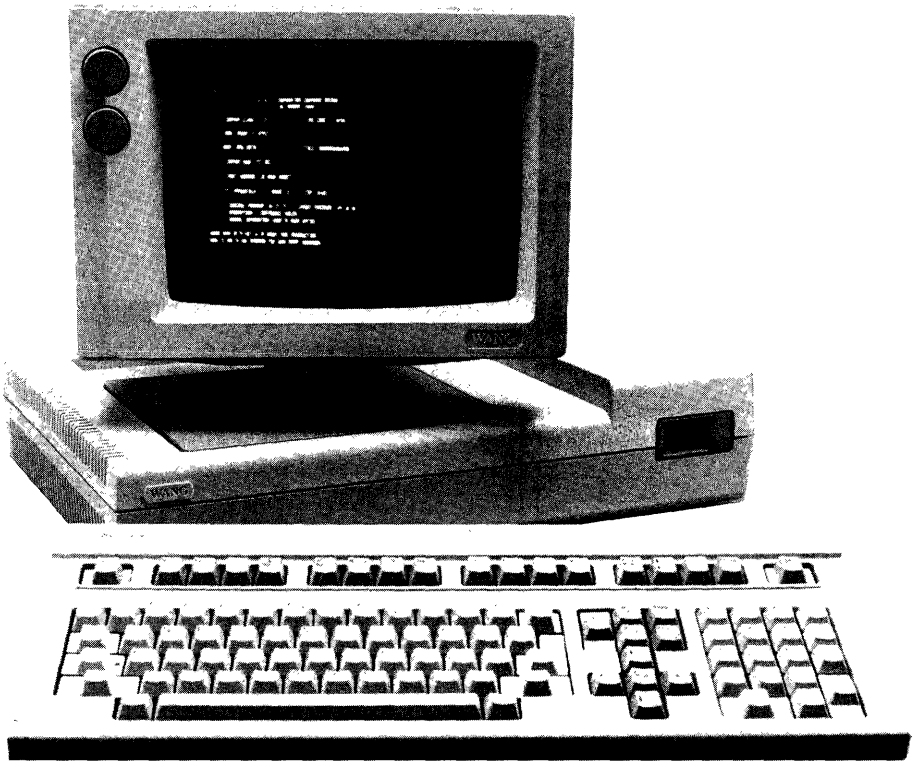

Figure 6-1. 4200 Series Workstation

6.1.1 4205 Workstation

The 4205 workstation is a 32KB, local serial workstation that supports data processing on all VS systems. The 4205 does not support word processing.

6.1.2 4220 Workstation

The 4220 workstation provides remote processing access to a VS system. It can be used in place of the 2246R in remote VS applications. The 4220 workstation provides only data processing functions when it is configured with a VS system. Word processing and other VS/IIS applications require a VS Combined Serial workstation or a Wang Professional Computer.

Connection to the remote VS system is made via telephone lines through an appropriate communications IOP or device adapter and a modem. The telephone lines can be leased or switched. On leased lines, up to eight workstations can be connected subject to the line loading limitations of the actual traffic. You can also configure a 4220 workstation for local use through a null modem and the appropriate communications IOP or device adapter.

The 4220 workstation contains the necessary logic to connect to the VS processor; software from the VS Operating System is down-loaded to the workstation. This method allows workstation functions to be updated as new features are added to the VS Operating System.

The 4220 workstation includes a parallel printer port and a second interface for RS-232 compatible devices.

6.1.3 4230 Workstation

The 4230 workstation is a 64KB workstation that supports data processing on all VS systems and both data processing and word processing on VS/IIS and VS Alliance systems. A VS/IIS or VS Alliance user can perform advanced functions and run optional software packages that require a 64KB workstation.

6.1.4 4230A Workstation

The 4230A workstation is a 4230 workstation that supports Arabic as well as English.

6.1.5 Workstation Characteristics

All 4200 workstations consist of a lightweight, movable keyboard, an adjustable monitor, and a separate base/electronics unit. These three components are matte-finished to reduce glare. You can tilt the monitor to provide the most comfortable working position. The brightness controls enable you to adjust the character intensity and the general screen brightness. An optional suspension arm allows you to move the monitor to the side when it is not in use.

The monitor and the keyboard are the same as those used with the Wang Professional Computer (PC). By replacing the 4200 base/electronics unit with the Wang PC electronics unit, you can easily upgrade a 4200 Series workstation to a Wang PC.

Keyboard

The detachable Wang Universal keyboard consists of 101 keys, including 16 programmable function keys, numeric keys, and cursor control keys. It is a low profile keyboard that has a maximum height of 1.18 inches (30 mm) at the base. This keyboard is available with a variety of foreign language options. It supports both uppercase and lowercase letters. Special function keys are used for control functions.

All keys on the Universal keyboard provide adjustable audio feedback when you press them. The keys repeat when they are held down. In WP mode, only select keys repeat. The workstation adjusts the repeat interval according to the data transfer rate; it sounds the key-entry signal each time the character is transmitted. Thus, you can both see and hear the character as it is repeated.

Monitor

The 4200 workstations feature a high-resolution, 12-inch (31 cm) monitor. This monitor has a 24-line, 80-column display and scrolls horizontally to 158 characters. The screen displays light green characters on a dark background.

Self-Testing Diagnostics

A 4200 workstation performs self-testing diagnostics when it is powered on. The diagnostics check the workstation condition before use. The system displays on the screen any error condition it encounters. The tests allow a Wang customer engineer to quickly diagnose and correct any problems.

6.1.6 Specifications

Monitor

Physical Specifications	
Height	11.5 in. (29.2 cm)
Width	13.0 in. (33.0 cm)
Depth	10.8 in. (27.4 cm)
Weight	15.0 lb (6.8 kg)
Screen Size	12 in. diagonal 25 rows in hardware; 24 rows supported by software
Character Size	0.3 x 0.204 in. (7.62 x 5.18 mm) 10 x 12 addressable dots per character
Resolution	800 x 288 pixels

Keyboard

Height	
Front	1.7 in. (4.3 cm)
Back	1.2 in. (3.0 cm)
Width	18.3 in. (46.5 cm)
Depth	7.8 in. (19.8 cm)
Weight	4.5 lb (2.0 kg)

Base/Electronics Unit

Height	4.1 in. (10.5 cm)
Width	19.0 in. (48.3 cm)
Depth	14.1 in. (36.0 cm)
Weight	15.2 lb (6.9 kg)

Other Specifications

Character Set	Software-loadable
Power Requirements	110/220 VAC (switch selectable); 50/60 HZ
	100 watts
	341 Btu/hour
Environmental Requirements	
Ambient Temperature	60° to 90° F (16° to 32° C)
Relative Humidity	20% to 80%, noncondensing
Cabling	
Standard Cable	25.0 ft (7.6 m)
Maximum Available	2,000.0 ft (609.6 m)
Cord (Base to Keyboard)	6.0 ft (1.8 m) coiled cable
Cord (Base to Monitor)	2.0 ft (0.61 m) twin cable

6.2 6300GM GRAPHICS WORKSTATION

The 6300GM Graphics workstation is an integrated, multifunction workstation on VS systems. You can use the 6300GM Graphics workstation to create and display charts and graphics through CHARTER or the VS Graphics Facility. The 6300GM Graphics workstation also supports all other VS data processing and word processing software.

The 6300GM Graphics workstation is ergonomically designed. It includes an independent Universal keyboard with nonglare, sculpted key caps. The tilt display screen has a nonglare surface, and its casing is matte-finished to minimize overhead light reflection.

6.3 2509V SERIAL 9-TRACK TAPE DRIVE

The 2509V is a serial 9-track tape drive available for all VS systems. It connects to any serial IOP through up to 2,000 feet (609.6 m) of coaxial cable. The 2509V tape drive can be used to back up files or to interchange files, libraries, or volumes of information with compatible Wang and non-Wang systems.

The 2509V includes a tape transport mechanism and a formatter. The 2509V is a 9-track, single-density tape drive that uses the Phase Encoded (PE) method to read and write data at a density of 1600 bits per inch. It has a storage capacity of up to 25MB.

6.3.1 Features

The 2509V tape drive provides error detection and automatic correction of single track errors. Tape is transported at a rate of 75 inches (192.3 cm) per second during read and write operations and at a rate of 200 inches (508 cm) per second during rewind operations.

The formatter included in the 2509V tape drive provides control for selection, timing, encoding, data transfer, and status and error conditions. It also provides error detection for attached tape units. The formatter uses a microprocessor that allows 16-bit instructions to be fetched, decoded, and executed in 250 nanoseconds.

In addition, the 2509V includes dual-gap read/write heads to verify data, a full-width erase head, and photoelectric sensors to detect reflective tape markers. The 2509V is vacuum-buffered to prevent data loss and accidental damage to the tape.

The 2509V features push button controls for easy operation. Indicator lights alert the operator to the current status of the drive.

6.3.2 Specifications

General	
Recording Density	1600 bpi PE
Storage Capacity	25MB
Tracks	9
Data Transfer Rate	120KB/second
Performance	
Read/Write Speed	75 ips (192.3 cm/sec)
Rewind Speed	200 ips (508.0 cm/sec)
Physical	
Height	34.0 in. (86.4 cm)
Width	24.0 in. (61.0 cm)
Depth	26.0 in. (66.0 cm)
Weight	170.0 lb (77.1 kg)
Heat Output	1623 Btu (409 Kcal)
Tape Capacity	2400 ft (731.5 m)

Environmental	
Power	4.1 amps @ 115 VAC (± 10%) 2.0 amps @ 230 VAC (± 10%) 50/60 Hz (475 watts)
Temperature	50° to 80° F (10° to 27° C)
Relative Humidity	35% to 65% (noncondensing)

6.4 2220 DISK DRIVE

The 2220 is an 8-inch, high-performance, fixed-disk drive with a storage capacity of 76MB. The drive is compatible with VS25 and VS45 systems and resides inside the system cabinet. There is a physical limit of one 2220 disk drive per system.

The 2220 fixed-disk system features a data transfer rate of 1198 kilobytes per second and an average latency time of 8.55 milliseconds.

With the introduction of the 2220, a third fixed-disk drive option is available to meet VS25 and VS45 system storage and performance needs. The VS25 and VS45 can be configured with a single Q2040 (34MB) disk drive, two Q2040 disk drives, or a single 2220 (76MB) disk drive.

6.5 DW/OS-55 DAISY PRINTER

The DW/OS-55 (refer to Figure 6-2) is a bidirectional daisy wheel printer with a standard 15-inch carriage. It provides letter-quality printing at a rate of approximately 55 characters per second in data processing or word processing applications. The DW/OS-55 is available as a local printer for all VS systems; it can be located up to 2000 feet (609.6 meters) from the CPU.

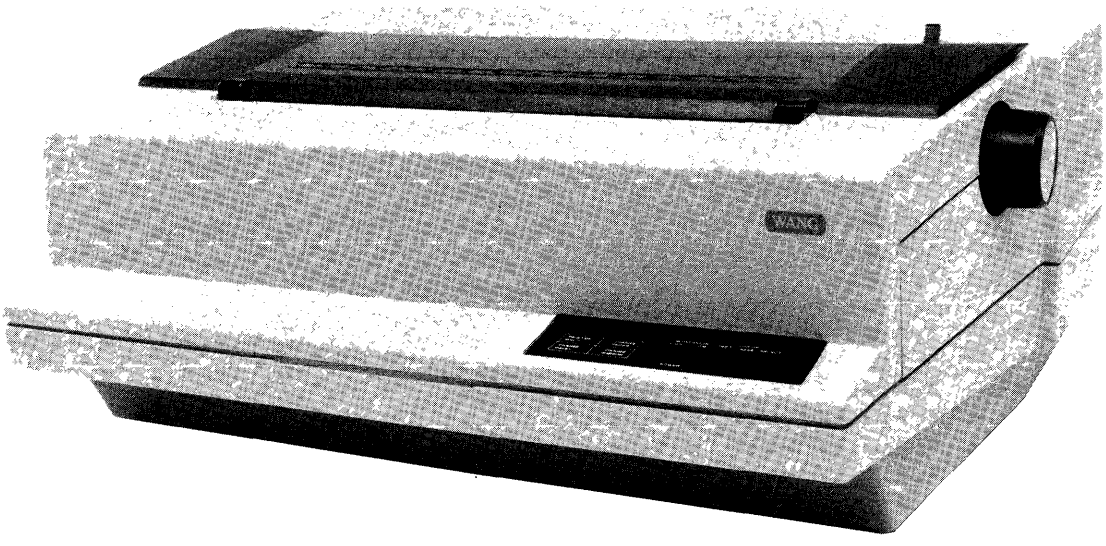

Figure 6-2. DW/OS-55 Daisy Printer

The printer uses interchangeable metal or plastic print wheels, each containing 96 characters. These print wheels are available in 10-, 12-, or 15-pitch or proportional spacing. By overstriking, you can generate additional characters. Selection of print wheel spacing is possible from the workstation. You can select the type of wheel (metal or plastic) by setting a switch on the printer. Print wheel replacement is an easy, straightforward operation.

With a 10-pitch print wheel in place, the printer allows up to 132 characters per line. It can print up to 158 characters per line with a 12-pitch print wheel, and it can print up to 198 characters per line with a 15-pitch print wheel. In word processing applications, the system limits single column printing at 15-pitch to a maximum of 158 characters per line. Fifteen-pitch is available on VS systems in WP mode only.

A proportional spacing print wheel permits a maximum line length of 13 inches (33 cm). Nonproportional spacing print wheels, in 10-, 12-, and 15-pitch, allow a maximum line length of 13.2 inches (33.5 cm). The printer can use single-sheet paper or continuous forms of up to six parts; papers can be 3 to 15 inches (7.62 to 38.1 cm) wide.

Available options include a bidirectional forms tractor, which permits superscript and subscript printing, and a dual-forms feeder.

6.5.1 Features

Wang Laboratories Certified (WLC) print wheels come in various type styles. The type styles offer non-English fonts, optical character reader fonts (OCR-A and OCR-B), ligatures and diacritical marks used in non-English writing, and special scientific and mathematical symbols.

Microprocessor control of the printing process automatically adjusts the hammer striking force for individual characters. This control supplements the usual Impression Control switch, which permits hammer striking force to be set to normal or hard, depending on the thickness of the paper. This added feature prevents embossing or cutting and produces an even print impression for every character.

A calibrated Copy Control lever permits adjustment of the space between the printing mechanism and the platen, depending on the thickness of the paper. The calibrations allow you to make adjustments for optimum print quality.

The TOP OF PAGE switch serves a dual function. In addition to feeding a new sheet to the next top-of-page position, the switch can be used in conjunction with the SELECT switch to reprint a page.

An ERROR CODE display that consists of a 7-segment LED (Light Emitting Diode) indicator helps to identify printer error conditions quickly.

A Test switch permits off-line printing of a test pattern to check print quality.

The construction of the DW/OS-55 printer results in a low noise level that does not interfere with normal office routine. This, in conjunction with the printer's convenient size and weight and a permissible cable run of up to 2000 ft (609.6 m), makes desktop placement possible in a working environment.

The Print Document menu allows you to easily specify the format and type of printout through the workstation.

Microprocessor control permits simultaneous print data input and hardcopy output for increased printer efficiency.

6.5.2 Specifications

General	
Character Set	96 characters; additional characters created by overstriking
WLC Print Wheels	10-pitch, 12-pitch, 15-pitch, and Proportional Spacing
WLC Ribbon Cartridges	Black fabric or multistrike carbon
Speed	55 cps (plastic print wheel) 45 cps (metal print wheel)
Physical Specifications	
Height	8.87 in. (22.53 cm)
Height with cover open	21.4 in. (54.36 cm)
Width	23.8 in. (60.45 cm)
Depth	17.5 in. (44.45 cm)
Weight	55 lb (24.95 kg)
Print Format	
Horizontal	132 columns maximum at 10-pitch in a 13.2 in. (33.5 cm) line 158 columns maximum at 12-pitch in a 13.2 in. (33.5 cm) line 198 columns maximum at 15-pitch in a 13.2 in. (33.5 cm) line Maximum line length of 13 in. (33 cm) for proportional spacing
Vertical	6 or 8 lines per inch

Paper Specifications	
Width	3.0 to 15.0 in. (7.62 to 38.1 cm)
Thickness	0.003 to 0.027 in. (0.076 to 0.686 mm)
Single-Sheet Weight	15 lb (56 g/m^2) or 20 lb (75 g/m^2)
Single-Part Forms Weight	15 lb (56 g/m^2) minimum 20 lb (75 g/m^2) maximum
Multipart Forms	
2-ply	15/15-lb bond, 9-lb carbon
3-ply	15/12/15-lb bond, 7-lb carbon
4-ply	15/12/12/12-lb bond, 5-lb carbon
5-ply	15/12/12/12/12-lb bond, 5-lb carbon
6-ply	15/12/12/12/12/12-lb bond, 5-lb carbon
Cabling	25 ft (7.6 m) from printer to CPU
	Optional lengths up to 2000 ft (609.6 m)
Power Requirements	100, 120, 220, or 240 VAC (+10%, -15%)
	50 or 60 HZ (+0.5%, -1%)
	300 Watts nominal
Fuses	3A (SB) for 100/120 VAC 1.5A (SB) for 220/240 VAC
Operating Environment	
Temperature	60° to 90° F (16° to 32° C)
Relative Humidity	20% to 80% (noncondensing)
Maximum Wet Bulb Temperature	75° F (24° C)
Altitude	1000 ft (304.8 m) below sea level to 9842 ft (3000 m) above sea level)

6.6 TELECOMMUNICATIONS SUPPORT

Release 6.20 includes additional TC support as summarized below.

128K TC Board (TCB-3): The TCB-3 is a serial device for use with Remote WangNet. It supports SNA, Point-to-Point Remote WangNet, and the X.25 protocol. The TCB-3 replaces the TCB-1.

VS80 TC Device Adapter (22V56-1): For VS80 systems, the 22V56-1 is an alternative to the TCP. It supports the internal TCB-1 for SNA, Point-to-Point Remote WangNet, and the X.25 protocol. It supports the TC2 for line definition.

VS100 TC Device Adapter (22V66-1): For VS100 systems, the 22V66-1 is an alternative to the TCP. It supports the internal TCB-1 for SNA, Point-to-Point Remote WangNet, and the X.25 protocol. It supports the TC3 for line definition.

TC Device Adapter (25V76-2): For VS25 and VS45 systems, the 25V76-2 is a 2-port TC adapter. It provides support for Remote WangNet (previously supported on TCP).

6.7 IOPS AND DEVICE ADAPTERS

Release 6.20 supports additional IOPs and device adapters as summarized below.

VS80 Extended Serial IOP (22V37): For VS80 systems, the 22V37 has 32 physical ports and supports a total of 32 logical devices. It does not support Workstation 0.

VS100 Extended Serial IOP (22V47): For VS100 systems, the 22V47 has 32 physical ports and supports a total of 32 logical devices. It does not support Workstation 0.

ISIO Device Adapter (25V37): For VS25 and VS45 systems, the Intelligent Serial I/O (ISIO) device adapter is a loadable controller that supports Control mode for Workstation 0 functions. It has 32 physical ports and supports a total of 32 logical devices. It supports all device configurations currently supported by the 25V27 Standard Serial controller.

CHAPTER 7
CORRECTED SOFTWARE ANOMALIES

7.1 INTRODUCTION

This chapter lists corrections made to software anomalies for Release 6.20. The Problem Report number (PR#) is included for those anomalies reported by customers.

7.2 OPERATING SYSTEM

Several related problems that occurred occasionally during heavy sharing loads have been fixed. The symptoms of the problems were as follows:

- Sharer cancelled (PR# F002755)
- Error halt "WS75 - Invalid page frame from unmapping DTI" (PR# F002895, PR# F002964)
- Error halt "WS75 - FLUB not Sharer's or user's releasing page" (PR# F003165, PR# F003201)

The operating system now includes support for the printing of both uppercase and lowercase on 5521 printers. (PR# F003978)

The operating system now recognizes 2265V-3A dual-port disks and releases them when you detach them through the Operator's Console.

7.3 BACKUP

You can now run BACKUP many times by specifying PF1 on the EOJ screen. BACKUP no longer cancels because of a GETHEAP failure.

BACKUP now allows you to mount fixed disk volumes through the Mount screen. Previously, after you specified the device number, BACKUP responded with the message "Disk does not have the requested volume type (Fixed/Removable)."

If you attempt to mount a different input volume on a drive already in use, BACKUP no longer continually displays the message "Volume may not be mounted for protected use." BACKUP now displays the message "The volume is currently in use" and prompts you to specify another device.

BACKUP now passes program privileges from the input file to the output file.

After you back up a tape volume with CLEAR=YES and copy no files, BACKUP now clearly notes that no files are present on the tape volume when it is restored or verified.

BACKUP no longer gets an addressing exception if you attempt a backup to an ANSI-labeled tape volume.

When you back up files disk-to-disk and the output disk volume becomes full, BACKUP now always stores the information about the next output volume in @BAKREC@, the BACKUP information file. Previously, this did not happen if the last file created had filled the remaining space on the volume and no partial file was created.

When you restore files from a fixed disk of a Phoenix drive to a removable 15MB disk, BACKUP now handles a full VTOC in the same manner as a full volume. (PR# F003496)

When you back up a log file that contains zero records, BACKUP now copies to the output file special file information (block and file length indicators) contained in the first block of the file. (PR# F003717)

The UPDATE function available on the PROMPT and SAMEFILE screens now allows you to back up or restore files with a more recent modification date. (PR# F003765)

When you are restoring a large library from tape to diskette, BACKUP now terminates the restore operation if the output volume becomes full. BACKUP no longer requests you to mount the next output volume in this situation.

If you back up or restore the active WTEFORM (the one that the executing BACKUP program opened) to a library that contains a file of the same name, you no longer have to cancel BACKUP processing in the case of a disk-to-disk backup or restore of a library or volume.

You can now continue a file, library, or volume restore from any tape volume although the volume mounted may not be the correct volume in sequence.

If you are restoring a tape volume and mount the volume with a name other than the one used during the backup operation, you now have the option to respecify the input (PF1), to continue with the currently mounted volume (PF2), or to mount the correct tape volume.

After you mount the wrong tape volume, BACKUP no longer dismounts the volume until it determines whether or not to continue with the currently mounted volume.

The BACKUP log now records indexed files as INDEXED (not CONSEC). (PR# F003104)

The BACKUP log now includes page numbers. (PR# F003154)

The BACKUP log file now reports enhanced messages for OPEN EXIT errors. If UFBFS1 is equal to 9, UFBFS2 is decoded to provide a more detailed report of the error that occurred.

WANG

Customer Comment Form

Publication Number 800-3114-01

Title VS SOFTWARE BULLETIN RELEASE 6.20

Help Us Help You . . .

We've worked hard to make this document useful, readable, and technically accurate. Did we succeed? Only you can tell us! Your comments and suggestions will help us improve our technical communications. Please take a few minutes to let us know how you feel.

How did you receive this publication?

- ☐ Support or Sales Rep
- ☐ Wang Supplies Division
- ☐ From another user
- ☐ Enclosed with equipment
- ☐ Don't know
- ☐ Other _____

How did you use this Publication?

- ☐ Introduction to the subject
- ☐ Classroom text (student)
- ☐ Classroom text (teacher)
- ☐ Self-study text
- ☐ Aid to advanced knowledge
- ☐ Guide to operating instructions
- ☐ As a reference manual
- ☐ Other _____

Please rate the quality of this publication in each of the following areas.

	EXCELLENT	GOOD	FAIR	POOR	VERY POOR
Technical Accuracy — Does the system work the way the manual says it does?	☐	☐	☐	☐	☐
Readability — Is the manual easy to read and understand?	☐	☐	☐	☐	☐
Clarity — Are the instructions easy to follow?	☐	☐	☐	☐	☐
Examples — Were they helpful, realistic? Were there enough of them?	☐	☐	☐	☐	☐
Organization — Was it logical? Was it easy to find what you needed to know?	☐	☐	☐	☐	☐
Illustrations — Were they clear and useful?	☐	☐	☐	☐	☐
Physical Attractiveness — What did you think of the printing, binding, etc?	☐	☐	☐	☐	☐

Were there any terms or concepts that were not defined properly? ☐ Y ☐ N If so, what were they? _____

After reading this document do you feel that you will be able to operate the equipment/software? ☐ Yes ☐ No ☐ Yes, with practice

What errors or faults did you find in the manual? (Please include page numbers) _____

Do you have any other comments or suggestions? _____

Name _____ **Street** _____

Title _____ **City** _____

Dept/Mail Stop _____ **State/Country** _____

Company _____ **Zip Code** _____ **Telephone** _____

Thank you for your help.

Printed in U.S.A. 14-3140 7-83-5C

WANG

Fold

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 16 LOWELL, MA

POSTAGE WILL BE PAID BY ADDRESSEE

WANG LABORATORIES, INC.
TECHNICAL PUBLICATIONS
ONE INDUSTRIAL AVENUE
LOWELL, MASSACHUSETTS 01851

Fold

Cut along dotted line.

WANG

ONE INDUSTRIAL AVENUE
LOWELL, MASSACHUSETTS 01851
TEL. (617) 459-5000
TWX 710-343-6769, TELEX 94-7421

Printed in U.S.A.
800-3114-01
1-84-10M