WANG

# VS25

## Bulletin

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PREFACE

This document is an introduction to the Wang VS25 computer system. It provides an overview of VS25 operating procedures. Other essential manuals are the VS System Operation Guide (800-1102SO-06) and the VS System Management Guide (800-1104SM-03). Depending on the anticipated use of your system, one or more of the following documents may also be helpful:

VS Programmer's Introduction (800-1101PI)
VS Principles of Operation (800-1100PO)
VS System Utilities Reference (800-1303UT)
VS File Management Utilities (800-1308FM)
VS Procedure Language Reference (800-1205PR)

CONTENTS

## FIGURES



## TABLES

CHAPTER 1
SYSTEM OVERVIEW

## 1.1 INTRODUCTION

The VS25 and VS45 are new additions to Wang's family of information processing systems. They are based on a newly implemented system architecture and state-of-the-art hardware.

Designed specifically for today's distributed business processing requirements, the VS25 blends well with the office environment. The compact system cabinet encloses all system components except printers and workstations. It can be installed in most offices without special power or air conditioning.

The VS45 offers expansion over the VS25 system for users requiring more memory, disk storage, and workstation support. Both the VS25 and VS45 systems are completely software compatible with the existing members of the VS product family. In the tradition of Wang VS systems, the VS25 and VS45 are powerful yet extremely user-friendly.

Wang has designed the VS25 and VS45 to accommodate today's demanding user and tomorrow's growth requirements. Both systems offer industry-standard languages, data communications, network access, and software utilities, as well as Wang's pace-setting word processing. Modular system design enables the user to add memory, disk storage units, and peripheral devices without hardware replacement.

Wang word processing is the unchallenged industry leader, offering a wide range of application capabilities and virtually every type of editing and formatting feature. Easy training and user-friendliness result in unprecedented user acceptance. Word processing and data processing are completely integrated within VS systems.

## 1.2 VS SOFTWARE

### VS Operating System

Wang has designed VS software for effectiveness and ease of use. These goals are realized by the VS operating system. The same advanced virtual storage operating system is shared by all members of the VS family. The operating system is the program that governs the use of resources and interprets user requests to the system. Users interact with the operating system through a menu-driven command processor. The menu technique is faster and subject to fewer errors than the typical command language offered on competing systems.

Besides menu choices, the operating system displays messages and prompts in clear English, providing information or requesting clarification. Users can interrupt task processing at any time to enter the debugger or to inspect the status of files, I/O activities, or the entire system, and then resume task operations from the point of interruption.

### Virtual Storage

Virtual storage management gives each VS25 and VS45 user simultaneous address space of up to 2 million bytes, half for the program file and half for data (including some system overhead), regardless of the actual size of main memory. Program segmentation and overlays are eliminated, freeing programmers to concentrate on the logical structure of their code. The operating system brings pages of a user's address space from disk into main memory as needed and moves unneeded pages back to disk. The entire process is totally transparent to programmers and users.

### Background Processing

Though designed primarily for interactive processing, the VS offers batch-type handling of tasks that require no user input. These background jobs are run from a separate job queue and have lower-priority access to system resources to minimize interference with interactive jobs. Once submitted, background jobs leave workstations free for interactive use.

### VS Data Management System

The VS Data Management System is a complete and efficient system for creating, updating, and maintaining files. DMS manages disk file space and services all file I/O requests as required by various devices. Consecutive, indexed, and alternate indexed files are supported. Records in files may be located in a sequential or random fashion, or through index key values. Data compaction conserves disk space and speeds data transfer. Integrated file sharing allows several users to perform concurrent updates and/or inquiries, avoiding unnecessary delays and preserving file integrity.

## 1.3 VS25 DISK STORAGE

The 8-inch fixed-disk drive provides a fast yet economical method of data access. Because the fixed disk is housed in a sealed environment, it is virtually immune to particle contamination, thereby allowing the disk drive heads to fly close to the disk surface. The resulting decreased air gap permits a greater data density than was previously possible, enabling the user to access data faster and store more data in less space.

Additionally, the Winchester fixed-disk technology allows lubricated disk surfaces and a decrease in head-loading force, permitting the head to "take off" and "land" on the platter surface during power-up and power-down procedures. The reduced possibility of a head crash furthers data integrity. These features contribute to a compact disk drive that retains the performance and reliability of other disk models, at significant price reductions.

A 34M-byte fixed-disk drive housed in the system cabinet is standard equipment for the VS25. The operating system resides on this disk, which serves as the principal disk storage medium. A second 34M-byte disk is optional. The VS45 can be configured with fixed disks and/or external, large-capacity removable disks. (Office environmental considerations are affected by the inclusion of external disks.)

A 1.2M-byte dual-sided, double-density diskette drive is also supplied as standard equipment in the VS25 system cabinet. Diskettes back up the fixed disk and serve as a transfer medium for system software and applications packages.

## 1.4 SUMMARY OF VS25 AND VS45 FEATURES

| | |
|---|---|
| New Central Processor | Executes instructions in 500-nsec average microinstruction time |
| Loadable Microcode | Allows dynamic upgrades of processor function |
| DSDD Diskette Drive | Loads and backs up files with 1.2M-byte dual-sided double-density diskettes |
| Fixed Disk Drive | Supports operating system and user files in 34M-byte or 68M-byte capacities |
| Remote Diagnostics | Report system status through data communications |
| Multi-User System | Supports 1 to 20 users |
| Multiprogramming | Processes many tasks concurrently |
| Virtual Storage | Allots up to 2 million bytes of program and data address space to each task |
| Communications | Connect the VS with remote users and systems through networks |
| Assembler | Enables program development through more than 200 instructions |
| Floating-Point Instructions | Offer binary and decimal floating-point capability as a standard item |
| Standard Languages | Support application program development in COBOL, BASIC, FORTRAN, PL/I, and RPG II |
| VS Utilities | Provide simplified system and job control, programmer productivity aids (including data entry, file definition and handling, screen formatting, report and menu generation), and sophisticated inquiry facilities |
| System Security | Provides complete yet flexible security at user, file, program, and workstation levels |
| Word Processing | Offers all Wang word processing capabilities |
| Tape Cartridge | Provides an optional 14M-byte backup and archiving medium |

CHAPTER 2
SYSTEM INTRODUCTION

This chapter describes power-up procedures and introduces the command processor and the SECURITY program.

## 2.1 POWER-UP PROCEDURE

This section describes standard power-up procedures for the VS25. After your machine has been properly installed, follow these simple steps, referring to Figure 1 as necessary:

1. Power up all workstations and printers.

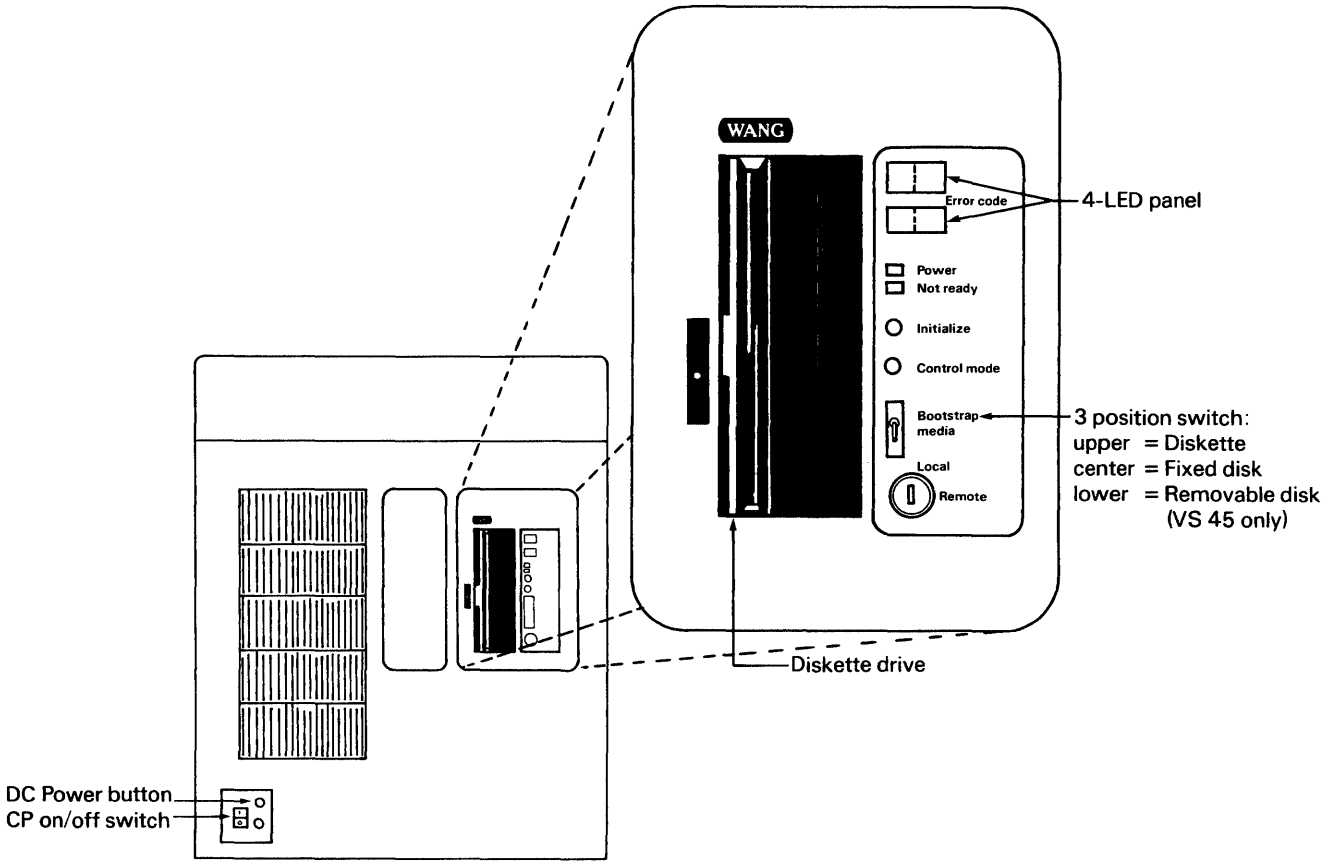


Figure 1. VS25 System Cabinet

2. Set the Bootstrap Media switch to the proper position to load system microcode. For a normal power-up it should be set to the center position, i.e., for the internal fixed disk. (For a cold-start, it should be set to the upper position, i.e., for the diskette. See Appendix A for the cold-start procedure.) The 4-LED panel displays the error code "40BA" if the medium selected by the switch does not contain the bootstrap program.

3. Turn the key on the right of the front panel to Local. Power up the CP: press the red rocker switch in the lower left corner of the front panel to turn on the AC power; then press the red button next to it to turn on the DC power. The 4-digit LED displays numbers that first count down from FFFF to 0000 (in hexadecimal notation), then count up through a series of numbers (typically 10, 12, 14, 60, and 40), and finally turn blank. Wait approximately one minute for the internal fixed disk to get up to speed before proceeding.

4. The IPL Drive Selection screen is displayed (refer to Figure 2). The cursor is now positioned next to the entry for the fixed disk drive. Press ENTER to perform an Initial Program Load (IPL) from this drive. You do not need to power up or load the heads of the drive, which is located inside the CP cabinet.

   (To IPL if the system is already powered up: press the green Control mode button on the right side of the front panel to halt system processing, then press the red Initialize button to trigger microcode loading.)

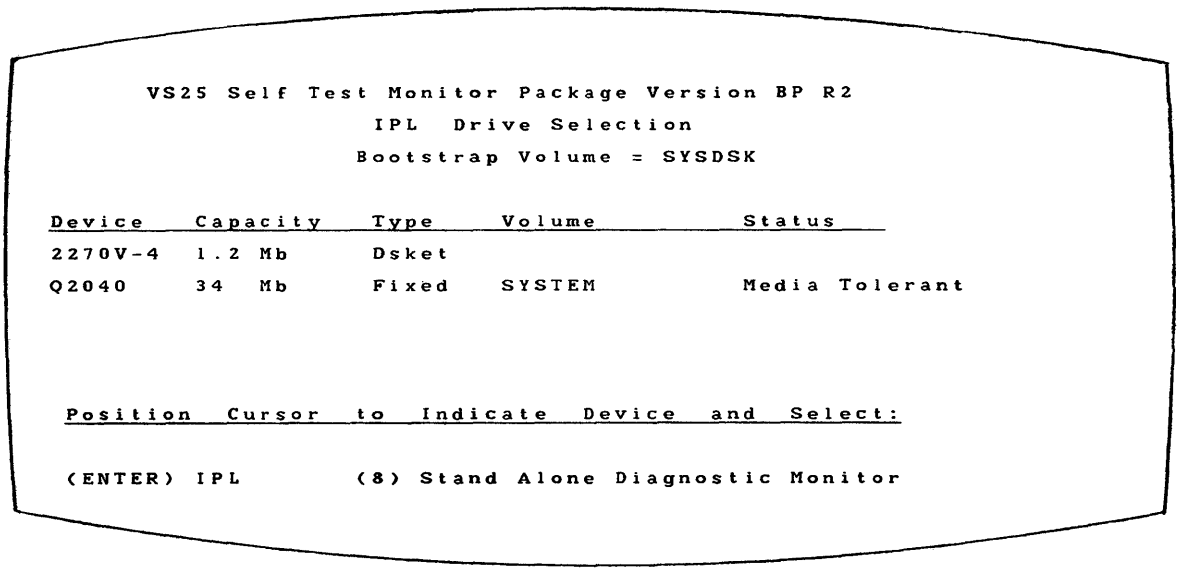


Figure 2. IPL Drive Selection Screen

Workstation 0 should now display the System Hardware Status screen (see Figure 3). This screen displays the results of self-test diagnostics. (Refer to Appendix F for a listing of error codes.)

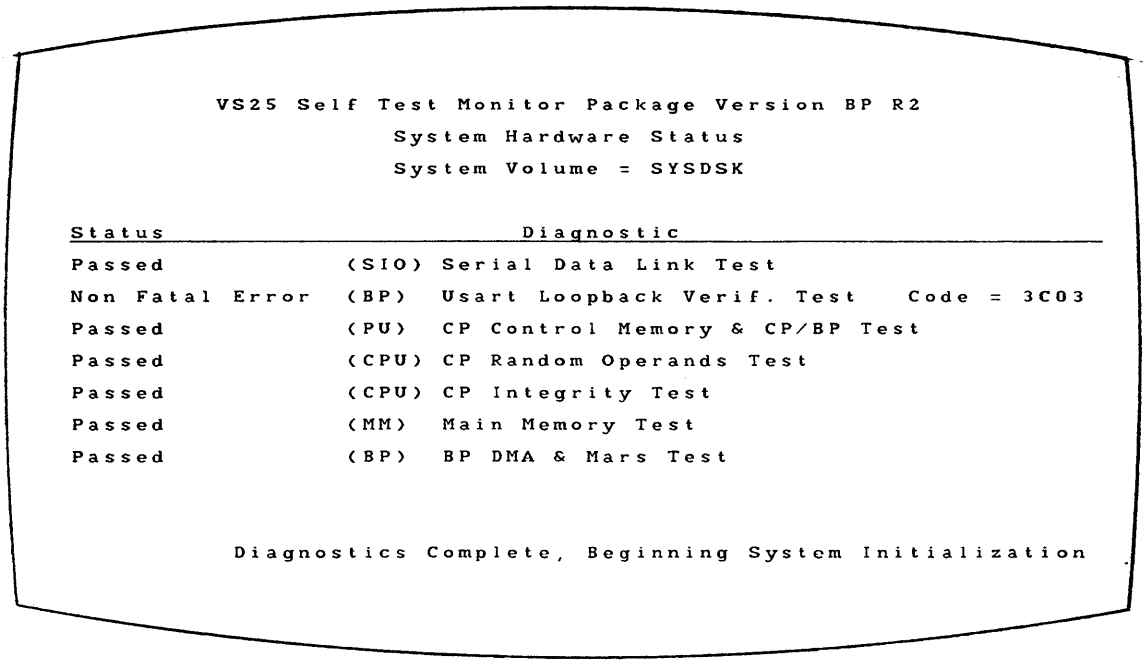


Figure 3. System Hardware Status Screen

When all components, including the workstation, have been tested and found operational, the message, "Diagnostics completed. Beginning system initialization", appears on the workstation screen. Now begins the loading of system microcode.

If the message "Non-Fatal Error" is displayed, make a note of the name of the failed test and the error code, and report it to Wang Field Service at a later time. Press ENTER to continue.

If diagnostics messages do not appear on the workstation 0 screen within one minute, power down workstation 0 and power it up again to trigger microcode loading. Continue with Step 4, above.

5. In about 30 seconds, the message shown in Figure 4 appears, asking for the name and library of the system configuration file to be used when bringing up the system. You may enter configuration file information now, or you may take the displayed default values simply by pressing ENTER. It is recommended that you take the defaults: press ENTER.

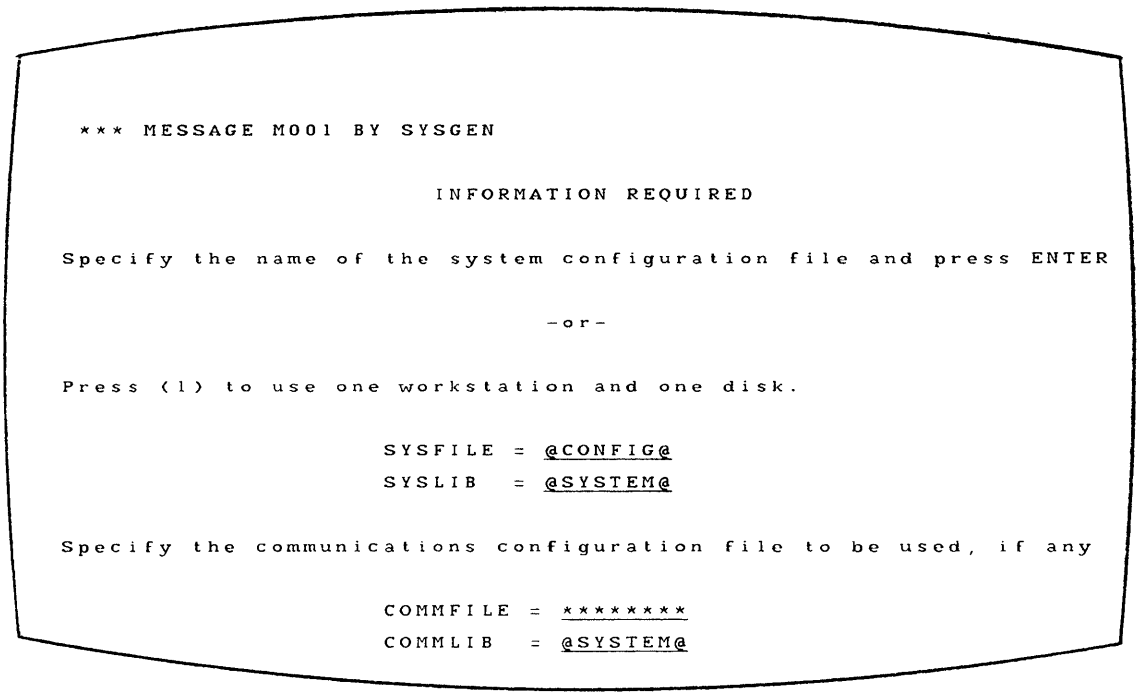


Figure 4. SYSGEN Configuration File Screen

6. The next screen asks you for the current date and time. Enter the date and time in the YY/MM/DD HH/MM/SS format indicated, and press ENTER. (Note that date and time information is lost whenever the system is brought down.)

Now the system is up and running in accordance with the configuration file specified. The workstation displays the Operator's Console screen (operator main menu) as shown in Figure 5. You are now in operator mode.

## 2.2 ENTERING USER MODE

In operator mode, using the screen shown below, you can manage the entire computer system. One of your first tasks should be to enter user mode and run the SECURITY program in order to allow other users to log on.

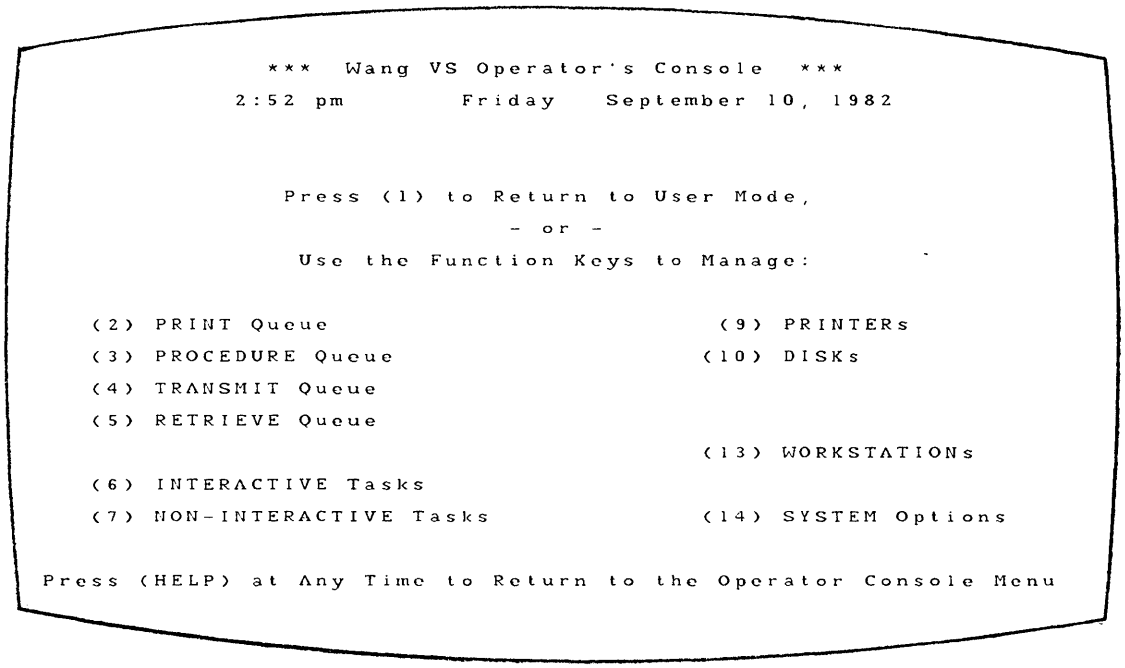


Figure 5. Operator's Console Screen (Operator Main Menu)

Press PF1 ("Program Function Key #1") on this screen. The Logon screen appears, as shown in Figure 6.

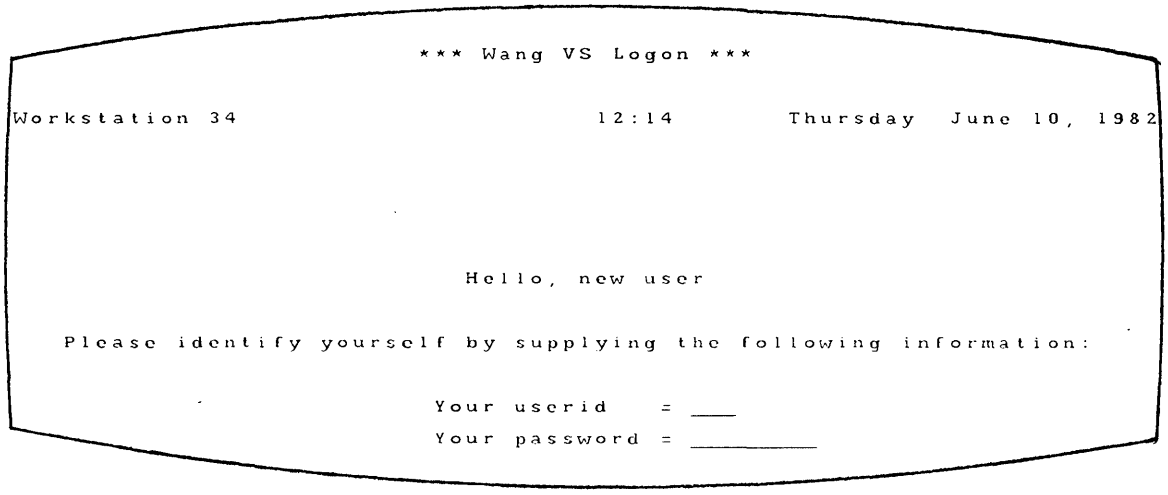


Figure 6. Logon Screen

Enter your user ID and password. (If this is the first time your VS25 has been powered up, no user IDs or passwords have been assigned yet; in this case, enter the three-letter user ID "CSG", which does not require a password.) Press the RETURN key. You are now logged on. The Command Processor screen (user main menu) appears.

## 2.3 INTRODUCTION TO THE COMMAND PROCESSOR

The command processor screen displays system commands associated with the program function (PF) keys on the top row of the workstation keyboard. You select a command by pressing the appropriate PF key. (See Figure 7.)

For more detailed information about functions available on the command processor screen, refer to VS Programmer's Introduction.

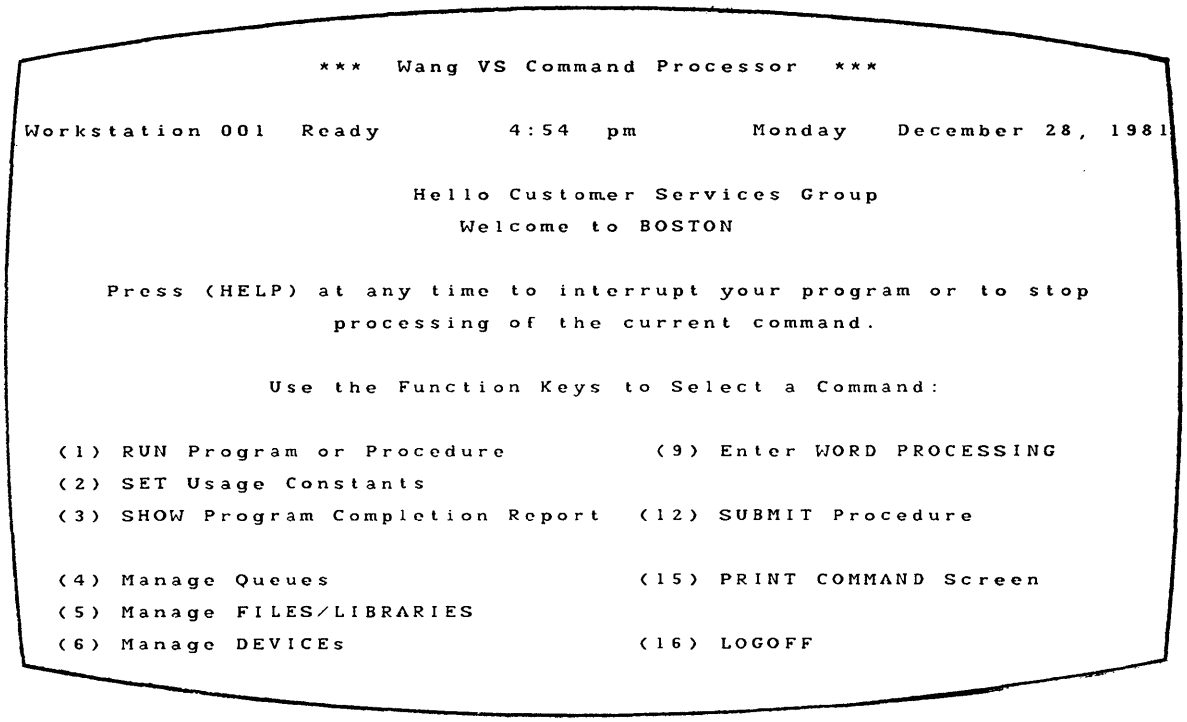


Figure 7. Command Processor Screen (User Main Menu)

The RUN Program or Procedure command (PF1) is the most commonly used command. It runs both system and user programs. When you press PF1, the system prompts you for the name of the program or procedure you want to run.

The Manage Queues command (PF4) lets you display and control the Print, Transmit, and Retrieve queues. When you invoke this command, a small menu directs you to select the appropriate queue.

You can use the Manage FILES/LIBRARIES command (PF5) to check on the presence and attributes (e.g., size and creation date) of files. For example, configuration file @CONFIG@ is in library @SYSTEM@ on volume SYSTEM.

If you press PF16 on the Command Processor screen and then press ENTER, you terminate your workstation session.

## 2.4 RUNNING THE SECURITY PROGRAM

Once you are logged on as user CSG, you should run the SECURITY program to allow other users to log on. Press PF1, then enter the name "SECURITY" on the next screen and press ENTER. (See Figure 8.)

```
***  WANG VS SECURITY SYSTEM ADMINISTRATION UTILITY VERSION  5.02.06 ***

        PRESS the PFKEY Corresponding to the Desired Function:

     (1)  REVIEW (Optional MODIFY or DELETE) System Access Privileges
          Starting with USER ***  (If Blank, First User is Assumed).

     (2)  ADD a New User to the System.

     (9)  REVIEW (Optional MODIFY) Program Special Access Privileges
          for Program ******** in Library ******** on Volume ******

    (12)  REVIEW (Optional MODIFY or DELETE) Inter-system Access
          Privileges Starting with SYSTEM ********
          (If Blank, First System is Assumed).

    (13)  INSTRUCTIONS.

    (15)  PRINT Listing of Users.

    (16)  END PROCESSING.
```

Figure 8. SECURITY Program Screen

The VS security system is a mechanism for protecting system resources against unauthorized use. The SECURITY program can be used to protect resources on three levels:

- On the system level - Before users may access system resources, they must log onto the system by entering a user ID and password. User log-ons may also be restricted to or prohibited from certain workstations.

- On the file level - Each user may access only those files belonging to the protection classes to which the user has been granted access rights. Access to other files is denied by the system. Up to 30 unique file protection classes may be defined. Programs also may be granted these access rights.

- On the access level - The kind of file access granted may vary with protection class and user: for a given user, some classes of files may be modified, some may only be read and executed, and some program files may only be executed. The same categories of access also apply, independently of user, to programs that access files.

Once you are running the SECURITY program, PF1 and PF2 access the User list, where you must enter information for each user, e.g., user IDs, names, and access rights. The User list should be placed in protection class "#", with a system security administrator as owner, so that only security administrators can gain access to it. The list is maintained and updated through the SECURITY program.

Each record in the system User list contains the following information:

USER ID - Each user must have a unique ID up to three characters in length. The first character must be alphabetic, the others alphanumeric.

PASSWORD - A password, though optional, should be assigned for security reasons to each user ID (including user ID "CSG", once it has been used to gain initial access to the system). It may be up to eight uppercase characters in length. Display of the password is suppressed when it is entered during log-on.

NAME - This name appears in a greeting displayed on the Command Processor screen at log-on time.

SECURITY ADMINISTRATOR - This field must have a value of either Y or N. It defines whether the user is a system security administrator. If this value is set to Y, the user has access to all files on the system, including the SECURITY program and all private files. If this value is set to N, the user is not a system security administrator, and the user's access rights are set on a per-file-class basis (see p. 14).

For more information on VS system security, refer to the VS System Management Guide.

### 2.4.1 PF1 - Review, Modify, or Delete User Records

Starting with the SECURITY Program screen, i.e., the screen illustrated in Figure 8, enter the initials of the user to be reviewed and press PF1. If the initials are left blank, the new screen displays the record of the first user ID. If an incorrect ID is entered, the new screen presents the record of the next valid ID. Once a user's record is displayed, you may modify it by pressing PF9, entering the changes, and then pressing ENTER; to delete the record, press PF12. Security administrators may modify any information (except the ID itself) for any other user. A security administrator's record can be deleted only by another security administrator; administrators cannot delete their own records.

After examining a displayed record, the system security administrator can inspect the first record by pressing PF2, the next record by pressing PF5, or any other record by supplying another ID and pressing PF8; by pressing PF16 he can return to the SECURITY Program screen. By pressing PF13 on that screen, he can review instructions for modifying user records.

### 2.4.2 PF2 - Add a New User

Starting with the SECURITY Program screen, press PF2. A new, blank user record appears; enter a new, unique user ID, then fill in the requested information and press ENTER. You may instead press PF1 to return to the SECURITY menu, or PF13 to review the instructions for modifying user records.

### 2.4.3 PF9 - Review or Modify Program Access Privileges

To review and modify a program's special access privileges, enter the file, library, and volume name of the program, and press PF9. The next screen displays the 26 lettered file classes and the program's current level of access (R--Read, E--Execute, W--Write, or blank--no access) to each, and indicates whether the program has security administrator status, i.e., write access to all 26 of these classes. To modify, enter the changes and press ENTER.

### 2.3.4 PF13 - Review the Instructions for SECURITY

By pressing PF13 on the SECURITY Program screen, the security administrator is supplied with an explanation of each PF key optrion.

### 2.3.5 PF15 - Print the User List

This option allows the security administrator to print a listing of all user information except passwords. No screen display is provided. As this listing contains privileged information, the administrator should take special care to store it in a secure location.

CHAPTER 3
MANAGING DEVICES

## 3.1 INTRODUCTION

PF keys 9 through 13 on the Operator's Console screen (see Figure 5) may be used to control all I/O devices. By pressing proper PF keys, the operator can logically mount and dismount disk and tape volumes; logically attach and detach disk and tape drives, printers, and telecommunications devices; manage remote networking devices; and control logons and logoffs for workstations. The current status of each type of device is displayed by pressing the appropriate PF key.

Most device management functions can be executed from both user and operator workstations. However, the Attach and Detach commands and the telecommunications functions (Activate, Deactivate and Change) appear only on the Operator's Console screen.

## 3.2 CONTROLLING DISKS

To reach the Control Disks screen, press PF10 (DISKs) on the Operator's Console screen. The Control Disks screen provides information about all the disk drives configured for the system. The current user's ID appears on the Owner Information screen, as explained below.

The information is listed in the order of the drive number (unit number or device address). The following information is provided for all disk devices:

- Drive number
- Device model number
- Capacity in M bytes (megabytes) or K bytes (kilobytes)
- Platter type--removable, fixed, or diskette

If a disk volume is mounted on the drive, the following additional information appears:

- Volume name
- Restrictions--removal, write protection, or exclusive use
- Number of open files
- Any status other than Ready

Figure 9 shows a Control Disks screen. Note that a list of commands for controlling disks and the PF keys associated with them is given at the bottom of the screen. These commands are described below.

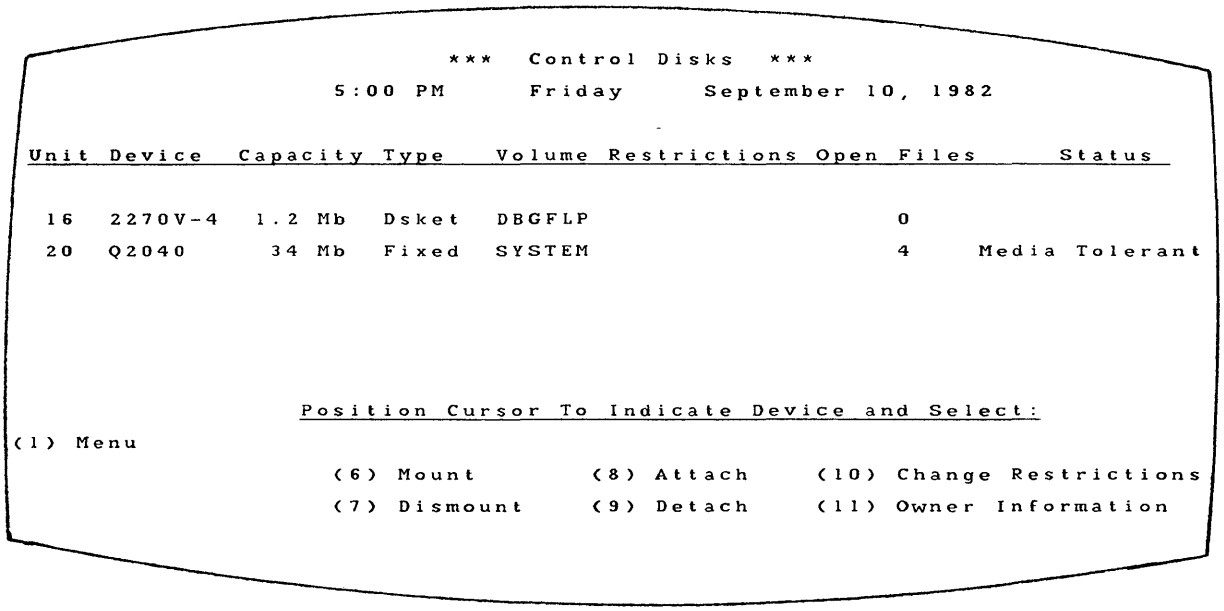


Figure 9. Control Disks Screen

## Mounting a Disk Volume

To logically mount a volume on a disk drive, move the cursor to the line describing the drive and press PF6. (Note that the Quantum fixed disk (model Q2040) included in the CP cabinet of VS25 systems cannot physically be mounted or dismounted.)

The Mount Disk screen, illustrated in Figure 10, appears. Enter values for the following parameters:

- Volume name
- Label type. "No Label" is valid for diskettes only; "Standard Label" is the default.
- Mode--"Shared" is the default.
- Allow work files? Choose "YES" or "NO"; "NO" is the default.
- Allow spool files? Choose "YES" or "NO"; "NO" is the default.
- Allow paging files? Choose "YES" or "NO"; "NO" is the default.

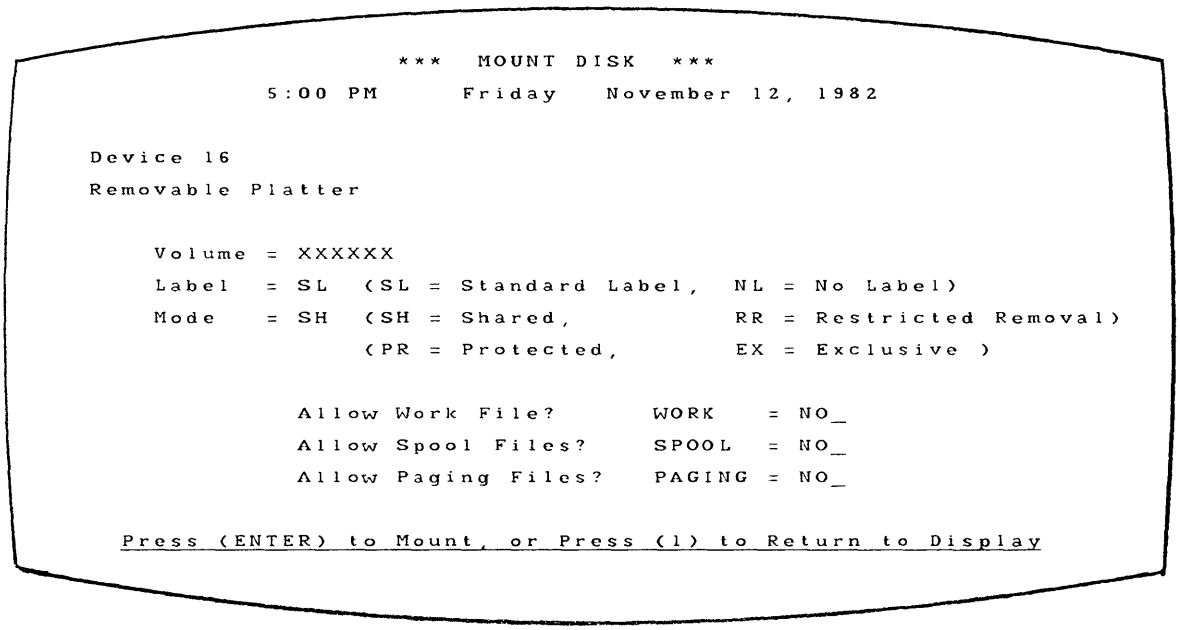


Figure 10. Mount Disk Screen

Press ENTER to logically mount this disk volume; if appropriate, the system prompts you to physically mount the volume. You may instead press PF1 to cancel the mount request and return to the Control Disks screen.

## Dismounting a Disk Volume

When logically dismounting a volume, move the cursor to the line of the display that describes the volume and press PF7. The volume name blinks, so you can verify that this is the volume you wish to dismount. Press ENTER to logically dismount the volume; if appropriate, the system prompts you to physically dismount it. You may instead press PF1 to cancel the dismount request and return to the Control Disks screen.

## Changing Mount Restrictions

This command modifies the mount restrictions. To change these restrictions for a specific volume, move the cursor to the entry for that volume and press PF10. The system highlights the Restriction column and lets you modify the entry. Enter one of the following restrictions:

- Shared
- Removal (restricted removal)
- Protected
- Exclusive

A blank restriction is equivalent to Shared.

Press ENTER to effect the change, or press PF1 to cancel the command and return to the Control Disks screen.

Owner Information

To receive information about volume owners, press PF11 on the Control Disks screen. (A volume's owner is the user who mounted the volume.) The following owner information now appears in the rightmost columns of the screen, as illustrated in Figure 11:

- Owner's User ID and/or job name--supplied unless the volume is mounted for initialization or is a "No Label" (NL) volume.
- Proc-ID--specified only if a background job mounts a volume. The name in this column is the name of the job that was submitted; it is not the Procedure name.
- The volume's eligibility for spool, work, or paging file allocation.

The Control Disks screen showing owner and paging information makes available two additional commands--Change Restrictions, and Status Information.

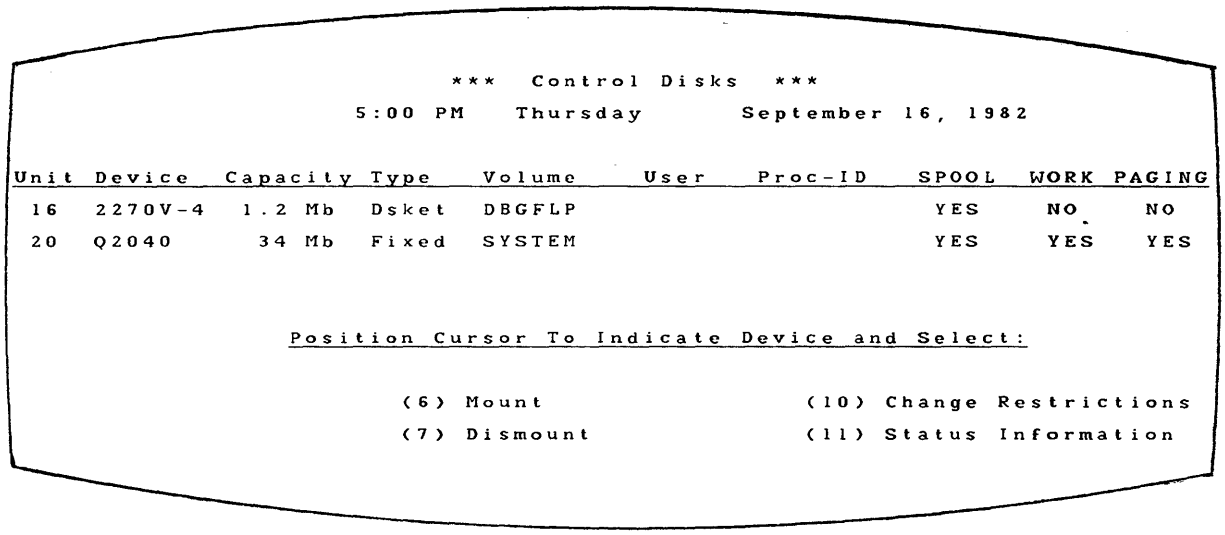


Figure 11. Control Disks Screen Showing Owner Information

### Change Restrictions

This command modifies a disk volume's work, spool, and paging file eligibility. To change these restrictions for a volume, position the cursor next to that volume's entry and press PF10. The system highlights the Work, Spool, and Paging columns and lets you change the entries. Type YES or NO in the column you wish to change. Then press ENTER to effect the change, or press PF1 to cancel the command and return the screen to its previous state.

### Status Information

Pressing PF11 (Owner Information) on the Control Disks screen shown in Figure 9 replaces the Restrictions, Open Files, and Status columns with User, Proc-ID, and SPOOL, WORK, and PAGING columns. To return to the original screen, press PF11 on the new screen.

### Attach and Detach

The operator may logically attach or detach any system device except for workstations. Press PF9, PF10, or PF12 on the Operator's Console screen to select the type of device, and then position the cursor on the resulting screen to select the specific device. Then press PF8 to attach the device, or PF9 to detach it. The system then displays the device in flashing characters and asks you to confirm the operation by pressing ENTER. A device cannot be detached while it is in use. A detached device cannot be accessed until the operator re-attaches it or the system is re-IPLed.

## 3.3 INTRODUCTION TO BACKUP PROCEDURES

Your data processing files and programs should periodically be backed up (i.e., copied onto backup disk volumes), on a schedule satisfactory for your installation. This section provides instructions for operating the 2270V-4 diskette drive built into the CP cabinet of the VS25 and VS45.

The 2270V-4 diskette drive uses only soft-sectored, dual-sided, double-density diskettes that have a capacity of 1232K bytes (1.2M bytes). Any VS system having archiving workstations can also use these diskettes. Table 1 shows Wang diskette types and applications.

In order to back up your system's data processing files, you have to initialize new diskettes, then mount them and run the BACKUP utility. To initialize a diskette you must run the DISKINIT utility: on the Command Processor screen (user main menu) press PF1, enter the program name "DISKINIT", and press ENTER. Then enter the word "INITIALIZE" and the name you have chosen for the diskette, and press ENTER. The screen shown in Figure 12 uses the name "FLOPPY".

Table 1. Diskette Compatibility Table

| Application | (Hard-Sectored Model: single-sided, single density) | (Soft-Sectored (Model: single- or dual-sided, single or double density) |
|---|---|---|
| WP Archiving | 2270-0<br>2270V-1 | |
| VP/MVP | 2270V-0<br>2270V-1<br>2270V-3 | |
| LVP | | 2270V-2<br>2270V-3 |
| IBM | | 2270V-2<br>2270V-3 |
| VS80 Cabinet | 2270V-0 | |
| VS25/45 Cabinet | | 2270V-4 |
| VS Archiving Workstations | 2270V-1<br>2270V-2<br>2270V-3 | 2270V-2<br>2270V-3 |

```
***  MESSAGE 001  BY WT1M00
                    RESPONSE REQUIRED BY  PROGRAM  DISKINIT
                              TO SELECT FUNCTION

Please select one of the functions and specify volume to be processed.
Wang VS Disk Initialize Utility Program - Version  5.02.11
The following functions are provided by this utility program:
INITIALIZE - To initialize a new disk volume by analyzing the disk surfaces
             for reliable data storage and optionally creating a standard
             Volume Table Of Contents and volume serial number for it.
REFORMAT   - To reconstruct a standard Volume Table Of Contents on a
             disk volume.
RELABEL    - To change the volume serial number of a disk volume.
VERIFY     - To scan the surfaces of a given disk volume to make sure that
             all blocks are readable and report any bad blocks that exist.
REMOVE     - To remove an unreliable block from volume and replace it
             with a reserved block if available on the specified volume.

FUNCTION = INITIALIZE    on    VOLUME    = FLOPPY
```

Figure 12. DISKINIT Program Screen

After you press ENTER, you are shown the message, "Specified volume is not mounted. Please respecify volume or press 'PF5' key to initiate a mount operation." Press PF5; you are then asked to identify the device number that has been assigned to the diskette drive. (See Figure 13.)

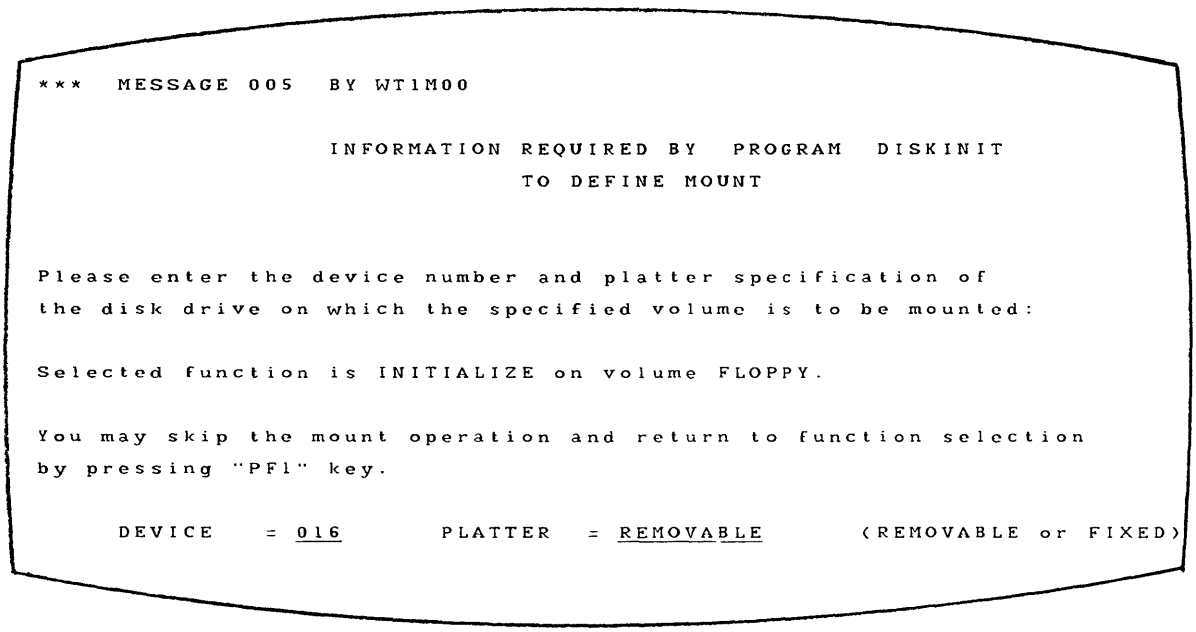


Figure 13. DISKINIT Drive Selection Screen

Enter the drive number (shown here as "16"), then press ENTER. The next prompt you see should begin with the words,

MESSAGE 0001 by MOUNT

Assistance required

Physically mount your diskette in the drive. The next screen should match the illustration in Figure 14. You can accept the default values and initialize the diskette by pressing ENTER.

If your diskette has been initialized and is still mounted, you may press PF1 to return to the Command Processor screen, and on this screen press PF1 to run the BACKUP program.

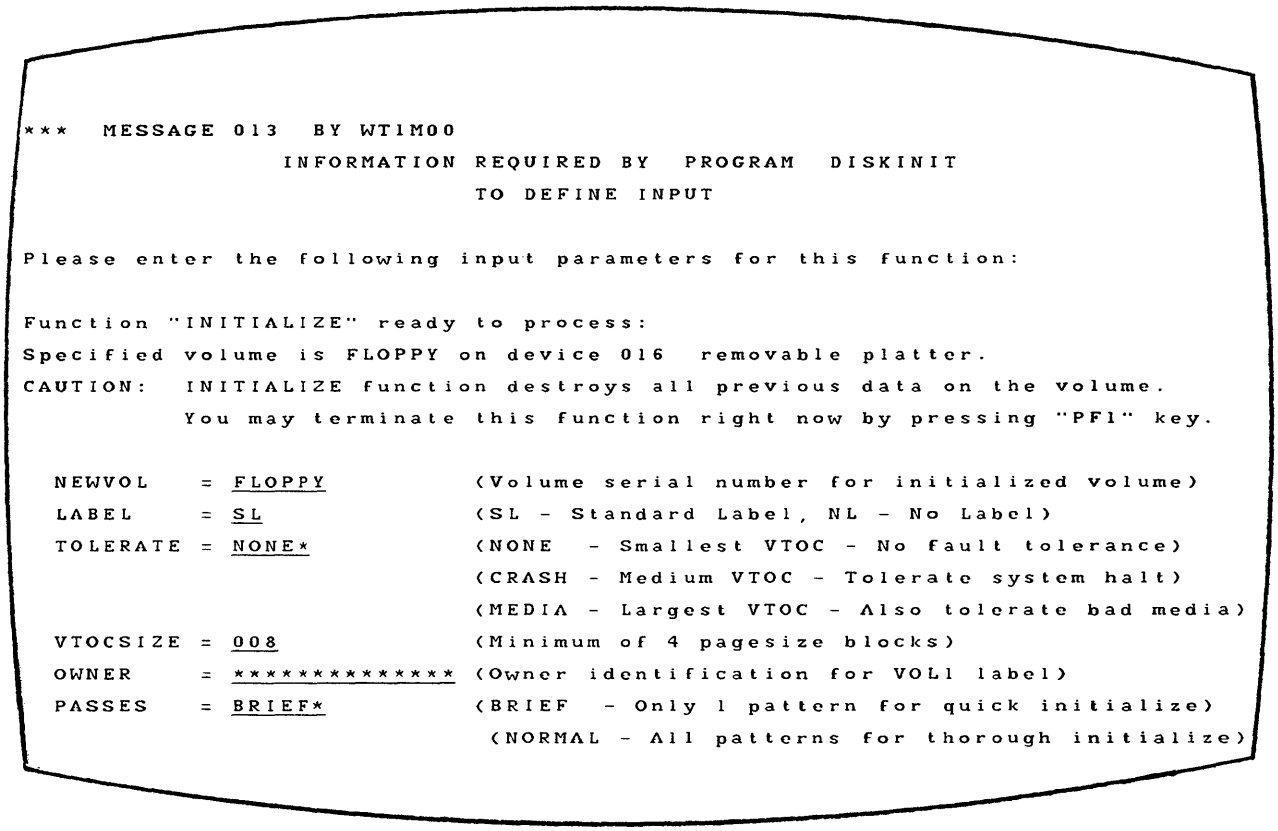


Figure 14. Final DISKINIT Screen

## BACKUP Procedures

When the diskettes needed for backup have been initialized, run the BACKUP utility by pressing PF1 on the command processor screen. You must then specify whether you want to back up a file, library, or an entire volume (e.g., the entire contents of the internal Q2040 disk), and provide their names on the BACKUP Input screen (see Figure 15). Then press ENTER to view the BACKUP Output screen (not shown).

If an initialized diskette is currently mounted, you may enter its volume name (in Figure 14, "FLOPPY") on the BACKUP Output screen. If your diskette has not been mounted, you may press PF4 on the BACKUP Output screen, then mount it and specify its volume name.

## Backup to Multiple Diskettes

A single diskette may not be sufficient to contain the files you are backing up. ( For example, to back up the contents of a Q2040 disk volume you may need up to thirty 1.2M-byte diskettes.) In such cases, when the currently mounted diskette is full the BACKUP utility prompts you to enter the name of the next backup diskette and press ENTER. You are then asked to remove the current diskette and insert the next one.

It is wise to keep enough initialized diskettes on hand, as otherwise you must cancel the BACKUP utility during backup operations to initialize extra diskettes as needed. You should give these diskettes sequential names, e.g., "SYS1", "SYS2", etc., to keep them straight.

Backup Log

A print file containing the names of the files, libraries, or volumes being backed up is stored on the system disk or sent to the Print queue to be printed. This backup log is not placed on the diskette.

Backup of WP Documents

WP documents may also be backed up with the BACKUP utility and the system diskette drive, by using file names for documents and standard-labeled (SL) diskette volumes. Document 0001B, e.g., is file 0001 in library DOCMNTB; 0001b is file 0001 in DOCMNTBB. (The system diskette drive cannot be used for WP-mode backup on non-labeled (NL) diskettes, although an archiving workstation may be used in that fashion.)

```
***  MESSAGE 0001 BY BACKUP
                INFORMATION REQUIRED BY  PROGRAM  BACKUP
                          TO DEFINE INPUT
            ***  WANG VS BACKUP PROGRAM - VERSION  4.00.00  ***

Please specify the following information and press ENTER,
or press PF4 to mount the input volume

       RANGE    = FILE***     ( VOLUME / LIBRARY / FILE )
       VOLUME   = SYSTEM     LIBRARY  = @SYSTEM@     FILE     = USERLIST
       FUNCTION = BACKUP*     ( BACKUP / RESTORE )
       ERRDISP  = YES         ( YES to display errors / NO )
       DEVICE   = DISK        ( DISK / TAPE )
       FILESEQ  = ****        ( For DEVICE = TAPE only )
       INCREMEN = NO*         ( YES for incremental BACKUP / NO )
                  (Press PF16 to end BACKUP processing.)
```

Figure 15. BACKUP Input Screen

Restoring from Diskettes

To install software or restore data that has been backed up onto multiple diskettes, use the BACKUP utility. Enter the range and the input volume, library, and file names (refer to Figure 15). Then specify a RESTORE operation and press ENTER.

When multiple diskettes were needed in a single backup operation using BACKUP, the subsequent restore operation using the RESTORE option of BACKUP prompts you to insert successive diskettes in order, and verifies their order.

## 3.4 CONTROLLING WORKSTATIONS

To reach the Control Workstations screen, press PF13 (WORKSTATIONs) on the Operator's Console screen. The Control Workstations screen provides information about all local workstations that are configured for the system and all remote workstations that are currently connected (see Figure 16). This information is listed in order by unit number (device address).

The unit number and device model number appear for all workstations; additional information appears in the following specific cases:

| | |
|---|---|
| Status | appears for any unit that is not READY, or shows "Operator" for any workstation that is an operator's console |
| Node name | appears if the workstation is a remote workstation connected through Remote WangNet. |
| User ID | appears if the user is logged on |
| User name | appears if the user is logged on |

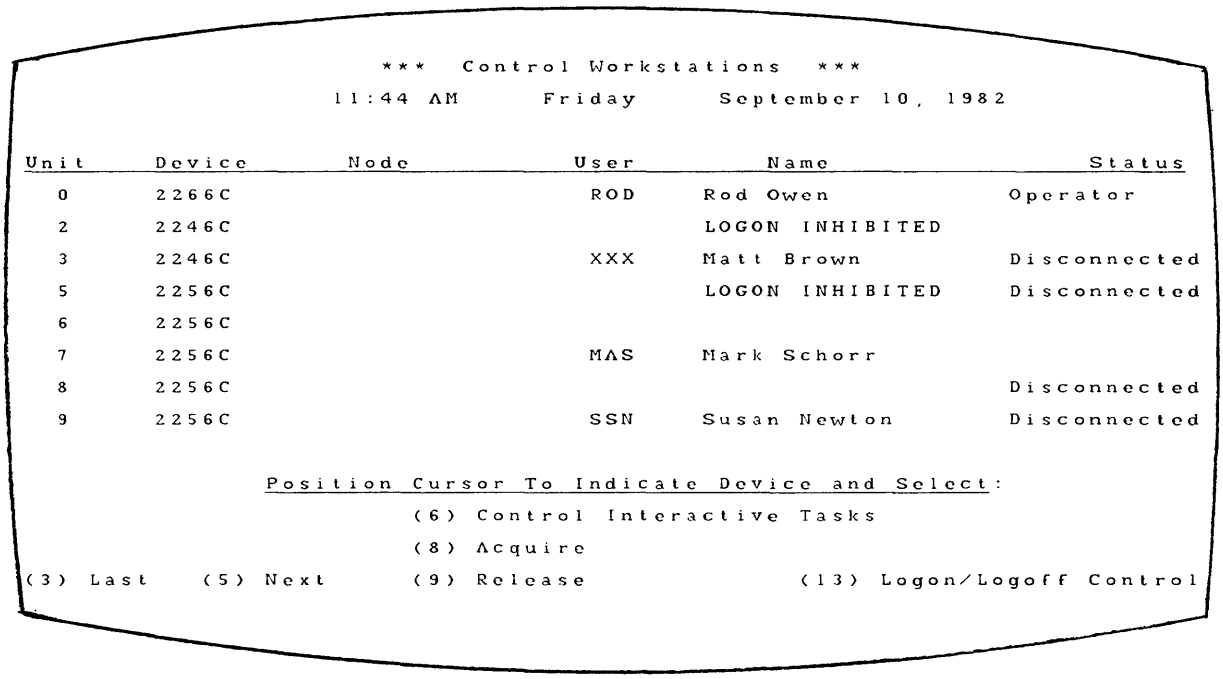


Figure 16. Control Workstations Screen

A status of "Disconnected" is indicated for local workstations that are physically disconnected (powered off or unplugged), and for those remote system workstations that have been disconnected by loss of the physical inter-system connection or by explicit operator or user request. The operator can request disconnection by moving the cursor to a workstation's display line and pressing PF13 (Logon/Logoff Control), then PF4 (DISCONNECT Workstation) on the resulting Control Logon/Logoff screen (see Figure 18).

For now, press HELP on the Control Workstations screen to return to the Operator's Console screen, then press PF6 (Interactive Tasks). You should see something like the following screen (Figure 17).

Notice that only workstations with logged-on users are shown. You may control (or disconnect) a single selected workstation by using the screen that results from pressing PF13; via an additional key (PF10) on that screen you may control all workstations.

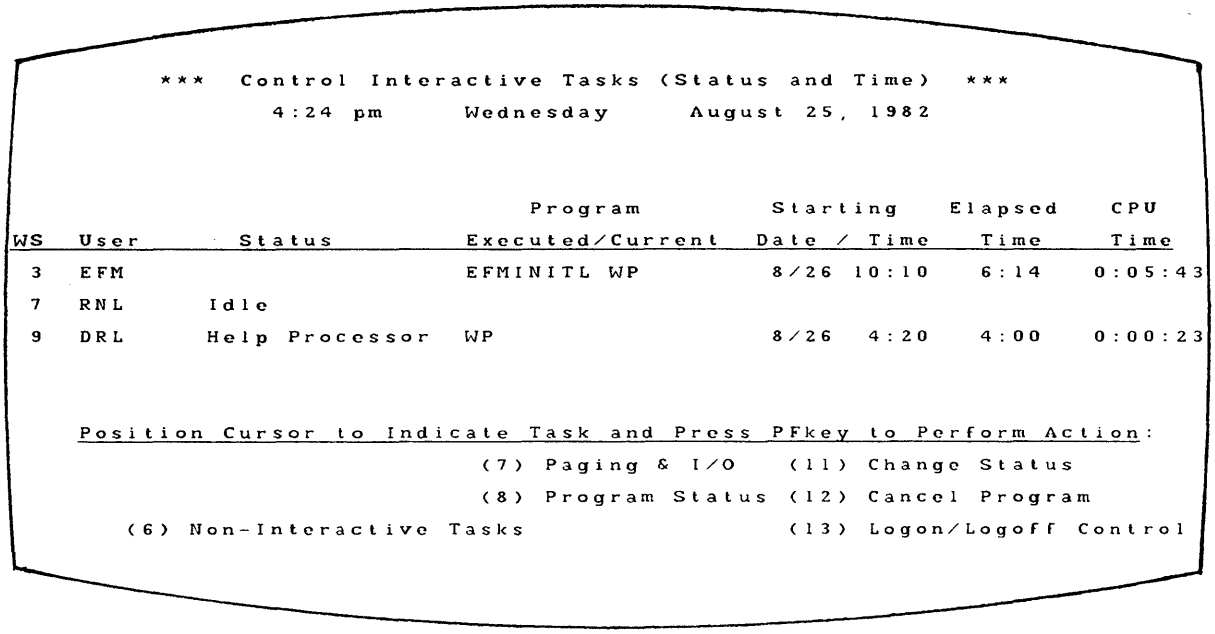


Figure 17. Control Interactive Tasks Screen

For logon-logoff control from the screen shown in either Figure 16 or Figure 17, position the cursor to the number of the workstation that you want to control. Press PF13 and refer to Figure 18.

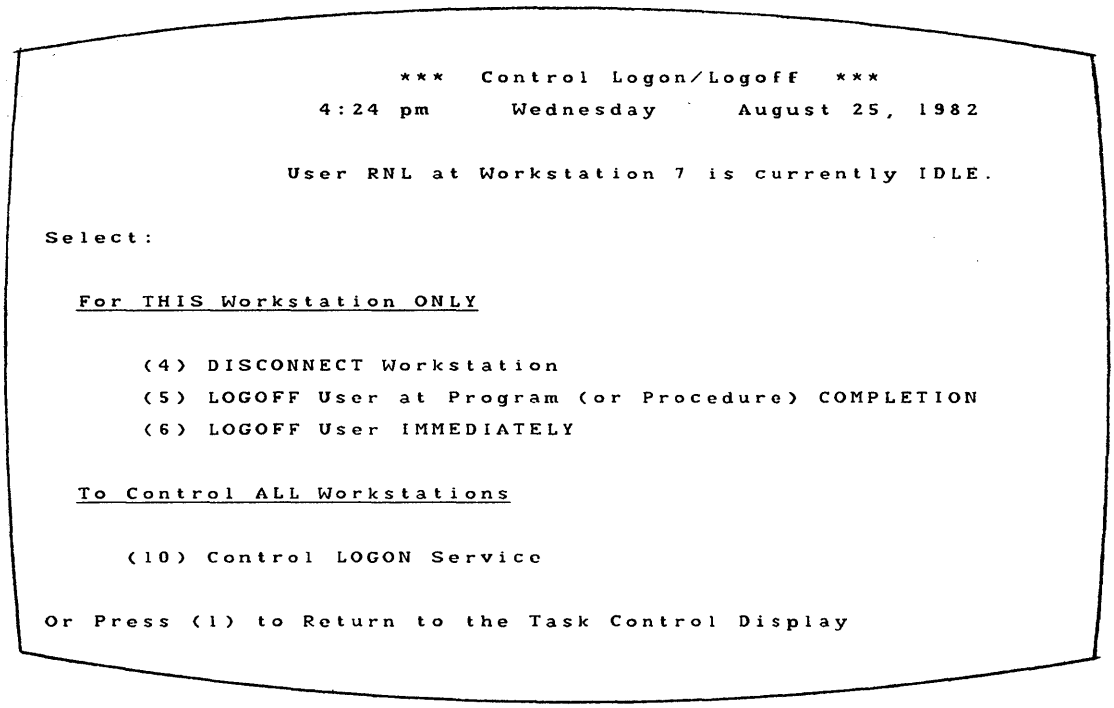


Figure 18. Control Logon/Logoff Screen for Workstations

PF10 (Control LOGON Service) gives the operator simultaneous control over all workstations logged onto your system. See Figure 19.

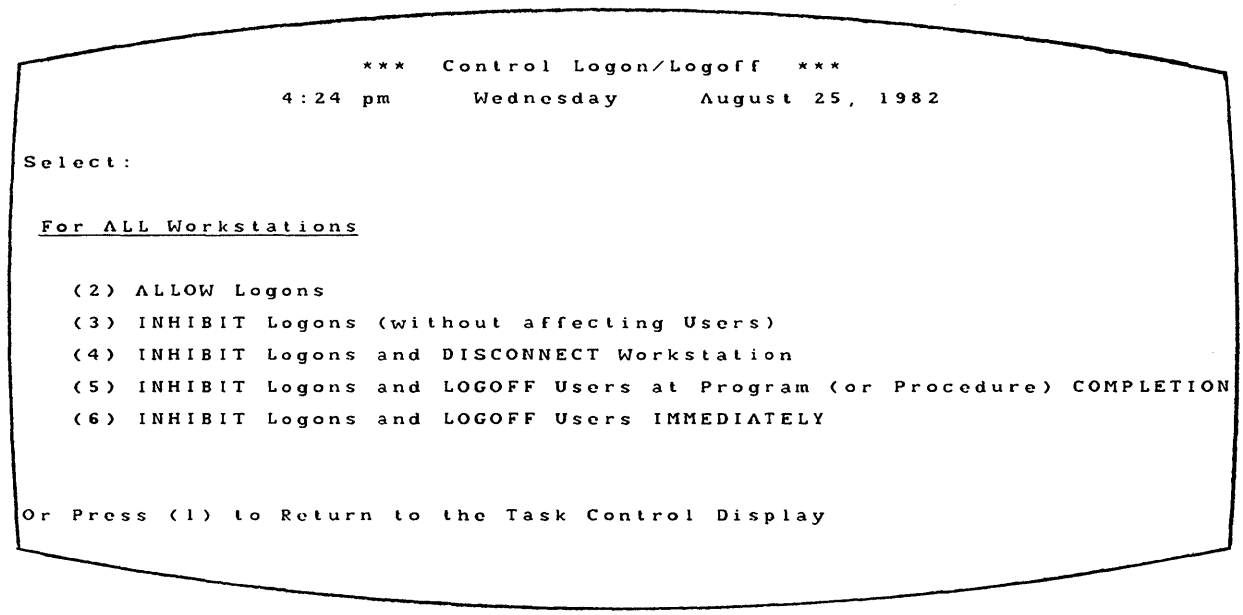


Figure 19. Control Logon/Logoff Screen for All Workstations

## 3.5 CONTROLLING PRINTERS

To reach the Control Printers screen, press PF9 (PRINTERs) on the Operator's Console screen. The Control Printers screen provides information about all printers that are configured for the system. This information is listed in order by unit number (device address). Press HELP to return to the Operator's Console screen.

To inspect the Print queue, press PF2 on the Operator's Console screen.

APPENDIX A
COLD-START PROCEDURES

The following procedure should be followed to bring a VS25 system on line using diskettes as the bootstrap medium. If your system is delivered with the system disk (i.e., the internal fixed disk, model Q2040) formatted and loaded, then the cold-start does not have to be performed. However, if you are unable to IPL your system from the fixed disk, you (or your Wang customer engineer) may have to cold-start, i.e., transfer essential parts of the operating system from bootstrap diskettes, as explained below. When this procedure has been performed, you can then bring in the rest of your operating system software by using the BACKUP utility. Use these instructions along with Figure 1 on page 5, which is a diagram of the VS25 system cabinet control panel.

1. Power up all workstations and printers, or at least the dual mode (user/operator) workstation. For convenience, this workstation should be located near the system cabinet.

2. Set the drive selector switch labeled "Bootstrap Media" to the top position. This setting selects the diskette as the bootstrap volume.

> **NOTE**
>
> COLDSTART consists of a core of programs that assume the system disk is empty. These programs overwrite the system disk. So COLDSTART should be used only if an IPL is not possible from a large disk device. If the cold-start sequence is interrupted for any reason, it must be restarted from the beginning.

3. Power up the CP, using the CP ON/OFF switch. Then press the red DC POWER button located next to the CP ON/OFF switch. Wait one minute for the internal fixed disk to get up to speed.

3A. Insert the first cold-start diskette into the diskette slot and close the diskette slot door. (The proper diskette should be labeled with the word "FORMAT".)

On the VS25 system cabinet (see Figure 1), the Power LED and the Not Ready LED are illuminated. The 4-LED panel should quickly count down through the diagnostic Test / Error Code numbers from FFFF through 0000 (in hexadecimal notation), then count up through a series of numbers (typically 10, 12, 14, 60, and 40), and finally turn blank.

The diskette LED should light as the diskette is accessed and the bootstrap program is read in. This process takes about ten to fifteen seconds. If the bootstrap medium cannot be read, an error code, typically "40BA", is displayed on the 4-LED panel. For a list of error codes, refer to Appendix E.

4. The IPL Device Selection screen is displayed (see Figure 2), and the cursor is positioned next to the diskette drive. Press ENTER.

   The System Hardware Status screen is now displayed (see Figure 3). The screen displays the results of each test with the message sequence "Loading", "Running", and "Passed". When all components, including the workstation, have been tested and found operational, the message, "Diagnostics completed. Beginning system initialization" appears on the workstation screen. The system microcode is now loaded.

   If the message "Non-Fatal Error" is displayed, make a note of the name of the failed test, and report it to your Wang field service representative at a later time. Press ENTER to continue.

4A. Diagnostics options:

   Under some circumstances, you may be advised by your Wang field service representative to insert the diagnostics diskette into the drive, re-IPL, and run PROM-based and RAM-based diagnostic tests of system hardware, including processors, memory, and device adapters. Pressing PF8 from the IPL Drive Selection screen runs the diagnostic tests contained on the optional diagnostics diskette. (Refer to Figure 2.)

   Under other circumstances, you may be advised by Wang field service representative that remote diagnostic tests must be run from a Wang TAC center. Refer to Appendix G for the remote diagnostic procedures.

5. After about 1 minute, the COLDSTART Volume Initialization screen is displayed (see Figure 20).

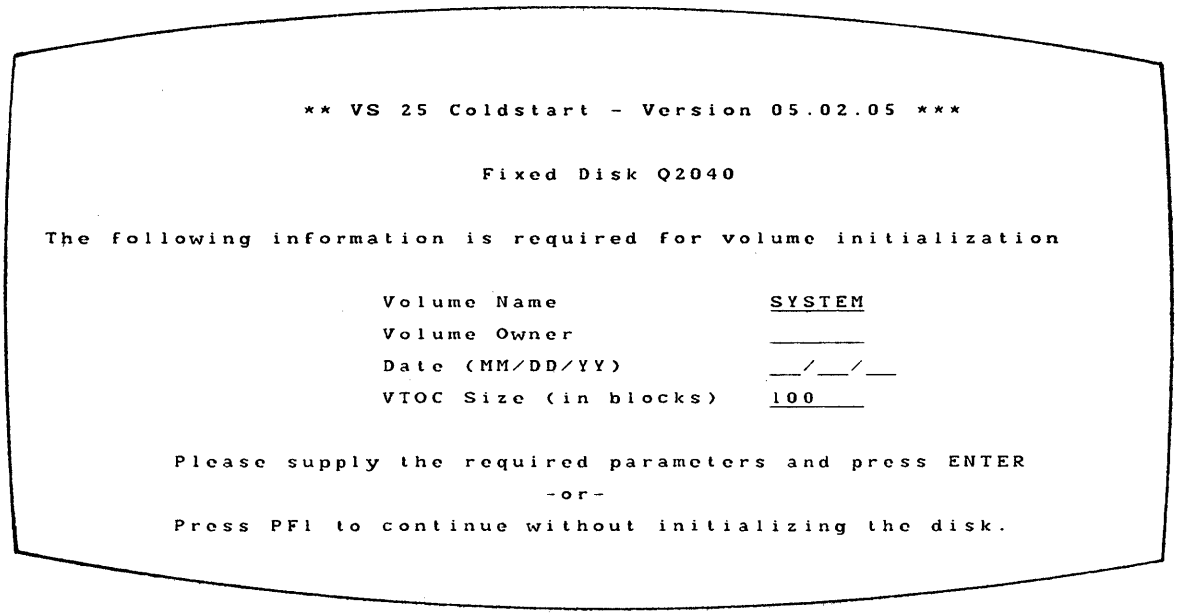


Figure 20. COLDSTART Volume Initialization Screen

The screen asks for the name, owner, date of creation, and size of VTOC of the volume to be configured as the system volume, and displays default values for these. You may change this information or take the default values. Pressing ENTER causes the entire disk to be formatted, a process currently taking about SEVENTY MINUTES. Pressing PF1 causes formatting to be bypassed and only the volume label to be rewritten, in about 30 seconds. Press one of these keys.

6. If you pressed PF1 in Step 5, you should see the message, "Writing volume label," which remains on the screen for about 15 seconds. This is followed by the message, "Formatting complete. Please insert first diskette to be copied." At this point, go to Step 7.

   If instead you pressed ENTER in Step 5, the fixed disk is first formatted, and then a VTOC is written onto it. While the disk is being formatted, the message "Formatting Disk" remains on the workstation screen. After approximately 70 minutes, the message changes to "Writing volume label" while the VTOC is being written. This is followed by the message, "Formatting complete. Please insert the first diskette to be copied." Go to Step 7.

7. Remove the diskette labeled "FORMAT" and replace it with the one labeled "SYSTM1". You do not have to press the ENTER key. The message "Copy in progress" appears on the workstation screen.

8. Copying continues until the following message appears on the workstation screen: "All files on this diskette have been copied. Please mount the next volume to be copied and press ENTER, or press PF16 to terminate." This message should appear in about 2 minutes. Replace the diskette labeled "SYSTM1" with the diskette labeled "SYSTM2", and press the ENTER key. The message "Copy in progress" appears on the workstation screen.

9. Repeat Step 8, using successively numbered diskettes, until the contents of all cold-start diskettes have been copied. [At the time of publication, this is diskette "SYSTM3".] After removing the last cold-start diskette, press PF16.

> **NOTE**
>
> You must press PF16 after removing the last diskette in order to successfully start the system in Step 11.

The message, "Copy completed. IPL when ready", appears on the workstation screen.

10. Change the Bootstrap Media switch to the middle setting (see Figure 1). This specifies the newly formatted and loaded fixed disk as the system volume. From this point on, you perform a normal IPL from the system volume.

11. Press the Control mode button, which is the green button on the system cabinet control panel, i.e., the lower of two buttons immediately above the Bootstrap Media switch. Then press the Initialize button, i.e., the red button above the Control mode button.

    The Power LED and the Not Ready LED should now be illuminated. The 4-LED panel should quickly count down through the diagnostic Test / Error Code numbers from FFFF through 0000 (in hexadecimal notation), then count up through a series of numbers (typically 10, 12, 14, 60, and 40), and finally turn blank.

12. The IPL Drive Selection screen is displayed (see Figure 2), and the cursor is now positioned next to the fixed system drive entry. Press ENTER. The system microcode is now loaded.

    The System Hardware Status screen is now displayed (see Figure 3). When all components, including the workstation, have been tested and found operational, the message, "Diagnostics completed. Beginning system initialization", appears on the workstation screen.

13. In about 60 seconds, a message appears on the workstation screen asking for the name and library of the system configuration file to be used when bringing up the system, as shown in Figure 21. You may enter configuration file information now, or you may take the displayed default values simply by pressing ENTER. It is recommended that you take the defaults: press ENTER.

```
*** MESSAGE M001 BY SYSGEN
                        INFORMATION REQUIRED

Specify the name of the system configuration file and press ENTER
                              -or-
Press (1) to use one workstation and one disk.

                     SYSFILE = @CONFIG@
                     SYSLIB  = @SYSTEM@

Specify the communications configuration file to be used, if any

                     COMMFILE = ********
                     COMMLIB  = @SYSTEM@
```

Figure 21. SYSGEN Configuration File Screen

14. The next screen asks for the current date and time. Enter the date and time in the YY/MM/DD HH/MM/SS format indicated.

    Now the system is up and running in accordance with the configuration file specified. The workstation displays the Operator's Console screen. Use the user ID "CSG" to log on, then run the SECURITY program to enable other users.

    You can now install the remainder of your operating system software by using the RESTORE function of the BACKUP utility.

APPENDIX B
CONTROL MODE DUMP PROCEDURE

A Control mode dump is performed by using the Control mode dump program. This program allows the entire contents of main memory to be copied to diskettes. The dump should be performed only by an authorized DP staff person or by Wang field service personnel. The Control mode dump procedure for the VS25 is similar to that for the VS100.

All workstation operations required during this procedure must be performed at workstation 0. When entering alphanumeric characters, begin entering at the current cursor position; do not reposition the cursor. Be sure to enter 0s where indicated. The character "*" represents the current value of a position and must not be changed while performing the dump. For any instruction of the form, 'Enter the characters "0000**** 0000"', you must enter the 0s and skip over the characters represented by "****" by using the space bar.

Before beginning to take a VS25 Control mode dump, you should have a listing of your system configuration and a blank non-labeled (NL) diskette. Any data already written on the diskette is overwritten by the dump program.

The procedure for performing a Control mode dump on a VS25 or a VS45 is as follows.

1. If the system is not already in Control mode, press the green Control mode button on the front panel of the CP cabinet.

2. Record the displayed line. The line is made up of the current PCW and possibly a message.

3. Enter the characters "V 000070" and press ENTER to find the address of the master control block (MCB) and the dump program. The display shows "V 000070 AAAA**** ********". "AAAA" is the address of the MCB.

4. Enter the characters "V 00AAAA" and press ENTER. "AAAA" is the value displayed in Step 3. The display will then show "V 00AAAA ******** ****ZZZZ", where "ZZZZ" is the address of the dump program.

5. Enter "W" and press ENTER to display the current PCW. Enter the characters "M 0000ZZZZ 00000000" and press ENTER. "ZZZZ" is the address of the dump program from Step 4.

6. Subtract 02 (in hexadecimal notation) from the "ZZZZ" of Step 5 to get YYYY. Enter the characters "V 00YYYY" and press ENTER. The dump device address, "QQQQ**** ********", is displayed. This device address should be modified to "2000**** ********", the physical device address of the diskette drive.

7. Enter the character "X" and press ENTER to exit from Control mode and begin execution of the dump program.

8. The program reenters Control mode to request that the diskette dump volume be mounted. "W ********4001****" is displayed. Enter the characters "M ******** 0*******" and press ENTER. Then enter the character "X" and press ENTER. This action clears the Control mode bit and the message code and starts the dump. Physically mount the diskette. A Control mode dump always fits on a single diskette. Execution of the dump program begins when the program detects that the diskette is ready.

9. The dump program continues writing for a short time. It may re-enter Control mode for either of two reasons:

   a. The dump is complete. This is indicated by the display "W ******** C000C000". Dismount the diskette volume and proceed to Step 10.

   b. An I/O error has occurred. This is indicated by the display "W 00000004 C000****". The dump cannot continue, but a partial dump has been completed. Dismount the diskette volume and proceed to Step 10.

10. Re-IPL the system. Verify all disk (not diskette) VTOCs by running the LISTVTOC utility (see the VS Utilities Reference). Print the I/O error log and mail it to Wang Quality Assurance along with the dump diskette, the recorded line from Step 2, and a Software Problem Report form (800-5104) describing the circumstances of the problem. The mailing address is as follows:

    WANG Quality Assurance
    MS 1369
    WANG LABORATORIES, INC.
    One Industrial Avenue
    Lowell, MA 01851

    If the condition in Step 9b occurred, also include a note advising that the dump is partial.

APPENDIX C
GENEDIT PROCEDURE

## C.1 INTRODUCTION

The program GENEDIT is used to edit an existing configuration file or create a new file. GENEDIT is run on line (i.e., any time after the system is IPLed) and can be run while other users are logged onto the system. If you are entering GENEDIT through the GENERATE procedure, GENERATE links you to GENEDIT at the appropriate point.

## C.2 RUNNING GENEDIT

To run GENEDIT, press PF1 (Run Program or Procedure) from the Command Processor screen (user main menu). Enter "GENEDIT" in the field provided for program name and press ENTER. The GENEDIT Configuration File screen (refer to Figure 22) then allows you to edit an existing configuration file or create a new one. To edit an existing file, enter the file, library, and volume names on the indicated lines. To create a new file, leave the lines blank. Before pressing ENTER, enter "5" in the space next to "CP=" to indicate that you are configuring a VS25 or VS45. (To exit GENEDIT without editing or creating a file, press PF16.)

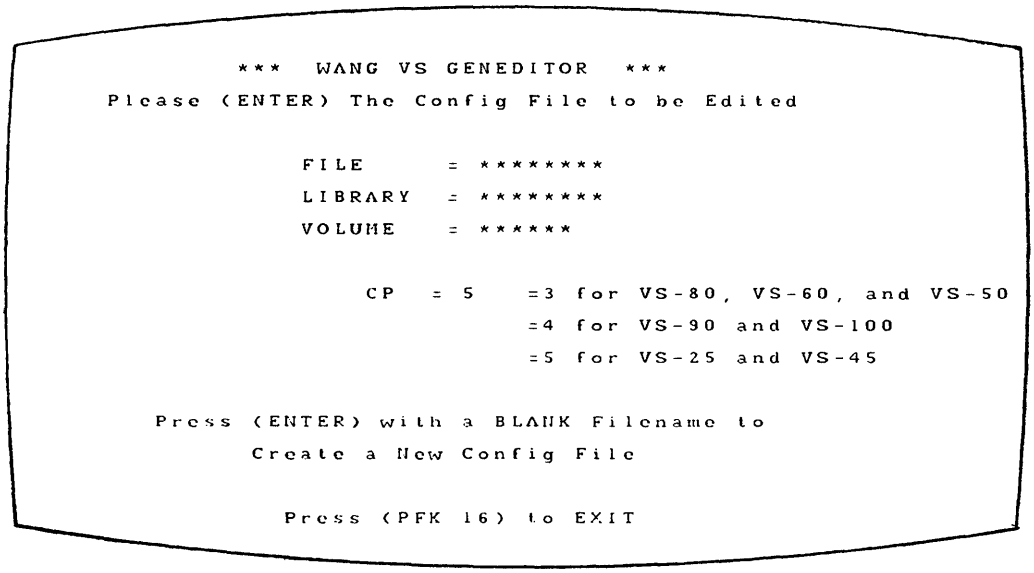


Figure 22. GENEDIT Configuration File Screen

## C.3 SPECIFYING THE GENERAL CONFIGURATION

After you press ENTER from the GENEDIT Configuration File screen, the GENEDIT General Configuration screen (refer to Figure 23) allows you to specify the number of peripheral devices and non-interactive tasks (background jobs) in the configuration file. Enter the number of workstations, printers, disk and tape drives, TC lines, and non-interactive tasks, and press ENTER. In Figure 23, the user has configured a system that consists of 10 workstations, 2 printers, 2 disk drives, and 2 non-interactive tasks.

Note that the VS25 supports a maximum of 16 serial devices. If this value is exceeded, you cannot proceed until the value is reduced to the maximum allowable number. The minimum configuration allowed for the VS25 is 1 workstation, 1 diskette drive, and 1 fixed disk drive.

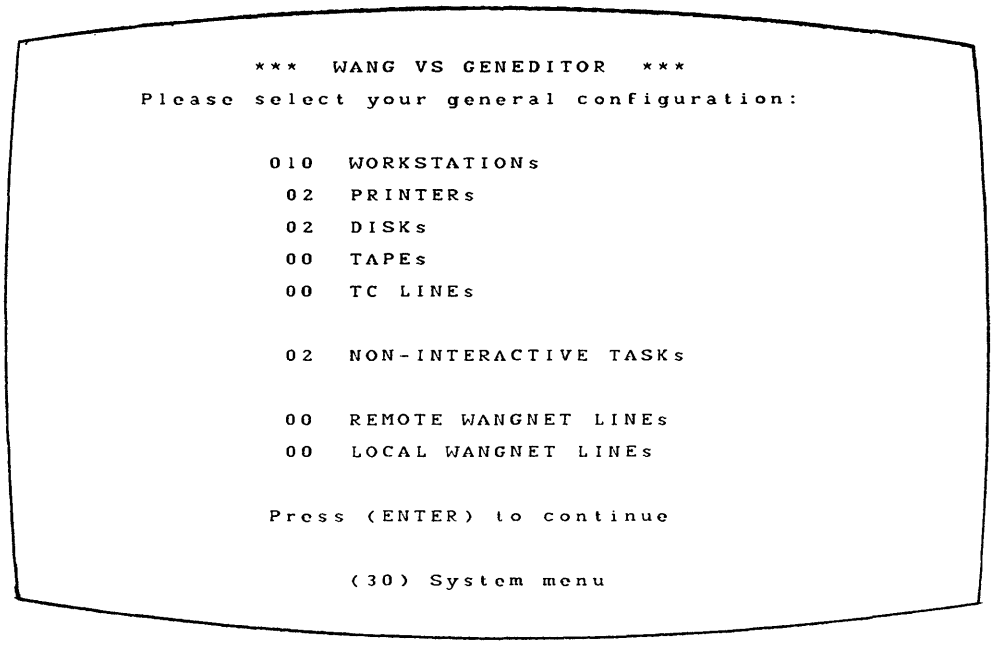


Figure 23. GENEDIT General Configuration Screen

You can set a variety of system parameters by pressing PF30 (System menu) on the GENEDIT General Configuration screen. The GENEDIT System Modifiable Parameters screen (refer to Figure 24) then displays a list of system parameters and default values for those parameters. To modify parameter values, press PF1, enter new values in appropriate fields, and finally press ENTER to confirm these modifications. Be sure to enter "Y" next to WP and/or MAILWAY if your system supports them.

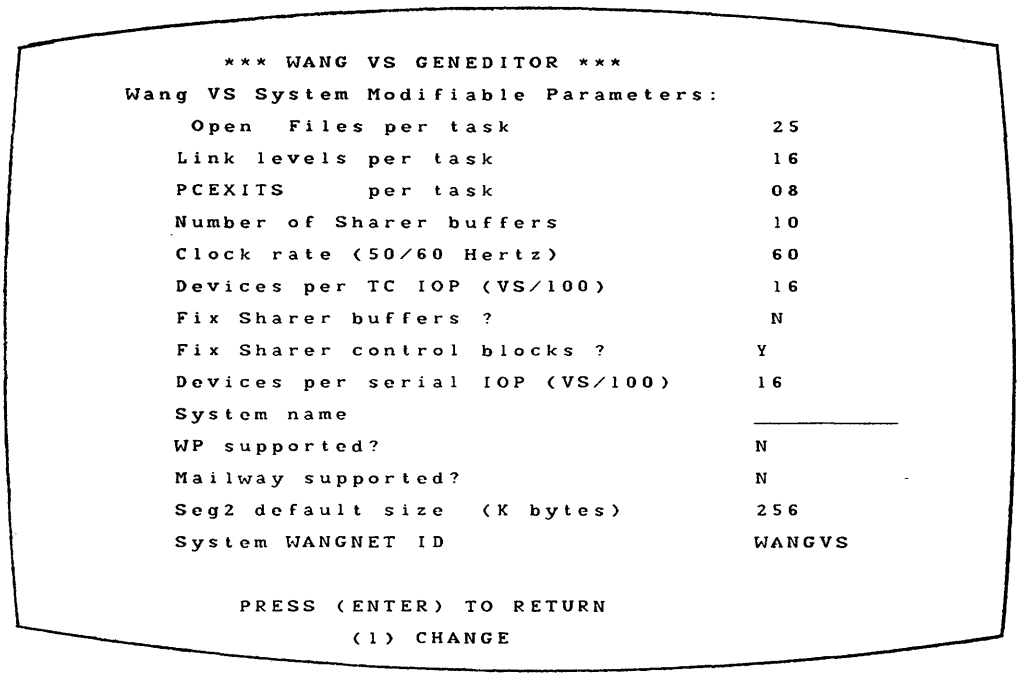


Figure 24. GENEDIT System Modifiable Parameters Screen

After modifying the system parameters, press ENTER again to return to the GENEDIT General Configuration screen. If you then press ENTER again, the GENEDIT Non-Interactive Task Segment 2 Sizes screen (refer to Figure 25) allows you to set the segment 2 size for non-interactive tasks (background jobs). In Figure 25, two segment 2 sizes are displayed because the user has specified two non-interactive tasks on the preceding GENEDIT General Configuration screen.

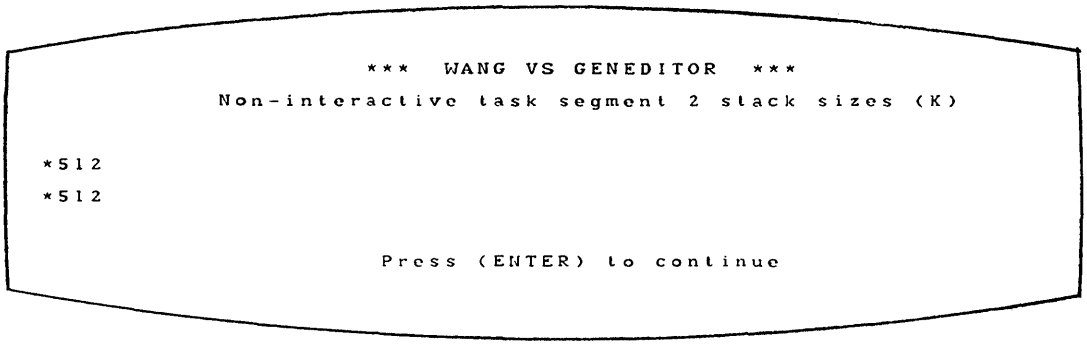


Figure 25. Non-Interactive Task Segment 2 Sizes Screen

The default value is 512K, but you can set the Segment 2 size to a any value between 64K and 1024K in increments of 4K. To modify any of the default values, type in the new values in the appropriate fields and press ENTER.

## C.4 DEVICE SELECTION

After you have specified the general configuration and the segment 2 size for the non-interactive tasks, GENEDIT displays a sequence of screens that list the dependent devices for each device controller. The four device controllers for the VS25 are the serial device controller #2, the small disk IOP #0, the fixed disk controller #1, and the disk controller #5. Figure 26 shows the Serial Device Controller #2 screen for the configuration specified in Figure 23. Screens for the other device controllers have a similar format and provide you with the same options.

```
                          ***  WANG VS GENEDITOR  ***
                         Serial Device Controller #2
Number          Type
    0   2246S   Serial    W/S
    1   2246S   Serial    W/S
    2   2246S   Serial    W/S
    3   2246S   Serial    W/S
    4   2246S   Serial    W/S
    5   2246S   Serial    W/S
    6   2246S   Serial    W/S
    7   2246S   Serial    W/S
    8   2246S   Serial    W/S
    9   2246S   Serial    W/S
   10   5521    200 cps Matrix Printer
   11   5521    200 cps Matrix Printer
   12
   13
   14
   15
                          Press (ENTER) to continue
(1) Set device-specific fields
(2) Show valid device types      (16) Summary menu     (32) General menu
```

Figure 26. GENEDIT Serial Device Controller #2 Screen

Each device controller screen displays default values for the devices supported by that device controller. To modify the supported devices, enter different model numbers in the appropriate fields. If you enter the model number of a device not supported by the device controller, GENEDIT displays an error message. The functions available from the device controller screens are summarized below.

| PF Key | Function | Description |
|---|---|---|
| ENTER | Continue | Continues to the next device controller screen in the sequence, or to the GENEDIT General Configuration screen if all the device controller screens have been displayed. |
| 1 | Set Device-Specific Fields | Allows the user to set the device-specific fields for printers. |
| 2 | Show Valid Device Types | Displays the valid device types for a device controller. For a list of all devices supported by device controllers on the VS25, refer to Table 2. |
| 16 | Summary Menu | Leaves the device controller screen sequence and displays the GENEDIT General Configuration screen. |
| 32 | General Menu | Returns to the GENEDIT General Configuration screen, from which you can modify the configuration. By pressing PF32, you begin the entire configuration process again. |

### C.4.1 Setting the Device-Specific Fields

To set the device-specific fields for printers, press PF1 from the GENEDIT Device Controller screen. The GENEDIT Set Device-Specific Fields screen (refer to Figure 27) then allows you to indicate whether a printer is to be used for word processing (WP). If a printer is to be used for word processing, you must type "Y" in the appropriate field; the default value is "N." An additional non-interactive system task is generated for each printer designated as a word processing printer. To return to the GENEDIT Device Controller screen, press ENTER.

There are no modifiable device-specific fields for workstations, disk drives, tape drives, or telecommunications devices.

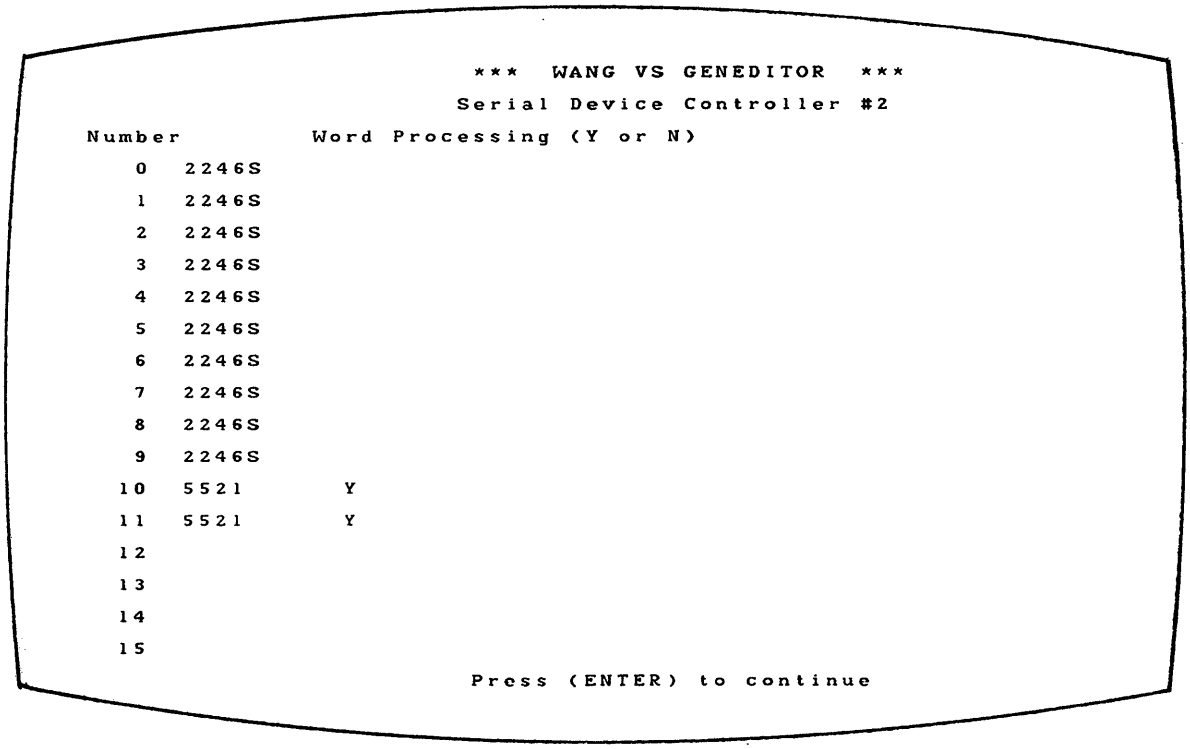


Figure 27. GENEDIT Set Device-Specific Fields Screen

### C.4.2 Devices Supported by the VS25

Table 2 lists all devices supported by device controllers on the VS25. If you press PF2 from the Device Controller screen, you can obtain a list of all devices supported by that device controller.

Table 2. Devices Supported by the VS25 and VS45

| Device Controller | Devices Supported |
|---|---|
| Serial Device Controller #2 | 2246S Serial Workstation<br>2246S Serial Workstation<br>2246C Combined Workstation<br>2246K Katakana Workstation<br>2266C Archiver C Workstation<br>2266S Archiver S Workstation<br>2246SI Ideographic S Workstation<br>2246CIJ Ideographic J C Workstation<br>2256C Combined Workstation (64K)<br>2276C Archiver C Workstation (64K)<br>2246O Okidata Workstation<br>2246S1 029 Standard Keypad Workstation<br>2246S2 Reversed Numeric Kypd. Workstation |

Table 2. Devices Supported by the VS25 and VS45 (continued)

| Device Controller | Devices Supported |
|---|---|
| Serial Device Controller #2 | 5571 430-lpm Train Printer<br>6581WC 40-cps Wide Daisy Printer<br>5573 250-lpm Band Printer<br>5574 600-lpm Band Printer<br>5521K 200-cps Katakana Printer (Matrix)<br>55312K 120-cps Katakana Printer (Matrix)<br>5548Z Typesetter<br>5521I 200cps Ideographic Printer (Matrix)<br>5581WD Dual-Head Daisy Printer<br>5521IK 200-cps Ideog. Kypd. Prtr. (Matrix)<br>5535 180-cps Matrix Printer<br>OK555 OKIDATA Matrix Printer for 2246O<br>2246S3 029 Rvse. Numeric Keypad Workstn.<br>2246SDB Autodial Workstation<br>2270V1 Hard-Sector Diskette<br>2270V2 Soft-Sector Diskette<br>2270V3 Hard-/Soft-Sector Diskette<br>5521 200-cps Matrix Printer<br>55312 120-cps Matrix Printer<br>5577 High-Density Printer<br>LPS12 Laser Printer<br>5570 600-lpm Train Printer<br>DWOS20 20-cps Daisy Printer<br>6581W 40-cps Daisy Printer<br>5575 Hi-Speed Band Printer<br>BIZDIAL BIZCOMP Autodial Modem<br>5533 100-cps Matrix Printer<br>CIU Device<br>TCB1 Device |
| Small Disk IOP #0 | 2270V4 Diskette |
| Fixed Controller #1 | Q2040 8-inch Fixed Disk |
| Disk Controller #5<br>(for VS45 only) | 2265V1 75M-byte Removable Disk<br>2265V2 288M-byte Removable Disk<br>2280V1 30M-byte Fixed/Removable Disk<br>2280V1 60M-byte Fixed/Removable Disk<br>2280V3 90M-byte Fixed/Removable Disk |

## C.5 CREATING OR REPLACING A CONFIGURATION FILE

After you have entered the information about the device controllers and the devices dependent upon them, the GENEDIT program returns to the GENEDIT General Configuration screen. Note that you cannot modify configuration information at this point; to do so, you must begin the configuration process again by pressing PF32.

If you press ENTER from the GENEDIT General Configuration screen, the GENEDIT Replace/Create Configuration File screen (refer to Figure 28) allows you to replace the old configuration file with your edited version by pressing ENTER. If instead you are creating an entirely new file, enter the file, library, and volume names on the indicated lines, and press ENTER. GENEDIT then displays the message, "File Creation in Progress".

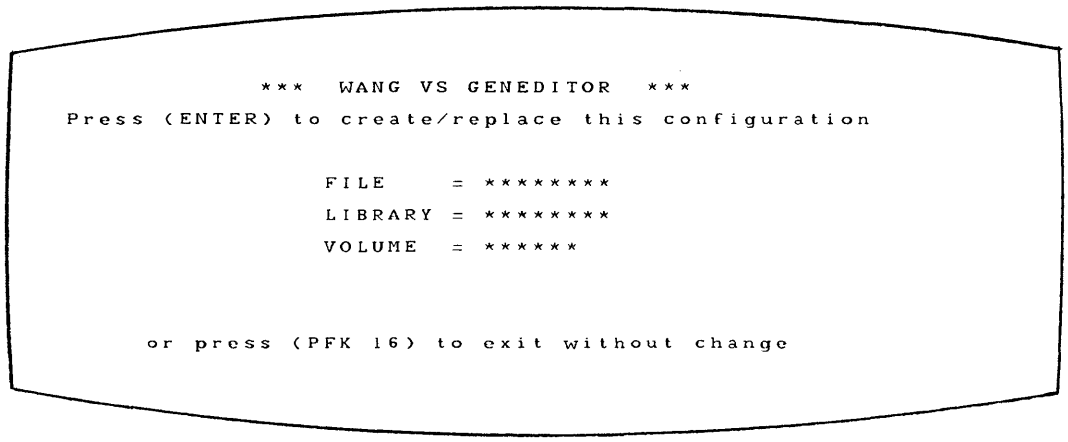


Figure 28. GENEDIT Replace/Create Configuration File Screen

When the file is successfully created or replaced, GENEDIT returns you to the GENEDIT Configuration File screen. To return to this screen without creating or replacing a file, press PF16. You then have the options to create additional configuration files, edit other files, or return to the Command Processor screen by pressing PF16. For further information, refer to Section C.2.

APPENDIX D
VS25 AND VS45 SPECIFICATIONS SUMMARIES

The following pages summarize the VS25 and VS45 architecture and other specifications.

## VS25 and VS45 Architecture Summary

| | |
|---|---|
| Virtual Program Address Space (including program file) | 1M bytes per user |
| Virtual Data Address Space (including system overhead) | 1M bytes per user |
| Microinstruction Time, avg. | 500 nsec |
| Microinstruction Size | 39 bits |
| Memory Cycle Time, avg. | 400 nsec |
| Memory Bus Width | 16 bits |
| Arithmetic Logic Unit (ALU) Width | 16 bits |
| Decimal ALU Width | 8 bits |
| Real Time Clock Width | 64 bits |
| Real Time Clock Frequency | 120 Hz* |
| 32-bit General Registers | 16 |
| 64-bit Floating-Point Registers | 4 |
| 32-bit Control Registers | 16 |
| 32-bit Segment Control Registers | 8 |

*International: 100 Hz

## VS25 and VS45 Model Summary

| | VS25 | VS45 |
|---|---|---|
| Memory Range | 256K-512K bytes | 256K-1M bytes |
| System Diskette | yes | yes |
| Workstations | 1-10 | 1-20 |
| Other Serial Devices | 1-6 | 1-12 |
| Fixed Disk Storage | 34M-68M bytes | 34M-68M bytes |
| Removable Disk Drives | none | up to 4 |
| Removable Disk Capacity | not applicable | 30M to 640M bytes |
| Remote Diagnostics | yes | yes |
| Data Communication Option | yes | yes |

## DISK SPECIFICATIONS

| | DSDD Diskette | 8-Inch Fixed Disk |
|---|---|---|
| Cylinders | 77 | 512 |
| Tracks/Cylinder | 2 | 8 |
| Blocks/Track | 4 | 4 |
| Capacity/Block | 2048 bytes | 2048 bytes |
| Total Formatted Capacity | 1.2M bytes | 33.55M bytes |
| Average Access Time | 91 msec | 65 msec |
| Average Latency Time | 83 msec | 10 msec |
| Speed | 360 rpm | 3000 rpm |
| Transfer Rate | 500K bits/sec | 4.34M bits/sec |

APPENDIX E
SITE PLANNING SPECIFICATION SUMMARY

The following specifications are to assist you in planning a site for your VS25 computer system.

| | |
|---|---|
| **Physical Dimensions** | |
| Height (including casters) | 36.0 in. (91.4 cm) |
| Width | 27.0 in. (68.6 cm) |
| Depth | 26.5 in. (67.3 cm) |
| Weight | 250 lbs. |
| **Temperature Range** | |
| Operating Environment | 60 to 90° F (16 to 32° C) |
| Storage Environment | 0 to 125° F (-17 to 51° C) |
| Transit Environment | 40 to 140° F (4 to 60° C) |
| Maximum Rate of Change | 12° F/hr (6° C/hr) |
| **Humidity Range** | |
| Operating Environment | 20% to 80% non-condensing (Maximum wet bulb temperature: 75° F (25° C)) |
| Storage Environment | 10% to 90% |
| Transit Environment | 15% to 90% |
| **Altitude Range** | 0 to 10,000 ft (0 to 3000 m) |
| **Power Requirements** | 8 amps @ 105 to 127 v (50 or 60 Hz) |
| **Power Connections** | 6-ft cable and grounded 3-prong plug (14/3 AWG type SJT) |
| **Heat Dissipation** | 850 W (2500 BTU/hr) |

CAUTION

Never move your VS25 system cabinet without using the plastic clip and metal screw to lock down the fixed disk. (Refer to hardware installation procedures.)

APPENDIX F
VS25 DIAGNOSTIC ERROR CODES

Your VS25 computer is designed for ease of use in a wide variety of applications. Diagnostic error codes are part of the design; they inform you when to take corrective action, and what information to relay to Wang Field Service.

If an error message occurs, copy down the numbers displayed on the 4-LED panel (Refer to Figure 1); this information allows the Wang customer engineer to take the appropriate corrective action.

A listing of all diagnostic tests and error codes follows. A few of these error codes tell you how to avoid subsequent occurrences of the error. Some messages, such as the self-test monitor messages numbered from 4200 through 44FF (in hexadecimal notation), may provide useful information to the system administrator. All messages should be recorded and forwarded to your Wang customer engineer.

VS25 Diagnostic Error Code Summary

This page is indexed by the upper two hexadecimal digits which are displayed on the VS25 Front Panel.

| When the top 2-digit LED reads: | Record the following information for Wang Field Service: |
|---|---|
| 00 | Bus Processor (PROM) |
| 10 | Bus Processor |
| 20 | Bus Processor |
| 30 | Bus Processor |
| 40 | Diagnostic Monitor |
| 41 | Boot Sequencer |
| 42 | First Boot File |
| 43 | Self Test |
| 44 | System Loader |
| 45 to 48 | Diagnostic Monitor File |
| 49 to 4A | unused |
| 4B | CPU Control Memory |
| 4C | CPU Self-Test |
| 4D | CPU Random Test |
| 4E | CPU Main Memory |
| 4F | BP DMA and MARS |
| 50 | Fixed Disk DA |
| 60 | Fixed Disk DA |
| 70 | Serial I/O DA |
| 80 | Floppy Disk Controller |
| 90 | Device Error |
| 90 | Workstation 0 |
| 92 to 94 | unused |
| 95 | Fixed Disk Device |
| 96 to 97 | unused |
| 98 | Floppy Disk Device |
| 99 to 9A | unused |
| 9B | SMD Disk Device |
| 9C to 9F | unused |
| A0 | Motherboard Signal |
| A0 to A3 | Un-Isolated |
| A4 to A7 | SIO Signal |
| A8 to AB | Fixed Disk Signal |
| AC to AF | SMD Disk Signal |
| B0 | SMD Disk DA |
| C0 | Invalid Error Code |
| D0 | Invalid Error Code |
| E0 | BP Operational Code |
| F0 | BP Operational Code |

The full list of 4-digit test/error code (EC) numbers follows. An "X", as in "41X9", stands for any hexadecimal digit.

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 01 | PROM POWER ON |
| 0100 | BP code hung on jump to routine start |
| 0102 | BP code hung when wait state generater set |
| | |
| 02 | PROM CHECKSUM |
| 0201 | BP PROM Checksum error |
| | |
| 04 | I/O Communication Check |
| 0401 | BP cannot access I/O address 4 (DMAR) |
| | |
| 06 | INTERRUPT CONTROLLER |
| 0600 | BP routine halted, unknown cause |
| 0601 | BP 8259 mask not readable on master SI = Mask pattern |
| 0602 | BP 8259 mask not readable on slave 4 SI = Mask pattern |
| 0603 | BP 8259 mask not readable on slave 3 SI = Mask pattern |
| 0604 | BP 8259 mask not readable on slave 2 SI = Mask pattern |
| 0605 | BP 8259 mask not readable on slave 1 SI = Mask pattern |
| | |
| 08 | PROGRAMMABLE INTERVAL TIMER |
| 0800 | BP Routine halted, unknown cause |
| 0801 | BP Data miscompare on PIT count read SI=Exp, DI=Rcvd |
| 0802 | BP PIT count incorrect |
| 0803 | No BP PIT interrupt request |
| | |
| 0A | RAM COMMUNICATION CHECK |
| 0A01 | BP parity error cannot be cleared |
| 0A02 | BP RAM address 0 can't be accessed |
| 0A03 | BP RAM low-byte parity error can't be forced |
| 0A04 | BP Ram high-byte parity error can't be forced |
| 0A05 | BP DATA RAM not available BX = DRAM status |
| | |
| 0C | RAM and PARITY RAM DATA LINE TEST |
| 0C00 | BP Routine halted, unknown cause |
| 0C01 | BP RAM Data miscompare |
| 0C02 | Unexpected BP PE, Address = DS:BX Main ram data = SI |
| 0C03 | BP RAM Data miscompare |
| 0C04 | Forced BP PE not detected |

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 0E | RAM ADDRESS LINES TEST |
| 0E00 | BP Routine halted, unknown cause |
| 0E01 | BP RAM Data miscompare |
| 0E02 | Unexpected BP parity error<br>Address = DS:BX  Main RAM data = SI |
| 0E03 | BP RAM chip addressing error<br>Address overwritten = DS:DI  Last address written = DS:BX |
| 0E04 | BP parity RAM chip addressing error<br>Address overwritten = DS:DI  Last address written = DS:BX |
| 0E05 | BP RAM bank addressing error<br>Address overwritten = ES:BX  Last address written = DS:BX |
| 0E06 | BP parity RAM bank addressing error<br>Address overwritten = ES:BX  Last address written = DS:BX |
| 10 | RAM INTEGRITY TEST, WORD OPERATIONS |
| 1000 | BP routine halted, unknown cause |
| 1001 | BP RAM data miscompare, pattern B6DB<br>Address = DS:BX  Received = [DS:BX] |
| 1002 | Unexpected BP PE, pattern B6DB  Address = DS:BX |
| 1003 | BP RAM data miscompare, pattern 6DB6<br>Address = DS:BX  Received = [DS:BX] |
| 1004 | Forced BP PE low byte not detected<br>Address = DS:BX |
| 1005 | BP RAM data miscompare, pattern 6DB6, 2nd read<br>Address = DS:BX  Received = [DS:BX] |
| 12 | RAM INTEGRITY TEST, BYTE OPERATIONS |
| 1201 | BP RAM data miscompare, pattern 6C low byte<br>Address = DS:DI  Received = [DS:DI] |
| 1202 | Unexpected BP PE, pattern 6C, low byte<br>Address = DS:DI |
| 1203 | BP RAM data miscompare, pattern DB, high byte<br>Address = DS:DI  Received = [DS:DI] |
| 1204 | Forced BP PE not detected, pattern 3 high byte<br>Address = DS:DI |
| 1205 | BP RAM data miscompare, pattern 3 low byte overwritten<br>Address = DS:DI |
| 1206 | BPRAM data miscompare, pattern 3 high byte overwritten<br>Address = DS:DI |
| 14 | RAM BLOCK MOVE OPERATIONS and NOISE SENSITIVITY TEST |
| 1401 | BP RAM data miscompare, word string move<br>Address = ES:DI |
| 1402 | BP RAM data miscompare, byte string move<br>Address = ES:DI |
| 1403 | BP RAM data miscompare, '0' in bank of '1's, low address<br>Address = DS:BX  Expected = SI  Received = [DS:BX] |
| 1404 | BP RAM data miscompare, '0' in bank of '1's, high address<br>Address = DS:BX  Expected = SI  Received = [DS:BX] |

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 20 | PARITY ERROR INTERRUPT TEST |
| 2000 | BP routine halted, unknown cause |
| 2001 | BP CODE RAM PE interrupt not detected |
| 2002 | BP DATA RAM PE interrupt not detected |
| 22 | WAIT STATE GENERATOR TEST |
| 2200 | BP routine halted, unknown cause |
| 2201 | BP CODE RAM wait states cannot be changed |
| 2202 | BP PROM, I/O wait states cannot be changed |
| 24 | Wait State Generator |
| 2401 | Changing BP CODE RAM wait states did not change CODE RAM access time. |
| 2402 | Changing BP PROM wait states did not change PROM access time |
| 3C | MODEM LOOPBACK SELF TEST |
| 3C01 | 8251, 8251 input line |
| 3C02 | 8251, C/D or data line, clock, modem |
| 3C03 | I/O decode logic, invertor |
| 3C04 | 8251, modem |
| 3C05 | 8251 |
| 3C06 | 8251, buffer or modem |
| 3C07 | 8251, buffer, modem |
| 3C08 | 8251, buffer, modem |
| 3C09 | 8251, buffer, modem |
| 3C0A | 8251, modem |
| 3C0B | 8251 |
| 3C0C | 8251, modem |
| 3C0D | 8251 |
| 3C2C | Local/Remote switch or buffer |
| 38 | FLOPPY POWER-UP TEST |
| 3801 | DMA Status Reg not cleared after Master Clear |
| 3802 | Floppy DMA error on write/read of pattern 00000 |
| 3803 | Floppy DMA error on write/read of pattern 0AAAA |
| 3804 | Floppy DMA error on write/read of pattern 05555 |
| 3805 | Floppy DMA error on write/read of pattern 0FFFF |
| 3806 | Floppy Word Count Register error of pattern 00000 |
| 3807 | Floppy Word Count Register error of pattern 0AAAA |
| 3808 | Floppy Word Count Register error of pattern 05555 |
| 3809 | Floppy Word Count Register error of pattern 0FFFF |
| 380A | FDC not ready for commands after reset |
| 380B | FDC error on sense drive status command |
| 380C | FDC error on recalibrate command |
| 380D | Not at track 0 after recalibrate command |
| 9820 | Floppy drive not ready |
| 9821 | Error on seek to track 77 |
| 9822 | Drive will not recalibrate |

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 3E | Unexpected interrupt handler |
| 3EXX | Unexpected BP interrupt. XX = interrupt type serviced. |
| 3EFF | Unexpected BP interrupt. The interrupt type is unknown. |
| 40 | Load Bootstrap file |
| 4000 | Hung during bootstrap operation |
| 4011 | SMD Media error |
| 4012 | Disk controller error (SMD) |
| 4014 | Drive not ready (SMD) |
| 4018 | Program error / media error (SMD) |
| 401C | Bad file load / checksum error (SMD) |
| 4021 | Media error (FLOPPY) |
| 4022 | Disk controller error (FLOPPY) |
| 4024 | Drive not ready (FLOPPY) |
| 4028 | Program error / media error (FLOPPY) |
| 402C | Bad file load / checksum error (FLOPPY) |
| 4031 | Media error (QTM) |
| 4032 | Disk controller error (QTM) |
| 4034 | Drive not ready (QTM) |
| 4038 | Program error / media error (QTM) |
| 403C | Bad file load / checksum error (QTM) |
| 4090 | Bad volume label read (SMD) |
| 4091 | SMD Media error |
| 4092 | Disk controller error (SMD) |
| 4094 | Drive not ready (SMD) |
| 4098 | Program error / media error (SMD) |
| 409A | Non-bootstrap volume (SMD) |
| 409C | Bad file load / checksum error (SMD) |
| 40A0 | Bad volume label read (FLOPPY) |
| 40A1 | Media error (FLOPPY) |
| 40A2 | Disk controller error (FLOPPY) |
| 40A4 | Drive not ready (FLOPPY) |
| 40A8 | Program error / media error (FLOPPY) |
| 40AA | Non-bootstrap volume (FLOPPY) |
| 40AC | Bad file load / checksum error (FLOPPY) |
| 40B0 | Bad volume label read (QTM) |
| 40B1 | Media error (QTM) |
| 40B2 | Disk controller error (QTM) |
| 40B4 | Drive not ready (QTM) |
| 40B8 | Program error / media error (QTM) |
| 40BA | Non bootstrap volume (QTM) |
| 40BC | Bad file load / checksum error (QTM) |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 41 | BOOT STRAP LOADER | |
| 4110 | Unlabeled Volume (VOL1 Missing) | Volume Label |
| 4111 | Media error | Volume Label |
| 4112 | Controller H/W error | Volume Label |
| 4114 | Drive Not Ready | Volume Label |
| 4116 | Program error (Divide) | Volume Label |
| 4118 | Program error (Bad Data) | Volume Label |
| 4119 | Media error | Bit Map |
| 411A | Controller H/W error | Bit Map |
| 411C | Drive Not Ready | Bit Map |
| 411E | Program error (Divide) | Bit Map |
| 4120 | Program error (Bad Data) | Bit Map |
| 4121 | Media error | VTOC |
| 4122 | Controller H/W error | VTOC |
| 4124 | Drive Not Ready | VTOC |
| 4126 | Program error (Divide) | VTOC |
| 4128 | Program error (Bad Data) | VTOC |
| 412A | FDX1 ID Does Not Match | VTOC |
| 412B | FDX2 ID Does Not Match | VTOC |
| 412C | FDR1 ID Does Not Match | VTOC |
| 4131 | Media error | Self Test Mon |
| 4132 | Controller H/W error | Self Test Mon |
| 4133 | Checksum Does Not Match | Self Test Mon |
| 4134 | Drive Not Ready | Self Test Mon |
| 4136 | Program error (Divide) | Self Test Mon |
| 4138 | Program error (Bad Data) | Self Test Mon |
| 413A | Library not found | Self Test Mon |
| 413B | File not found | Self Test Mon |
| 413C | FDR1 not found | Self Test Mon |
| 413E | Extents greater than 3 | Self Test Mon |
| 4141 | Media error | Diagnostic Monitor |
| 4142 | Controller H/W error | Diagnostic Monitor |
| 4143 | Checksum Does Not Match | Diagnostic Monitor |
| 4144 | Drive Not Ready | Diagnostic Monitor |
| 4146 | Program error (Divide) | Diagnostic Monitor |
| 4148 | Program error (Bad Data) | Diagnostic Monitor |
| 414A | Library not found | Diagnostic Monitor |
| 414B | File not found | Diagnostic Monitor |
| 414C | FDR1 not found | Diagnostic Monitor |
| 414E | Extents greater than 3 | Diagnostic Monitor |
| 4151 | Media error | System Loader |
| 4152 | Controller H/W error | System Loader |
| 4153 | Checksum Does Not Match | System Loader |
| 4154 | Drive Not Ready | System Loader |
| 4156 | Program error (Divide) | System Loader |
| 4158 | Program error (Bad Data) | System Loader |
| 415A | Library not found | System Loader |
| 415B | File not found | System Loader |
| 415C | FDR1 not found | System Loader |
| 415E | Extents greater than 3 | System Loader |
| 41E0 | Floppy Status error | |
| 41F0 | Invalid H/W Configuration | |
| 41FD | Bus Processor Code Ram Parity Error | |
| 41FE | Bus Processor Data Ram Parity Error | |
| 41FF | Unknown Interrupt on the Bus Processor | |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 42 | SELF TEST MONITOR | |
| 4210 | Unlabeled Volume (VOL1 Missing) | Volume Label |
| 4211 | Media error | Volume Label |
| 4212 | Controller H/W error | Volume Label |
| 4214 | Drive Not Ready | Volume Label |
| 4216 | Program error (Divide) | Volume Label |
| 4218 | Program error (Bad Data) | Volume Label |
| 4219 | Media error | Bit Map |
| 421A | Controller H/W error | Bit Map |
| 421C | Drive Not Ready | Bit Map |
| 421E | Program error (Divide) | Bit Map |
| 4220 | Program error (Bad Data) | Bit Map |
| 4221 | Media error | VTOC |
| 4222 | Controller H/W error | VTOC |
| 4224 | Drive Not Ready | VTOC |
| 4226 | Program error (Divide) | VTOC |
| 4228 | Program error (Bad Data) | VTOC |
| 422A | FDX1 ID Does Not Match | VTOC |
| 422B | FDX2 ID Does Not Match | VTOC |
| 422C | FDR1 ID Does Not Match | VTOC |
| 4231 | Media error | W. S. File |
| 4232 | Controller H/W error | W. S. File |
| 4233 | Checksum Does Not Match | W. S. File |
| 4234 | Drive Not Ready | W. S. File |
| 4236 | Program error (Divide) | W. S. File |
| 4238 | Program error (Bad Data) | W. S. File |
| 423A | Library not found | W. S. File |
| 423B | File not found | W. S. File |
| 423C | FDR1 not found | W. S. File |
| 423E | Extents greater than 3 | W. S. File |
| 4241 | Media error | @ST0500@ in @DIAGST@ |
| 4242 | Controller H/W error | @ST0500@ in @DIAGST@ |
| 4243 | Checksum Does Not Match | @ST0500@ in @DIAGST@ |
| 4244 | Drive Not Ready | @ST0500@ in @DIAGST@ |
| 4246 | Program error (Divide) | @ST0500@ in @DIAGST@ |
| 4248 | Program error (Bad Data) | @ST0500@ in @DIAGST@ |
| 424A | Library not found | @ST0500@ in @DIAGST@ |
| 424B | File not found | @ST0500@ in @DIAGST@ |
| 424C | FDR1 not found | @ST0500@ in @DIAGST@ |
| 424E | Extents greater than 3 | @ST0500@ in @DIAGST@ |
| 4251 | Media error | @BT0500@ in @DIAGST@ |
| 4252 | Controller H/W error | @BT0500@ in @DIAGST@ |
| 4253 | Checksum Does Not Match | @BT0500@ in @DIAGST@ |
| 4254 | Drive Not Ready | @BT0500@ in @DIAGST@ |
| 4256 | Program error (Divide) | @BT0500@ in @DIAGST@ |
| 4258 | Program error (Bad Data) | @BT0500@ in @DIAGST@ |
| 425A | Library not found | @BT0500@ in @DIAGST@ |
| 425B | File not found | @BT0500@ in @DIAGST@ |
| 425C | FDR1 not found | @BT0500@ in @DIAGST@ |
| 425E | Extents greater than 3 | @BT0500@ in @DIAGST@ |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 42 | SELF TEST MONITOR | |
| 4261 | Media error | @CT0500@ in @DIAGST@ |
| 4262 | Controller H/W error | @CT0500@ in @DIAGST@ |
| 4263 | Checksum Does Not Match | @CT0500@ in @DIAGST@ |
| 4264 | Drive Not Ready | @CT0500@ in @DIAGST@ |
| 4266 | Program error (Divide) | @CT0500@ in @DIAGST@ |
| 4268 | Program error (Bad Data) | @CT0500@ in @DIAGST@ |
| 426A | Library not found | @CT0500@ in @DIAGST@ |
| 426B | File not found | @CT0500@ in @DIAGST@ |
| 426C | FDR1 not found | @CT0500@ in @DIAGST@ |
| 426E | Extents greater than 3 | @CT0500@ in @DIAGST@ |
| 4271 | Media error | @CT0800@ in @DIAGST@ |
| 4272 | Controller H/W error | @CT0800@ in @DIAGST@ |
| 4273 | Checksum Does Not Match | @CT0800@ in @DIAGST@ |
| 4274 | Drive Not Ready | @CT0800@ in @DIAGST@ |
| 4276 | Program error (Divide) | @CT0800@ in @DIAGST@ |
| 4278 | Program error (Bad Data) | @CT0800@ in @DIAGST@ |
| 427A | Library not found | @CT0800@ in @DIAGST@ |
| 427B | File not found | @CT0800@ in @DIAGST@ |
| 427C | FDR1 not found | @CT0800@ in @DIAGST@ |
| 427E | Extents greater than 3 | @CT0800@ in @DIAGST@ |
| 4281 | Media error | @CT0B00@ in @DIAGST@ |
| 4282 | Controller H/W error | @CT0B00@ in @DIAGST@ |
| 4283 | Checksum Does Not Match | @CT0B00@ in @DIAGST@ |
| 4284 | Drive Not Ready | @CT0B00@ in @DIAGST@ |
| 4286 | Program error (Divide) | @CT0B00@ in @DIAGST@ |
| 4288 | Program error (Bad Data) | @CT0B00@ in @DIAGST@ |
| 428A | Library not found | @CT0B00@ in @DIAGST@ |
| 428B | File not found | @CT0B00@ in @DIAGST@ |
| 428C | FDR1 not found | @CT0B00@ in @DIAGST@ |
| 428E | Extents greater than 3 | @CT0B00@ in @DIAGST@ |
| 4291 | Media error | @MT0500@ in @DIAGST@ |
| 4292 | Controller H/W error | @MT0500@ in @DIAGST@ |
| 4293 | Checksum Does Not Match | @MT0500@ in @DIAGST@ |
| 4294 | Drive Not Ready | @MT0500@ in @DIAGST@ |
| 4296 | Program error (Divide) | @MT0500@ in @DIAGST@ |
| 4298 | Program error (Bad Data) | @MT0500@ in @DIAGST@ |
| 429A | Library not found | @MT0500@ in @DIAGST@ |
| 429B | File not found | @MT0500@ in @DIAGST@ |
| 429C | FDR1 not found | @MT0500@ in @DIAGST@ |
| 429E | Extents greater than 3 | @MT0500@ in @DIAGST@ |
| 42A1 | Media error | @BT0800@ in @DIAGST@ |
| 42A2 | Controller H/W error | @BT0800@ in @DIAGST@ |
| 42A3 | Checksum Does Not Match | @BT0800@ in @DIAGST@ |
| 42A4 | Drive Not Ready | @BT0800@ in @DIAGST@ |
| 42A6 | Program error (Divide) | @BT0800@ in @DIAGST@ |
| 42A8 | Program error (Bad Data) | @BT0800@ in @DIAGST@ |
| 42AA | Library not found | @BT0800@ in @DIAGST@ |
| 42AB | File not found | @BT0800@ in @DIAGST@ |
| 42AC | FDR1 not found | @BT0800@ in @DIAGST@ |
| 42AE | Extents greater than 3 | @BT0800@ in @DIAGST@ |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 42 | SELF TEST MONITOR | |
| 42E2 | SIO Time Out | |
| 42E3 | SIO Failure | |
| 42E4 | SIO Overrun | |
| 42E5 | SIO Data Ram Parity Error | |
| 42E6 | SIO Serial Parity Error | |
| 42E7 | Workstation Powered Off | |
| 42E8 | Workstation Coaxial Parity Error | |
| 42E9 | Workstation Memory Parity Error | |
| 42EA | Workstation Has No Code | |
| 42EB | Workstation Invalid Status | |
| 42E0 | Floppy Status Error | |
| 42F0 | Invalid Hardware Configuration | |
| | | |
| 43 | SELF TEST MONITOR | |
| 4371 | Media error | Overlay @CM0800@ |
| 4372 | Controller H/W error | Overlay @CM0800@ |
| 4373 | Checksum Does Not Match | Overlay @CM0800@ |
| 4374 | Drive Not Ready | Overlay @CM0800@ |
| 4376 | Program error (Divide) | Overlay @CM0800@ |
| 4378 | Program error (Bad Data) | Overlay @CM0800@ |
| 437A | Library not found | Overlay @CM0800@ |
| 437B | File not found | Overlay @CM0800@ |
| 437C | FDR1 not found | Overlay @CM0800@ |
| 437E | Extents greater than 3 | Overlay @CM0800@ |
| 4381 | Media error | Overlay @CM0B00@ |
| 4382 | Controller H/W error | Overlay @CM0B00@ |
| 4383 | Checksum Does Not Match | Overlay @CM0B00@ |
| 4384 | Drive Not Ready | Overlay @CM0B00@ |
| 4386 | Program error (Divide) | Overlay @CM0B00@ |
| 4388 | Program error (Bad Data) | Overlay @CM0B00@ |
| 438A | Library not found | Overlay @CM0B00@ |
| 438B | File not found | Overlay @CM0B00@ |
| 438C | FDR1 not found | Overlay @CM0B00@ |
| 438E | Extents greater than 3 | Overlay @CM0B00@ |
| 4391 | Media error | Overlay @MM0500@ |
| 4392 | Controller H/W error | Overlay @MM0500@ |
| 4393 | Checksum Does Not Match | Overlay @MM0500@ |
| 4394 | Drive Not Ready | Overlay @MM0500@ |
| 4396 | Program error (Divide) | Overlay @MM0500@ |
| 4398 | Program error (Bad Data) | Overlay @MM0500@ |
| 439A | Library not found | Overlay @MM0500@ |
| 439B | File not found | Overlay @MM0500@ |
| 439C | FDR1 not found | Overlay @MM0500@ |
| 439E | Extents greater than 3 | Overlay @MM0500@ |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 44 | SYSTEM LOADER | |
| 4410 | Unlabeled Volume (VOL1 Missing) | Volume Label |
| 4411 | Media error | Volume Label |
| 4412 | Controller H/W error | Volume Label |
| 4414 | Drive Not Ready | Volume Label |
| 4416 | Programming error (Divide) | Volume Label |
| 4418 | Program error (Bad Data) | Volume Label |
| 4419 | Media error | Bit Map |
| 441A | Controller H/W error | Bit Map |
| 441C | Drive Not Ready | Bit Map |
| 441E | Program error (Divide) | Bit Map |
| 4420 | Program error (Bad Data) | Bit Map |
| 4421 | Media error | VTOC |
| 4422 | Controller H/W error | VTOC |
| 4424 | Drive Not Ready | VTOC |
| 4426 | Program error (Divide) | VTOC |
| 4428 | Program error (Bad Data) | VTOC |
| 442A | FDX1 ID Does Not Match | VTOC |
| 442B | FDX2 ID Does Not Match | VTOC |
| 442C | FDR1 ID Does Not Match | VTOC |
| 4431 | Media error | W. S. 0 File |
| 4432 | Controller H/W error | W. S. 0 File |
| 4433 | Checksum Does Not Match | W. S. 0 File |
| 4434 | Drive Not Ready | W. S. 0 File |
| 4436 | Program error (Divide) | W. S. 0 File |
| 4438 | Program error (Bad Data) | W. S. 0 File |
| 443A | Library not found | W. S. 0 File |
| 443B | File not found | W. S. 0 File |
| 443C | FDR1 not found | W. S. 0 File |
| 443E | Extents greater than 3 | W. S. 0 File |
| 4441 | Media error | B. P. File |
| 4442 | Controller H/W error | B. P. File |
| 4443 | Checksum Does Not Match | B. P. File |
| 4444 | Drive Not Ready | B. P. File |
| 4446 | Program error (Divide) | B. P. File |
| 4448 | Program error (Bad Data) | B. P. File |
| 444A | Library not found | B. P. File |
| 444B | File not found | B. P. File |
| 444C | FDR1 not found | B. P. File |
| 444E | Extents greater than 3 | B. P. File |
| 4451 | Media error | C. M. File |
| 4452 | Controller H/W error | C. M. File |
| 4453 | Checksum Does Not Match | C. M. File |
| 4454 | Drive Not Ready | C. M. File |
| 4456 | Program error (Divide) | C. M. File |
| 4458 | Program error (Bad Data) | C. M. File |
| 445A | Library not found | C. M. File |
| 445B | File not found | C. M. File |
| 445C | FDR1 not found | C. M. File |
| 445E | Extents greater than 3 | C. M. File |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 44 | SYSTEM LOADER | |
| 4461 | Media error | CP uCode File |
| 4462 | Controller H/W error | CP uCode File |
| 4463 | Checksum Does Not Match | CP uCode File |
| 4464 | Drive Not Ready | CP uCode File |
| 4466 | Program error (Divide) | CP uCode File |
| 4468 | Program error (Bad Data) | CP uCode File |
| 446A | Library not found | CP uCode File |
| 446B | File not found | CP uCode File |
| 446C | FDR1 not found | CP uCode File |
| 446E | Extents greater than 3 | CP uCode File |
| 44E0 | DMA Time Out | |
| 44E1 | DMA Failure | |
| 44E2 | SIO Time Out | |
| 44E3 | SIO Failure | |
| 44E4 | SIO Overrun | |
| 44E5 | SIO Data Ram Parity Error | |
| 44E6 | SIO Serial Parity Error | |
| 44E7 | Workstation Powered Off | |
| 44E8 | Workstation Coaxial Parity Error | |
| 44E9 | Workstation Memory Parity Error | |
| 44EA | Workstation Has No Code | |
| 44EB | Workstation Invalid Status | |
| 44EC | CPU Failure | |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 45 | DIAGNOSTIC MONITOR | |
| 4510 | Unlabeled Volume (VOL1 Missing) | Volume Label |
| 4511 | Media error | Volume Label |
| 4512 | Controller H/W error | Volume Label |
| 4514 | Drive Not Ready | Volume Label |
| 4416 | Programming error (Divide) | Volume Label |
| 4518 | Program error (Bad Data) | Volume Label |
| 4519 | Media error | Bit Map |
| 451A | Controller H/W error | Bit Map |
| 451C | Drive Not Ready | Bit Map |
| 451E | Program error (Divide) | Bit Map |
| 4520 | Program error (Bad Data) | Bit Map |
| 4521 | Media error | VTOC |
| 4522 | Controller H/W error | VTOC |
| 4524 | Drive Not Ready | VTOC |
| 4526 | Program error (Divide) | VTOC |
| 4528 | Program error (Bad Data) | VTOC |
| 452A | FDX1 ID Does Not Match | VTOC |
| 452B | FDX2 ID Does Not Match | VTOC |
| 452C | FDR1 ID Does Not Match | VTOC |
| 4531 | Media error | W. S. 0 File |
| 4532 | Controller H/W error | W. S. 0 File |
| 4533 | Checksum Does Not Match | W. S. 0 File |
| 4534 | Drive Not Ready | W. S. 0 File |
| 4536 | Program error (Divide) | W. S. 0 File |
| 4538 | Program error (Bad Data) | W. S. 0 File |
| 453A | Library not found | W. S. 0 File |
| 453B | File not found | W. S. 0 File |
| 453C | FDR1 not found | W. S. 0 File |
| 453E | Extents greater than 3 | W. S. 0 File |
| 4541 | Media error | Test Table File |
| 4542 | Controller H/W error | Test Table File |
| 4543 | Checksum Does Not Match | Test Table File |
| 4544 | Drive Not Ready | Test Table File |
| 4546 | Program error (Divide) | Test Table File |
| 4548 | Program error (Bad Data) | Test Table File |
| 454A | Library not found | Test Table File |
| 454B | File not found | Test Table File |
| 454C | FDR1 not found | Test Table File |
| 454E | Extents greater than 3 | Test Table File |
| 45E0 | DMA Time Out | |
| 45E1 | DMA Failure | |
| 45E2 | SIO Failure | |
| 45E3 | SIO Time Out | |
| 45E4 | W.S. Failure | |
| 45E5 | W.S. Failed Start | |
| 45E6 | W.S. Failed Load | |
| 45E7 | W.S. Failed Restart | |
| 45E8 | Invalid Burn-in Table | |

| TEST / EC # | Test Title / Error Code Description | |
|---|---|---|
| 46 | Diagnostic Monitor | |
| 46X1 | Media error | Test File X |
| 46X2 | Controller H/W error | Test File X |
| 46X3 | Checksum Does Not Match | Test File X |
| 46X4 | Drive Not Ready | Test File X |
| 46X6 | Program error (Divide) | Test File X |
| 46X8 | Program error (Bad Data) | Test File X |
| 46XA | Library not found | Test File X |
| 46XB | File not found | Test File X |
| 46XC | FDR1 not found | Test File X |
| 46XE | Extents greater than 3 | Test File X |
| | | |
| 47 | Diagnostic Monitor | |
| 47X1 | Media error | File X + 15 |
| 47X2 | Controller H/W error | File X + 15 |
| 47X3 | Checksum Does Not Match | File X + 15 |
| 47X4 | Drive Not Ready | File X + 15 |
| 47X6 | Program error (Divide) | File X + 15 |
| 47X8 | Program error (Bad Data) | File X + 15 |
| 47XA | Library not found | File X + 15 |
| 47XB | File not found | File X + 15 |
| 47XC | FDR1 not found | File X + 15 |
| 47XE | Extents greater than 3 | File X + 15 |
| | | |
| 48 | Diagnostic Monitor | |
| 48X1 | Media error | Overlay X |
| 48X2 | Controller H/W error | Overlay X |
| 48X3 | Checksum Does Not Match | Overlay X |
| 48X4 | Drive Not Ready | Overlay X |
| 48X6 | Program error (Divide) | Overlay X |
| 48X8 | Program error (Bad Data) | Overlay X |
| 48XA | Library not found | Overlay X |
| 48XB | File not found | Overlay X |
| 48XC | FDR1 not found | Overlay X |
| 48XE | Extents greater than 3 | Overlay X |
| | | |
| 49 | Diagnostic Monitor | |
| 49X1 | Media error | Overlay X + 15 |
| 49X2 | Controller H/W error | Overlay X + 15 |
| 49X3 | Checksum Does Not Match | Overlay X + 15 |
| 49X4 | Drive Not Ready | Overlay X + 15 |
| 49X6 | Program error (Divide) | Overlay X + 15 |
| 49X8 | Program error (Bad Data) | Overlay X + 15 |
| 49XA | Library not found | Overlay X + 15 |
| 49XB | File not found | Overlay X + 15 |
| 49XC | FDR1 not found | Overlay X + 15 |
| 49XE | Extents greater than 3 | Overlay X + 15 |

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 4B | CPU Memory Self Test @CT0500@ |
| 4B00 | CPU failed Self Test, Run CPU diagnostics |
| 4B01 | CPU Instruction Counter cannot be set to zero. |
| 4B02 | Data error on write/read of control memory. |
| 4B03 | Data error on read/write/read sequence of control memory. |
| 4B04 | CPU hardware status register error. Bit2 not reset after setting CPU into 'STEP' mode. |
| 4B05 | CPU hardware status register error. Bit2 not set after setting CPU into 'RUN' mode. |
| 4B06 | CPU hardware status register error. Bit2 not reset after setting CPU into 'STEP' mode from 'RUN' mode. |
| 4B07 | CPU hardware status register error. Bit3 not reset after disabling CPU address comparator. |
| 4B08 | CPU hardware status register error. Bit3 not set after enabling CPU address comparator. |
| 4B09 | CPU hardware status register error. Bit4 not set after enabling CPU address comparator and setting compare address equal to MIC. |
| 4B0A | CPU hardware status register error. Bit4 not reset after enabling CPU address comparator and setting compare address not equal to MIC. |
| 4B0B | CPU hardware status register error. Bit3, 4, or 5 not reset after disabling CPU address comparator. |
| 4B0C | CPU hardware status register error. Bit3, 4, or 5 not reset after disabling CPU address comparator, with compare address set equal to MIC. |
| 4B0D | CPU hardware status register error. Bit3 or 4 not set after enabling CPU address comparator, with compare address set equal to MIC. |
| 4B0E | Sync Interrupt not detected |
| 4B0F | CPU hardware status register error. Bit3 or 4 not reset after disabling CPU address comparator, with compare address set equal to MIC. |
| 4B10 | CPU hardware status register error. CPU 'CIO 7' status bit set after execution of a NOP instruction. |
| 4B11 | CPU 'HALTED' interrupt not detected on a step in 'STEP' mode. |
| 4B12 | CPU hardware status register error. CPU 'CIO 7' status bit not set after execution of a CIO 7 instruction. |
| 4B13 | CPU 'HALTED' interrupt not detected when a CIO 7 instruction executed. |
| 4B14 | CPU hardware status register error. CPU 'CIO 7' status bit not reset after execution of a NOP instruction. |
| 4B15 | CPU 'HALTED' interrupt not detected when a NOP instruction executed. |
| 4B16 | CPU 'SYNC' interrupt not detected. |
| 4B17 | CPU hardware status register error. Bit 7 not set or bit 3 not reset after setting 'NANO STEP' mode. |
| 4B18 | Incorrect MIC after executing ENABLE IO3. |
| 4B19 | Incorrect MIC after executing CLEAR IO3. |

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 4B | CPU Memory Self Test @CT0500@ |
| 4B1A | CPU IO3 status bit not cleared by CLEAR IO3 instruction. |
| 4B1B | BP IO3 status bit not set by CLEAR IO3 instruction. |
| 4B1C | Incorrect MIC after executing CLEAR IO4 instruction. |
| 4B1D | CPU IO4 bit not cleared by CLEAR IO4 instruction. |
| 4B1E | Incorrect MIC after executing CLEAR IO4b instruction. |
| 4B1F | BP IO4b status bit not set after executing CLEAR IO4b instruction. |
| 4B20 | Incorrect MIC after executing MOVE IO4b to IO4. |
| 4B21 | CPU IO4 status bit not clear after moving IO4b to IO4. |
| 4B22 | Incorrect MIC after executing MOVE IO4b to IO4. |
| 4B23 | BP IO3 Status bit not reset after SET IO3 instruction. |
| 4B24 | BP IO4b status bit not reset after SET IO4b instruction. |
| 4B25 | CPU IO4 not set after SET IO4b, and MOVE IO4b TO IO4 instructions executed. |
| 4B26 | CPU IO3 status bit not set after SET IO3 instruction executed. |
| 4B27 | Incorrect MIC after CLEAR IO3 instruction executed. |
| 4B28 | CPU IO3 status bit not reset after CLEAR IO3 instruction executed. |
| 4B29 | BP IO3 status bit not set after executing CLEAR IO3 instruction |
| 4B2A | IO3 Interrupt not detected when IO3 cleared. |
| 4B2B | Incorrect MIC after executing CLEAR IO4b instruction. |
| 4B2C | BP IO4b status bit not set after executing CLEAR IO4b instruction. |
| 4B2D | IO4b Interrupt not detected when IO4b cleared. |
| 4B2E | Incorrect MIC after executing CLEAR IO4b instruction. |
| 4B2F | CPU IO4 status bit cleared after executing CLEAR IO4b instruction. |
| 4B30 | Incorrect MIC after executing DISABLE IO3. |
| 4B31 | CPU IO3 status bit not clear when setting IO3 after disabling IO3. |
| 4B32 | Incorrect MIC after executing ENABLE IO3. |
| 4B33 | CPU IO3 bit not set after enabling IO3. |
| 4B34 | CPU NANO code error. |
| | |
| 4C | CPU Operational Self Test @CT0800@ |
| 4C00 | CPU failed Self Test, Run CPU diagnostics |
| 4C10 | Time out |
| 4C20 | CPU detected error |
| | |
| 4D | CPU Integrity Self Test @CT0B00@ |
| 4D00 | CPU failed Self Test, Run CPU diagnostics |
| 4D10 | Time out |
| 4D20 | CPU detected error |
| | |
| 4E | Main Memory Self Test @MT0500@ |
| 4E00 | Main Memory failure, Run Main Memory diagnostics |
| 4E10 | Time out |
| 4E20 | CPU detected Main Memory error |

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 4F | BP DMA Self Test @BT0800@ |
| 4F00 | BP DMA Failure, Run BP DMA diagnostics |
| 4F10 | Time out |
| 4F20 | DMA error |
| | |
| 60 | Quantum Self Test |
| A810 | No Quantum Id On System |
| 9522 | Quantum not Ready Timeout |
| 6014 | Quantum Recalibrate Seek Complete 0 Interrupt Timeout |
| 6016 | Quantum Stepper Seek Complete 0 Interrupt Timeout |
| 6118 | Quantum Track 0 status missing |
| | |
| 62 | Quantum Read Routine 2 Sectors |
| 6202 | No Quantum Id on system |
| 6204 | Quantum Drive 0 not Ready |
| 6206 | Quantum Seek Complete 0 Interrupt Timeout |
| 6208 | Quantum Programming Error # of Blocks too big |
| 620A | Quantum Read Completion Interrupt Timeout |
| 620C | Quantum DA Status Error |
| 62D0 | Quantum Programming Error Block # too Big |
| 62E0 | Quantum Attempt Error Correction Interrupt Timeout |
| 62E1 | Quantum ECC Done Status Bit missing |
| 62F0 | Quantum Seek Complete 0 Interrupt Timeout on recalibrate |
| 62F1 | Quantum Track 0 status missing after Recalibrate |
| | |
| 63 | Quantum Read Routine 9 Sectors |
| 6302 | No Quantum Id on system |
| 6304 | Quantum Drive 0 not Ready |
| 6306 | Quantum Seek Complete 0 Interrupt Timeout |
| 6308 | Quantum Programming Error # of Blocks too big |
| 630A | Quantum Read Completion Interrupt Timeout |
| 630C | Quantum DA Status Error |
| 63D0 | Quantum Programming Error Block # too Big |
| 63E0 | Quantum Attempt Error Correction Interrupt Timeout |
| 63E1 | Quantum ECC Done Status Bit missing |
| 63F0 | Quantum Seek Complete 0 Interrupt Timeout on recalibrate |
| 63F1 | Quantum Track 0 status missing after Recalibrate |
| | |
| 71 | SIO Address Latch |
| 7101 | Address Latch Failure |
| 71FD | Unexpected Interrupt |
| 71FE | Unexpected SIO Interrupt |

| TEST / EC # | Test Title / Error Code Description |
|---|---|
| 72 | SIO Write/Read Byte |
| 7201 | Write Byte Completion Interrupt Failure |
| 7202 | Read Byte Completion Interrupt Failure |
| 7203 | Data Compare Failure |
| 7204 | Status Error |
| 7205 | SMAR Ripple Failure |
| 72FD | Unexpected Interrupt |
| 72FE | Unexpected SIO Interrupt |
| 72FF | Get Control of Workstation Failure |
| | |
| 73 | SIO Write/Read 256 |
| 7301 | Write 256 Completion Interrupt Failure |
| 7302 | Read 256 Completion Interrupt Failure |
| 7303 | Data Compare Error |
| 7304 | Status Error |
| 7305 | SMAR Ripple Failure |
| 73FD | Unexpected Interrupt |
| 73FE | Unexpected SIO Interrupt |
| 73FF | Get Control of Workstation Failure |
| | |
| 76 | SIO Give Status |
| 7601 | Give Status Completion Interrupt Failure |
| 7602 | Data Compare Failure |
| 7603 | Status Error |
| 76FD | Unexpected Interrupt |
| 76FE | Unexpected SIO Interrupt |
| 76FF | Get Control of Workstation Failure |
| | |
| 90 | SIO Give Status |
| 9011 | Workstation Powered Off Status |
| 9015 | Coax Parity, parity or not running status |
| 90FD | Unexpected Interrupt |
| 90FE | Unexpected SIO Interrupt |
| | |
| A4 | SIO ID Test |
| A401 | Device ID Not Found |
| | |
| A4 | SIO SMAR Test |
| A402 | SMAR Register Failure |
| A4FD | Unexpected Interrupt |
| A4FE | Unexpected SIO Interrupt |

APPENDIX G
REMOTE DIAGNOSTICS PROCEDURES

The remote diagnostics feature lets Wang customer engineers detect faults occurring on the circuit board level, and then isolate faults occurring on the circuit or chip level. Customer engineers execute diagnostics tests (which reside on the customer's disk) from a Technical Assistance Center (TAC). Three modes of remote diagnostics are available: those for power-up (IPL) failures, those for non-IPL failures, and those for routine maintenance. Remote diagnostic procedures vary slightly for each mode, and are subject to change without notice. These procedures are as follows.

Power-Up (IPL) Failure

| Customer Action: | TAC Action: |
|---|---|
| 1. Customer phones TAC (voice). | |
| | 2. TAC acknowledges call and instructs customer to turn key to Remote position. |
| 3. Customer IPLs in Remote mode and switches modem to Data (data). | |
| | 4. TAC loads VS25 REM package and switches modem to Data (data). |
| | 5. TAC receives 'SHOUT' contents (2K bytes of non-volatile RAM bearing diagnostic information). |
| | 6. TAC terminates remote session. |
| 7. Customer disconnects when modem carrier indicator is out. | |

Non-IPL Failure

| Customer Action: | TAC Action: |
| --- | --- |
| 1. Customer phones TAC (voice). | |
| | 2. TAC acknowledges call and instructs customer to turn key to Remote position and re-IPL. |
| 3. Customer IPLs in REMOTE mode and switches modem to Data (data). | |
| | 4. TAC loads VS25 REM package and switches modem to Data (data). |
| | 5. TAC establishes TC link with option to load diagnostics monitor or request a dump of the 2K non-volatile RAM. |
| | 6. TAC analyzes errors of received data. |
| | 7. TAC runs appropriate diagnostics package to diagnose failing module. |
| | 8. TAC echoes message to customer console that remote session is terminating and customer engineer is being dispatched with ORU. |
| | 9. TAC terminates remote session. |

Maintenence Mode

| Customer Action: | TAC Action: |
| --- | --- |
| | 1. TAC calls and notifies customer that a remote session is being initiated for maintenance reasons. |
| 2. Customer IPLs in REMOTE mode and switches modem to Data (data). | |
| | 3. TAC loads VS25 REM package and switches modem to Data (data). |
| | 4. TAC establishes TC link and performs maintenance, e.g., requests to dump non-volatile RAM to obtain latest customer information. |
| | 5. TAC echoes message to customer console that remote session is terminating and customer engineer is being dispatched with ORU. |
| | 6. TAC terminates remote session. |
| 7. Customer disconnects when modem carrier indicator is out. | |

WANG

# Customer Comment Form

Title VS25 BULLETIN

Publications Number 800-3108

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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.

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