VWS Installation Guide

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The *VWS Installation Guide* provides instructions for installing Version 3.0 of the MicroVMS Workstation software on a MicroVAX workstation.

Operating System and Version: MicroVMS Version 4.4

Software Version: MicroVMS Workstation Software
Version 3.0

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Preface

This guide explains how to install the MicroVMS Workstation software (VWS) on your VAXstation. It is organized as follows:

- Chapter 1 provides installation instructions.

  Section 1.1 describes how to start the system.

  Section 1.2 describes the steps you should take to prepare for the installation.

  Section 1.3 describes the procedure for installing VWS.

- Chapter 2 provides information on tuning the workstation parameters.

- Appendix A provides a list of files installed by the workstation software.

The MicroVMS Workstation Software Version 3.0 relies on features in MicroVMS Version 4.4 or later. You *must* install the MicroVMS Version 4.4 base system software *before* installing this or any other software. (The exception to this rule is any software that runs directly from diskettes, such as diagnostics.)

Associated Documents

The MicroVMS Release Notes may contain information critical to the base kit installation. You should read the release notes before installing the MicroVMS base kit.

The MicroVMS installation guide provides instructions on installing or upgrading your MicroVMS base system: If your base kit distribution volume is a tape cartridge, see the guide entitled *Installing or Upgrading MicroVMS from a Tape Cartridge*. If your base kit is distributed on floppy diskettes, see the guide entitled *Installing or Upgrading MicroVMS from Diskettes*.

The *Read-Me First* card that is included with your kit provides specific section references to guide you through each portion of the installation procedure.

Once you have the MicroVMS base system and the workstation software installed, see the *MicroVMS Workstation User's Guide* for essential information on using the workstation software.

If you intend to work with application programs using MicroVMS workstation graphics, you should consult the *MicroVMS Workstation Graphics Programming Guide*.

For detailed information on printing hardcopies from the VAXstation, see the *MicroVMS Workstation Guide to Printing Graphics*.

Conventions Used in This Document

This manual uses the following conventions in displaying the syntax requirements of user input to the system and in displaying examples:

Conventions	Meaning
RETURN	The RETURN key is not always shown in formats and examples. Assume that you must press RETURN after typing a command or other input to the system unless instructed otherwise.
CTRL/x	CTRL followed by a slash followed by a letter means that you must type the letter while holding down the CTRL key. For example, CTRL/B means hold down the CTRL key and type the letter B.
Lists	When a format item is followed by a comma and an ellipsis (, . . .), you can enter a single item or a number of those items separated by commas. When a format item is followed by a plus sign and an ellipsis (+ . . .), you can enter a single item or a number of those items connected by plus signs. If you enter a list (more than one item), you must enclose the list in parentheses. A single item need not be enclosed in parentheses.
Optional Items	An item enclosed in square brackets ([ ]) is optional.
Angle Brackets	In examples, angle brackets enclose a syntactic element of user input, such as a key ②, a key sequence CTRL/Z, or a parameter password.
Ellipsis	A vertical ellipsis indicates that some of the format or example is not included.
DELETE Key	The key on the VT200 series terminal keyboard that performs the DELETE function is labeled ⟨X⟩.
Examples	Examples show both system output (prompts, messages, and displays) and user input. User input is printed in red.

Chapter 1

Installing VWS on a MicroVAX I or a MicroVAX II

This chapter assumes that you have already installed your MicroVMS Version 4.4 base system.

NOTE: You should back up the fixed disk (your system disk) as described in the installation guide for your base system, before you begin installing the MicroVMS Workstation software.

1.1 Starting the System

You must perform the following steps before you can install the MicroVMS Workstation software.

1. Turn on the VAXstation monitor if it is not already on.

2. Turn on the processor if it is not already on. Make sure the control panel is set for normal operations, as described in the owner's manual for your processor.

3. Press the Halt pushbutton on the control panel of the system unit twice, making sure that the button pops back out and the red light in the center of the button goes off.

4. Enter the following response to the console prompt ($>>>$) and press RETURN:

    ```
    >>> B
    ```

    The system automatically boots.

5. If the system displays a prompt for the date and time, enter the current date and time in the format requested.

6. Wait several minutes while the system starts up. Several messages appear on the screen, beginning with the following:

    ```
    The MicroVMS system is now executing the site-specific startup commands.
    ```

    After startup is completed, the system issues a "job terminated" message.

After startup is completed, the system issues a "job terminated" message.

Disregard the error message "SYSGEN-E-VECINUSE, vector in use" if it appears on the console screen.

1.2 Preparing to Install the Workstation Software

To prepare for the workstation software installation, follow these steps:

NOTE: If you do not have a satisfactory backup copy of your system disk, do *not* attempt to install any software on it. Be sure to back up the system *before* proceeding with the installation. See the installation guide for your base system for backup instructions.

1. Locate the workstation software media (either diskettes or a tape cartridge), labeled "VWS030."

2. If MicroVMS is not running, press the Restart pushbutton on the control panel of the system unit. If requested, enter the date and time.

3. When the system displays the "job terminated" message, press RETURN. The username prompt will appear.

4. Log in to the system manager's account by typing SYSTEM and pressing RETURN.

   `Username: SYSTEM`

   If a password has been set for the system account, you will also be prompted for the password. If you are prompted for the password, enter the password and press RETURN.

5. If you have already installed other applications, check to see that the following requirements are met.

   • A minimum of 7000 free blocks of disk space are available on your system disk. During the workstation software installation, 3000 blocks of disk space will be used. To determine the number of free blocks, enter the following DCL command:

   `$ SHOW DEVICES SYS$SYSDEVICE`

   The number of free blocks will appear on your screen, under the heading "Free Blocks." If your system disk does not contain 7000 free blocks, you must remove some unnecessary applications or delete some unnecessary user files before you can install the workstation software.

• The system account quotas are as follows:

Open file quota:	16 (minimum)
Paging file quota:	1500 (minimum)
Subprocess quota:	2 (minimum)
Working set quota	250 (minimum)
	400-500 (optimum)

To check the open file quota, paging file quota, and subprocess quota for your account, use the DCL command SHOW PROCESS/QUOTA. For example:

```
$ SHOW PROCESS/QUOTA

28-MAY-1986 11:04:12.85   OPA0:                User: SYSTEM

Process Quotas:
 Account name: SYSTEM
 CPU limit:                          Infinite  Direct I/O limit:      18
 Buffered I/O byte count quota:         20480  Buffered I/O limit:    18
 Timer queue entry quota:                  20  Open file quota:       20
 Paging file quota:                      8843  Subprocess quota:      10
 Default page fault cluster:               16  AST limit:             22
 Enqueue quota:                            30  Shared file limit:      0
 Max detached processes:                    0  Max active jobs:        0
```

To determine the authorized quota for the working set, use the DCL command SHOW WORKING_SET. For example:

```
$ SHOW WORKING_SET
   Working Set      /Limit= 594   /Quota= 1000    /Extent= 2200
   Adjustment enabled    Authorized Quota= 1000  Authorized Extent= 2200
```

You can change these values using the Authorize Utility (AUTHORIZE). Consult the *MicroVMS User's Manual* for details.

1.3   Installing the Workstation Software

This section describes how to install the workstation software using the VMSINSTAL command procedure. The following instructions assume that you have taken the steps necessary to prepare the system for installation, as described in Section 1.2. The installation will take about twenty minutes to complete.

1. If you are installing from a magnetic tape cartridge, enter the following command to invoke the VMSINSTAL command procedure:

```
$ @SYS$UPDATE:VMSINSTAL VWS030 $TAPE1:
```

If you are installing from floppy diskettes, enter the following command to invoke the VMSINSTAL command procedure:

```
$ @SYS$UPDATE:VMSINSTAL VWS030 $FLOPPY1:
```

The VMSINSTAL procedure identifies itself and asks whether you have a satisfactory backup copy of your current system:

```
VAX/VMS Software Product Installation Procedure V4.4
```

```
It is 28-MAY-1986 at 09:10
Enter a question mark (?) at any time for help.
```

```
*Are you satisfied with the backup of your system disk [YES]?
```

2. Press RETURN if your backups are current, or if you are installing for the first time. Otherwise, you should enter **N** to exit from VMSINSTAL, back up the fixed disk as described in the MicroVMS installation guide, and begin the installation procedure again.

3. If you pressed RETURN to continue, VMSINSTAL instructs you to mount the first volume of the set and asks if you are ready.

   • If you are installing from a magnetic tape cartridge, you will receive the following message and prompt:

   ```
   Please mount the first volume of the set on $TAPE1:
   Are you ready?
   ```

   Load the magnetic tape cartridge labeled VWS030 into the tape drive. Enter **Y** and press RETURN. The installation will proceed and you will not need to load a second tape cartridge.

   • If you are installing from diskettes, you will receive the following message and prompt:

   ```
   Please mount the first volume of the set on $FLOPPY1:
   Are you ready?
   ```

   a. Load the first diskette labeled "VWS030 1/6" into drive 1. (Note that the actual number of diskettes may vary with hardware. Installation may complete without prompting for all the provided diskettes. Do not be concerned if this occurs.) Enter **Y** and press RETURN. The installation will proceed until VMSINSTAL is ready for the next volume of the set. VMSINSTAL will prompt you to load the continuation volumes, until the last diskette has been loaded. For example:

   ```
   %BACKUP-I-READYREAD, mount volume 2 on $FLOPPY1: for reading.
   ```

   ```
   Enter "YES" when ready:
   ```

   b. Remove the first diskette from drive 1 and store it in its envelope. Load the workstation software diskette labeled "VWS030 2/5" into drive 1. Enter **Y** to indicate that the second diskette is ready to be processed. After the last diskette has been loaded, the installation will proceed.

4. VMSINSTAL begins the installation and displays a series of messages about the products being installed. You will need to respond to several prompts during the installation, to determine which (if any) programming languages will be included in the MicroVMS Workstation software.

    Enter **Y** in response to a prompt if you want the language installed; otherwise, simply press RETURN. After you have answered all the language prompts, VMSINSTAL lists the selected languages and prompts for verification.

    The following is an example of some of the messages you may receive:

```
%MOUNT-I-MOUNTED, VWS030  mounted on _DUA1:

The following products will be processed:

  VWS030 V3.0

        Beginning installation of VWS030 V3.0 at 10:08

%VMSINSTAL-I-RESTORE, Restoring product save set A...

    Installing MicroVMS Workstation Software - V3.0

  This installation can build description files for multiple
  languages.  These description files are needed when using the
  UIS programming interface.

  Please enter Yes or No if you want files built
  for the following languages:
```

*   BLISS [N]? Y `Ret`
*   CC [N]? `Ret`
*   FORTRAN [N]? Y `Ret`
*   MACRO [N]? Y `Ret`
*   PASCAL [N]? `Ret`
*   PLI [N]? `Ret`

```
  The following languages have been chosen:
    (BLISS,FORTRAN,MACRO)
```

* Is this OK [Y]? `Ret`

```
%VMSINSTAL-I-SYSDIR, This product creates system directory [SYSFONT]

  Installing the fonts for your system.

%VMSINSTAL-I-RESTORE, Restoring product saveset B...
%VMSINSTAL-I-MOVEFILES, Files will now be moved to their target directories
```

.
.
.

In this example, the user has chosen the BLISS, FORTRAN, and MACRO languages.

Note that the save set specified by the informational message "VMSINSTAL-I-RESTORE" may vary according to workstation type.

5. After the installation procedure has completed, the system will shut down automatically and issue appropriate messages.

```
Installation of MicroVMS Workstation Software V3.0
is now complete.

The VMS AUTOGEN procedure will now be automatically run so that
your SYSGEN parameters will be set, and your system will be properly
configured.  After that, your system will be automatically shut down.

When the shutdown is complete, press the RESTART button to reboot
the system.
%AUTOGEN-I-BEGIN, SAVPARAMS phase is beginning.
        .
        .
        .

SYSTEM SHUTDOWN COMPLETE---USE CONSOLE TO HALT SYSTEM
```
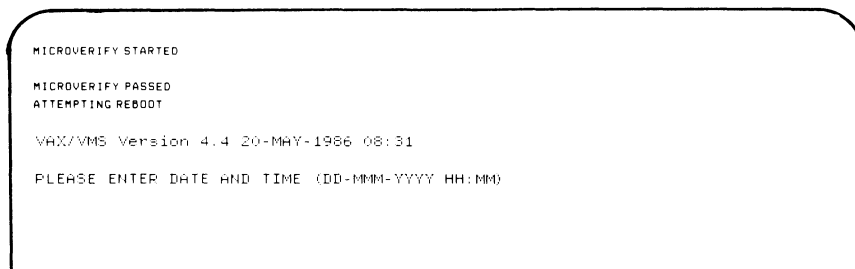
6. Remove the last diskette (or the tape cartridge) and store the distribution media.

7. You do not need to halt the system. Press the Restart button on the front control panel of the system unit; the system will reboot automatically.

If the system displays a date and time prompt, enter the current date and time in the format requested and press RETURN. Figure 1–1 illustrates the startup screen display with date-and-time prompt.

Figure 1–1   Screen Display Showing Date and Time Prompt


```
MICROVERIFY STARTED

MICROVERIFY PASSED
ATTEMPTING REBOOT

VAX/VMS Version 4.4 20-MAY-1986 08:31

PLEASE ENTER DATE AND TIME (DD-MMM-YYYY HH:MM)
```

ZK-4050-85

A series of startup messages appears, ending with a "job terminated" message. Then the screen display changes to a shaded area with a black pointer. Figure 1–2 shows the shaded screen and black pointer.

Figure 1–2   VAXstation Screen with Pointer
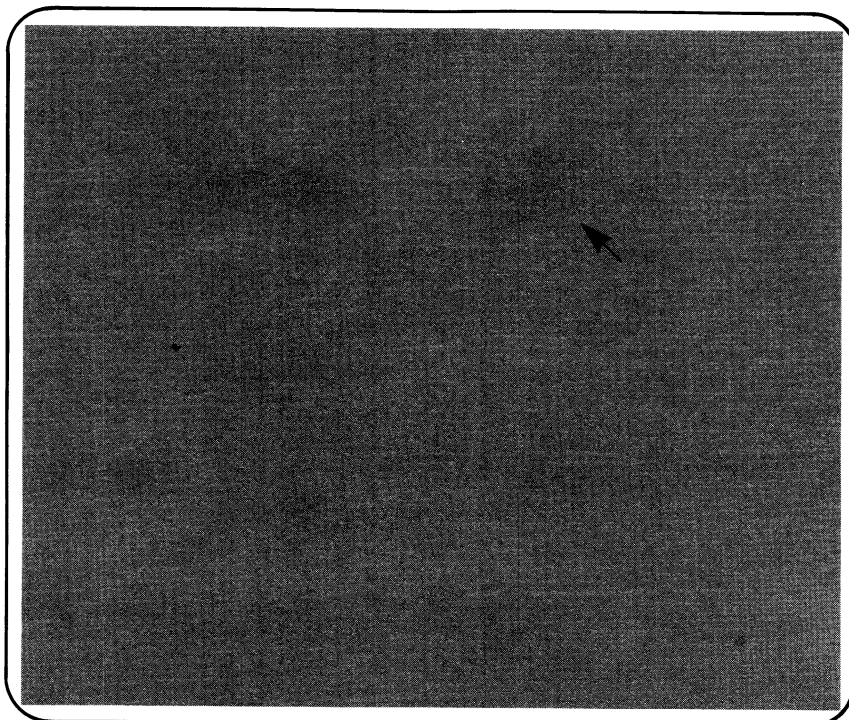
ZK-4051-85

NOTE: If you are starting up a color or intensity system and the system appears to be inactive following the "job terminated" message, you may need to press the F2 (operator window) key to change the screen display. Section 2.1 provides a detailed description of the operator window.

1.4 Where to Go from Here

Once you have the MicroVMS base system and the workstation software installed, see the *MicroVMS Workstation User's Guide* for essential information on using the workstation software.

After you have become familiar with the use of MicroVMS Workstation software, proceed to the *MicroVMS User's Manual*, which contains information about the rest of the MicroVMS operating system.

If you are the only user, or if you are the system manager for your VAXstation, read the sections of the *MicroVMS User's Manual* that discuss the setting up of accounts, startup and login procedures, backups, and disk management. If you have the DECnet option, you will also need to read the section on DECnet.

For information on tuning the MicroVMS Workstation software, see Chapter 2 of the *VWS Installation Guide*.

Chapter 2

VAXstation Management and Tuning

This chapter provides information on tuning the MicroVMS Workstation software. You will need to refer to this chapter, for example, when you perform tasks that require you to modify parameters of the VAX/VMS System Generation Utility (SYSGEN).

In addition, a section is included to describe the function of the operator window on the VAXstation. If you are the system manager of your VAXstation, or if you intend to perform tasks that will involve rebooting the system (such as modifications to some SYSGEN parameters), you will need to be familiar with the operator window.

2.1 The Operator Window

The operator window on the VAXstation, OPA0, serves as a viewport to both the console and the operator terminal device. When the MicroVMS system is halted, you can use the operator window to enter commands at the console prompt ($>>>$). When MicroVMS is running (but the workstation software is not), you can use the window to log in to OPA0. The operator window is dependent only on the MicroVMS base system and is different from the workstation software terminal emulator windows. It is not a full-function terminal.

The operator window appears in the top portion of the VAXstation screen, regardless of whether the workstation software is running. If you were to install MicroVMS without the workstation software, the entire screen would be dark and OPA0 would be your only means of logging in to the system.

2.1.1 Using the Operator Window

There are two instances in which you will see the operator window appear on your VAXstation screen:

- When you press the F2 function key.

  Pressing this key displays at the top of the screen any messages sent to the operator device (OPA0). For example, if you try to print on a remote device that is not accessible, the software sends a message to OPA0.

  To erase the operator display, press the F2 key again.

- When a message is sent to OPA0.

When a message is sent to OPA0 (for example, a device-offline error message), the operator window automatically appears; however, the keyboard does not automatically connect to it. The keyboard will connect to the operator window only if the display manager process has not yet been started.

Once you log in to OPA0, keyboard input will continue to be directed to it until you log out of that process.

You must always press the F2 key to erase the operator window display.

NOTE: It is possible to connect to the operator window even when it is not visible. If you need to halt the system and enter commands at the console prompt ($>>>$), you should be sure to press the F2 key *before* you press the Halt button. If you press the Halt button first, the F2 key is useless and the operator window may not appear. Since there is no screen activity, the system appears to be dead. However, any commands you issue still go to the console. To return the system to its normal screen activity, type C (for CONTINUE) and press RETURN.

2.1.2 Operator Window Functions on Color and Intensity Systems

The operation of the operator window is not the same on color and intensity systems as it is on the monochrome system. The following characteristics are peculiar to color and intensity systems:

- Writing or drawing to the screen does not continue while the operator window is present.

- When the system boots or crashes, the entire screen is used as the operator window. The windowing system will not come up until the startup procedure has completed.

  Note that because the operator window covers the entire monitor screen, the system may appear to be hung at startup or shutdown time. If a message is written to the operator window, the window remains on the screen until you press the F2 operator-window function key. Therefore, you may need to press

the F2 key to change the screen display after the installation is completed (the installation is complete when the "job terminated" message appears).

- The screen color changes when the operator window appears. To return the screen to its original colors, remove the operator window from the screen using the F2 operator-window) function key.

- The data in the operator window is lost when the operator window is removed from the screen.

2.2 Changing Window Memory Size

If your system crashes frequently, or if your processes are being deleted when you have a large number of windows on your screen, the problem may be that the amount of memory allocated for use by windows is insufficient.

You can change the window memory size to support more or fewer windows, as described in the following sections.

2.2.1 Monochrome Systems

On monochrome systems, the initial default value of 0.5 megabytes supports about 14 concurrent normal-sized (24-line) VT220 windows, or about 5 full-screen windows. (The number of windows possible varies according to their size.) Note that windows that are partially off the screen require twice as much window memory as those that are completely on the screen.

If you wish to increase window memory size, increase the value by 0.25 megabytes for each five additional VT220-size windows.

To change the default value, you must do the following:

1. Modify the command procedure SYS$MANAGER:STARTVWS.COM.

    This procedure includes a line that defines the logical name UIS$QVSS_POOL_SIZE, which specifies the default window memory size.

2. Increase the value of the System Generation Utility (SYSGEN) PAGEDYN parameter.

    When you increase window memory size, you must increase the value of the SYSGEN PAGEDYN parameter by the same amount.

3. Modify the file MODPARAMS.DAT to ensure that the PAGEDYN value will be maintained over different versions of MicroVMS.

4. Reboot the system as described in the installation guide for your base system.

The following sections describe the steps for modifying STARTVWS, PAGEDYN, and MODPARAMS.DAT.

2.2.1.1 Modifying STARTVWS.COM

Perform the following steps to modify the STARTVWS.COM procedure:

1. Create a terminal emulator window and log in to the SYSTEM account or a privileged user account.

2. Invoke the editor as follows:

   ```
   $ EDIT SYS$MANAGER:STARTVWS.COM
   ```

3. Search for the following line:

   ```
   $ if f$trnlnm("UIS$QVSS_POOL_SIZE") .eqs. "" then -
                            define uis$qvss_pool_size 'P1_POOL_SIZE_DEF
   ```

4. Replace the string "P1_POOL_SIZE_DEF" with the new value for window memory size.

5. Exit from the editor.

2.2.1.2 Increasing PAGEDYN

Perform the following steps to increase the value of PAGEDYN:

1. Create a terminal-emulator window and log in to the SYSTEM account or a privileged user account.

2. Enter the following commands:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SHOW PAGEDYN
```

Parameter Name	Current	Default	Minimum	Maximum	Unit	Dynamic
PAGEDYN	674819	190000	10240	-1	Bytes	

3. Note the value shown under the heading *Current*.

4. Add 250,000 to the current value of PAGEDYN for every 0.25 megabytes you added to window memory size.

5. Enter the result with a SET PAGEDYN command. For example, if you added 0.5 megabytes to window memory size and the current value of PAGEDYN is 674819, you would enter the following command:

   ```
   SYSGEN> SET PAGEDYN 924819
   ```

6. Enter a WRITE CURRENT command.

   ```
   SYSGEN> WRITE CURRENT
   ```

7. Exit from SYSGEN.

   ```
   SYSGEN> EXIT
   ```

The new values for window memory size and PAGEDYN will become current when the system is next rebooted.

2.2.1.3 Modifying MODPARAMS.DAT

Perform the following steps to modify MODPARAMS.DAT:

1. Invoke the editor as follows:

   `$ EDIT SYS$SYSTEM:MODPARAMS.DAT`

2. Move the cursor to the bottom of the file.

3. Add or modify the following line to specify the value you set using SYSGEN:

   `ADD_PAGEDYN= n`

4. Exit from the editor.

2.2.2 Intensity and Color Systems

On intensity and color systems, window memory is stored in permanent system global page file sections. Normal-sized windows (24 lines) require 12 global sections at 55 pages per global section. A full-screen window requires 32 global sections at 55 pages per global section.

The initial default value of 0.5 megabytes supports about 14 concurrent normal-sized (24-line) VT220 windows, or about 5 full-screen windows. (The number of windows possible varies according to their size.)

You can increase the number of windows supported by performing the following steps:

1. Modify the SYSGEN parameters GBLPAGES and GBLPAGFIL as follows:

   • Increase each parameter by 660 for each additional normal-sized window.

   • Increase each parameter by 1760 for each additional full-screen window.

2. Modify the SYSGEN parameter GBLSECTIONS as follows:

   • Increase by 12 for each additional normal-sized window.

   • Increase by 32 for each additional full-screen window.

3. Increase the SYSGEN parameter NPAGEDYN by 25000 for each additional window, regardless of window size.

4. Modify the SYSGEN parameter PAGEDYN as follows:

   • Increase by 30000 for each additional normal-sized window.

   • Increase by 40000 for each additional full-screen window.

5. Modify the file MODPARAMS.DAT to ensure that the new values will be maintained over different versions of MicroVMS.

6. Reboot the system as described in the installation guide for your base system.

The following sections describe the steps for modifying the SYSGEN parameters and MODPARAMS.DAT.

2.2.2.1 Modifying the SYSGEN Parameters

Perform the following steps to modify GBLPAGES and GBLPAGFILE:

1. Create a terminal-emulator window and log in to the SYSTEM account or a privileged user account.

2. Enter the following commands to invoke SYSGEN and determine the values of GBLPAGES and GBLPAGFIL:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> USE CURRENT
SYSGEN> SHOW GBLPAGES
Parameter Name    Current   Default   Minimum   Maximum Unit  Dynamic
--------------    -------   -------   -------   ------- ----   -------
GBLPAGES             6000      4096       512        -1 Pages
SYSGEN>  SHOW GBLPAGFIL
Parameter Name    Current   Default   Minimum   Maximum Unit  Dynamic
--------------    -------   -------   -------   ------- ----   -------
GBLPAGFIL            2800      1024       128        -1 Pages
```

3. Note the value shown under the heading *Current*.

4. Add 660 (for each additional normal-sized window) to the current values of GBLPAGES and GBLPAGFIL, and enter the results with a SET command for each parameter.

    For example, to support two additional normal-sized windows, you would enter the following commands:

    ```
    SYSGEN> SET GBLPAGES 7320
    SYSGEN> SET GBLPAGFIL 4120
    ```

5. Enter the following command to determine the value of GBLSECTIONS:

```
SYSGEN>  SHOW GBLSECTIONS
Parameter Name    Current   Default   Minimum   Maximum Unit  Dynamic
--------------    -------   -------   -------   ------- ----   -------
GBLSECTIONS           190       128        20      4095 Sections
```

6. Note the value shown under the heading *Current*.

7. Add 12 (for each additional normal-sized window) to the current value of GBLSECTIONS and enter the result with a SET command.

For example, to support two additional normal-sized windows, you would enter the following command:

```
SYSGEN> SET GBLSECTIONS 214
```

8. Enter the following command to determine the value of NPAGEDYN:

```
SYSGEN> SHOW NPAGEDYN
Parameter Name     Current   Default   Minimum   Maximum Unit  Dynamic
--------------     -------   -------   -------   ------- ----  -------
NPAGEDYN           616448    190000    10240         -1 Bytes
```

A display appears.

9. Note the value shown under the heading *Current*.

10. Add 25000 to the current value of NPAGEDYN for each additional window and enter the result with a SET command.

For example, to support two additional normal-sized windows, you would enter the following command:

```
SYSGEN> SET NPAGEDYN 666448
```

11. Enter the following command to determine the value of PAGEDYN:

```
SYSGEN> SHOW PAGEDYN
Parameter Name     Current   Default   Minimum   Maximum Unit  Dynamic
--------------     -------   -------   -------   ------- ----  -------
PAGEDYN            674819    190000    10240         -1 Bytes
```

A display appears.

12. Note the value shown under the heading *Current*.

13. Add 30000 to the current value of PAGEDYN for each additional normal-sized window and enter the result with a SET command.

For example, to support two additional normal-sized windows, you would enter the following command:

```
SYSGEN> SET PAGEDYN 734819
```

14. Enter a WRITE CURRENT command to ensure that the new values will be maintained after reboot.

```
SYSGEN> WRITE CURRENT
```

15. Exit from SYSGEN.

```
SYSGEN> EXIT
```

The new values for window memory size and PAGEDYN will become current when the system is next rebooted.

2.2.2.2 Modifying MODPARAMS.DAT

Perform the following steps to modify MODPARAMS.DAT:

1. Invoke the editor as follows:

    $ EDIT SYS$SYSTEM:MODPARAMS.DAT

2. Move the cursor to the bottom of the file.

3. Add or modify the following lines to specify the value you set using SYSGEN:

    ```
    ADD_GBLPAGES= n
    ADD_GBLPAGFIL= n
    ADD_GBLSECTIONS= n
    ADD_NPAGEDYN= n
    ADD_PAGEDYN= n
    ```

4. Exit from the editor.

2.3 Increasing SYSGEN CHANNELCNT Parameter

A channel is assigned to the MicroVMS Workstation driver whenever a pointer region, button region, or cursor region is created. In addition, a channel is assigned for every window created on the color or intensity system.

If your application programs create large numbers of regions or large numbers of windows, raise the System Generation Utility (SYSGEN) parameter CHANNELCNT appropriately and reboot the system.

By default, the MicroVMS Workstation software adds 175 to the CHANNELCNT parameter.

2.4 Setting Process Quotas

The following sections explain how the process quotas for BIOLM, DIOLM, and ASTLM should be set for your workstation.

2.4.1 BIOLM and DIOLM Quotas for VAXstation II/GPX Systems

If the direct I/O limit (DIOLM) and buffered I/O limit (BIOLM) process quotas are set incorrectly, the process could BUGCHECK, or the system could hang or crash.

The DIOLM quota for every process on the system must be set to a minimum of 100. The easiest way to do this is to invoke the Authorize Utility and modify all records using a wildcard character as follows:

`UAF> MODIFY * /DIOLM=100`

In addition, the buffered I/O count limit (BIOLM) quota must be modified. The recommended value for this quota is 100. Again, using a wildcard character in the MODIFY command to modify all the records in your authorization file is the easiest way to set this quota for all users. The recommended value of 100 allows a process to create approximately 40 windows. The algorithm you should use to determine how much BIOLM is needed for the process is as follows:

`16 + (2 * maximum number of windows created by the process).`

During installation of the VWS software, the SYSGEN parameters PQL_MDIOLM and PQL_MBIOLM are each set by AUTOGEN to a value of 100. Therefore, modifying the UAF records is now optional, as the values in the UAF records are automatically maximized with these SYSGEN parameters during process creation.

However, DIGITAL recommends that you still modify these fields in the UAF records for consistency.

2.4.2 ASTLM Quota for VAXstation II and VAXstation II/GPX Systems

If the AST limit (ASTLM) process quota is set incorrectly, the process could BUGCHECK, or the system could hang or crash. To avoid these problems, set your AST limit to 325.

When AUTOGEN is run during installation of VWS, the SYSGEN parameter PQL_MASTLM is set to a value of 325.

2.5   Adding User-Defined Fonts to the Workstation

The default workstation parameters allow for up to eight additional (user-defined) font files. You can add more than eight fonts to the workstation, but you may need to adjust certain system parameters in order to provide sufficient system resources.

This section explains how to install a font and how to tune the system according to the type of font installation you choose.

The MicroVMS Workstation software allows you to add your own font files in any of the following ways:

- As a process-based font—You can simply place the font in the directory SYS$FONT and invoke it from applications as needed.

  If more than eight user-defined fonts are in use on the system, you will need to increase the section count for the process (SYSGEN parameter PROCSECTCNT) and the open-file limit (process quota FILLM).

- As a shareable process-based font—You can use the VAX/VMS Install Utility (INSTALL) to enable the font as a shareable image. This will improve performance when the font is called from a program and will not count against PROCSECTCNT or FILLM. However, you will need to increase the SYSGEN parameters GBLPAGES and GBLSECTIONS.

- As a system font—You can use the workstation Font Utility to load the font into the *system font list* (list of fonts that use system paged pool). You may want to do this if you use the font on a regular basis, as you will gain enhanced performance. The system font does not count against PROCSECTCNT or FILLM. However, you will need to increase the value of PAGEDYN to allow for sufficient memory in paged pool.

  Once you have added a font to the system list, the only way to remove it is by rebooting the system.

  Note that if a font is to be used from kernel mode, it *must* be loaded into the system list.

To determine which method of installing user-defined fonts is best for you, you will need to consider the advantages and disadvantages of each. Tables 2–1, 2–2, and 2–3 summarize each method in terms of ease of use and system resource requirements.

Table 2-1   Process-Based Font

Advantages	Disadvantages
Easy to use as it does not require extensive setup	Counts as an open file
Eight font files supported without modification to system parameters	

Table 2-2   Shareable Process-Based Font

Advantages	Disadvantages
Faster loading time when called from an application	Requires more setup procedures
Does not count as an open file	Uses global sections and global pages

Table 2-3   System Font

Advantages	Disadvantages
Fastest loading time when called from an application	Most complicated setup
Font is loaded once and remains loaded	Uses paged pool
Does not count as an open file	
Font is shared (because it is in the system)	

Regardless of how you decide to use the font file, you must first compile it with the Font Utility. Note that you must have the MACRO assembler installed on your system, as the Font Utility uses MACRO to perform the compile operation. In addition, the Font Utility requires CMKRNL privilege.

The following sections describe the procedures for compiling the font file and tuning the system parameters to allow for additional fonts.

2.5.1 Compiling a Font File

Use the following procedure to compile a font:

1. Copy the font file into the directory SYS$FONT.

2. Invoke the Font Utility and enter the COMPILE command as in the following example:

    ```
    $ RUN SYS$FONT:UISFONTS
    Font Utility> COMPILE X
    $
    ```

The Font Utility assumes a default file type of FNT. If your file is named X.FNT, you only need to specify X.

The Font Utility exits automatically after compiling the specified file. The resulting (compiled) file will be an executable image with one of the following file types, depending on workstation type:

*   VWS$FONT—for monochrome systems.

    If the source file was named X.FNT, the image will be named X.VWS$FONT.

*   VWS$VAFONT—for color and intensity systems.

    If the source file was named X.FNT, the image will be named X.VWS$VAFONT.

2.5.2 Using a Font from Within Your Process

Using a process-based font requires no installation steps other than copying the file into SYS$FONT and compiling it. Once you have performed these steps, you can call the font from an application. However, if the total number of user-defined fonts on the system is greater than eight, you may need to increase the values of the SYSGEN parameter PROCSECTCNT and the process quota FILLM.

For example, if you are adding two user-defined fonts (beyond the eight allowed by the workstation software), perform the following steps:

1. Edit the file SYS$SYSTEM:MODPARAMS.DAT to modify PROCSECTCNT. For example:

    ```
    $ EDIT SYS$SYSTEM:MODPARAMS.DAT
    ```

2. Move the cursor to the bottom of the file.

3. Add or modify the following line to increase the value of PROCSECTCNT by 4 for each font you are adding to the system:

    ```
    ADD_PROCSECTCNT= 8
    ```

4. Exit from the editor.

5. Enter the following DCL command to determine the open-file quota for your account:

```
$ SHOW PROCESS/QUOTA

28-MAY-1986 11:04:12.85   WTA1:                User: WORKERBEE

Process Quotas:
 Account name:
 CPU limit:                         Infinite  Direct I/O limit:          18
 Buffered I/O byte count quota:        20480  Buffered I/O limit:        18
 Timer queue entry quota:                 20  Open file quota:           20
 Paging file quota:                     8843  Subprocess quota:          10
 Default page fault cluster:              16  AST limit:                 22
 Enqueue quota:                           30  Shared file limit:          0
 Max detached processes:                   0  Max active jobs:            0
```

6. Increase the open file quota by 1 for each additional font, using the VAX/VMS Authorize Utility (AUTHORIZE).

   For example, if your current open-file quota is 20 and you have two additional fonts, you would enter the following commands:

```
$ SET DEFAULT SYS$SYSTEM:
$ RUN AUTHORIZE
UAF> MODIFY WORKERBEE/FILLM=22
%UAF-I-MDFYMSG, user record(s) updated
UAF> EXIT
%UAF-I-DONEMSG, system authorization file modified
%UAF-I-NAFNOMODS, no modifications made to network authorization file
%UAF-I-RDBNOMODS, no modifications made to rights database
$
```

7. Perform an orderly shutdown to reboot the system, as described in the installation guide for your base system.

2.5.3 Using a Shareable Process-Based Font

Once you have copied the font file into SYS$FONT and compiled it, you have the option of installing the font as an image to be shared by programs. You invoke the font in the same way as you would for a font that is not shared, but the file is read into memory more quickly.

The following sections describe how to install the shareable font and tune the system accordingly.

2.5.3.1 Installing a Shareable Process-Based Font

Use the following procedure to install a font as a shareable image:

1. Invoke the VAX/VMS Install Utility (INSTALL) with the following command:

    ```
    $ RUN SYS$SYSTEM:INSTALL
    INSTALL>
    ```

2. At the INSTALL> prompt, enter the file name as in the following examples.

    *   For monochrome systems:

        ```
        INSTALL> SYS$FONT:X.VWS$FONT/OPEN/HEADER_RESIDENT/SHARE
        ```

    *   For intensity and color systems:

        ```
        INSTALL> SYS$FONT:X.VWS$VAFONT/OPEN/HEADER_RESIDENT/SHARE
        ```

3. Press CTRL/Z to exit from the Install Utility.

    ```
    INSTALL>  CTRL/Z
    $
    ```

2.5.3.2 Tuning the System for Shareable Fonts

If the total number of user-defined fonts on the system is greater than eight, you will need to increase the values of the SYSGEN parameters GBLPAGES and GBLSECTIONS.

Perform the following steps to modify GBLPAGES and GBLSECTIONS:

1. Use the DCL command DIRECTORY/SIZE to determine the block size of the font files.

    For Example:

    ```
    $ DIRECTORY/SIZE SYS$FONT:X,Y
    X.VWS$FONT;1                   11
    Y.VWS$FONT;1                   15
    ```

    In this example, the total number of blocks is 26.

2. Edit the file SYS$SYSTEM:MODPARAMS.DAT to modify GBLPAGES and GBLSECTIONS. For example:

    ```
    $ EDIT SYS$SYSTEM:MODPARAMS.DAT
    ```

3. Move the cursor to the bottom of the file.

4. Add or modify the appropriate lines to increase GBLPAGES by the total number of additional font blocks, and GBLSECTIONS by 4 for each additional font. For example:

    ```
    ADD_GBLPAGES= 26
    ADD_GBLSECTIONS= 8
    ```

5. Exit from the editor.

6. Perform an orderly shutdown to reboot the system, as described in the installation guide for your base system.

2.5.4 Using a System-List Font

After you have compiled the font, you can include it in the system list by using the workstation Font Utility.

Note that each font you add to the system list requires 512 bytes of paged pool for every block. (For example, if the size of the font file is 10 blocks, the font requires 5120 bytes of paged pool.) If you only need to access a user-defined font from one process at a time, the amount of available paged pool should be sufficient.

The following sections describe how to place the font into the system list and increase the amount of system paged pool.

2.5.4.1 Loading a System Font

You can load a font into the system list by using the following procedure:

1. Invoke the Font Utility as follows:

    ```
    $ RUN SYS$FONT:UISFONTS
    Font Utility>
    ```

2. At the Font Utility> prompt, enter the load command.

    ```
    Font Utility> LOAD X
    Font Utility>
    ```

    You do not need to specify a directory or file type. The Font Utility assumes the default directory SYS$FONT and looks for the default type of VWS$FONT (for monochrome systems) or VWS$VAFONT (for color and intensity systems).

    The Font Utility prompt appears when the load operation is completed.

3. Press CTRL/Z to exit from the utility.

    ```
    Font Utility> CTRL/Z
    $
    ```

2.5.4.2 Tuning the System for System-List Fonts

In order to add the appropriate amount of paged pool to your system, you need to modify the value of the SYSGEN parameter PAGEDYN. Use the following procedure:

1. Enter the DCL command DIRECTORY/SIZE to determine the size of the font files.

   For Example:
   ```
   $ DIRECTORY/SIZE SYS$FONT:X,Y
   X.VWS$FONT;1                    11
   Y.VWS$FONT;1                    15
   ```

2. To determine the byte value by which you need to increase paged pool, multiply the size (number of blocks) of each additional font file by 512 and add the results.

   For example, if X.VWS$FONT is 11 blocks and Y.VWS$FONT is 15 blocks, add 5632 and 7680. You need a total of 13,312 bytes of additional paged pool.

3. Edit the file SYS$SYSTEM:MODPARAMS.DAT to modify PAGEDYN. For example:
   ```
   $ EDIT SYS$SYSTEM:MODPARAMS.DAT
   ```

4. Move the cursor to the bottom of the file.

5. Add or modify the following line to specify the value you need to add to paged pool. For example:
   ```
   ADD_PAGEDYN= 13312
   ```

6. Exit from the editor.

7. Perform an orderly shutdown to reboot the system, as described in the installation guide for your base system.

Appendix A

Files Installed by MicroVMS Workstation Software

The following files are installed with the workstation software:

    SYS$SYSROOT:[SYSEXE]CSDRIVER.EXE
    SYS$SYSROOT:[SYSEXE]TKDRIVER.EXE
    SYS$SYSROOT:[SYSEXE]UISBG.EXE
    SYS$SYSROOT:[SYSEXE]UISHELP.EXE
    SYS$SYSROOT:[SYSEXE]UISLOA.EXE
    SYS$SYSROOT:[SYSEXE]UISLOASYM.STB
    SYS$SYSROOT:[SYSEXE]UISMEMFONTS.COM
    SYS$SYSROOT:[SYSEXE]UISSTRUCT.STB
    SYS$SYSROOT:[SYSEXE]VADRIVER.EXE
    SYS$SYSROOT:[SYSEXE]VCDRIVER.EXE
    SYS$SYSROOT:[SYSEXE]WTDRIVER.EXE
    SYS$SYSROOT:[SYSEXE]WTDRIVER.STB
    SYS$SYSROOT:[SYSLIB]VWSSYSDEF.*
    SYS$SYSROOT:[SYSLIB]UISENTRY.*
    SYS$SYSROOT:[SYSLIB]UISKEYBOARD.TLB
    SYS$SYSROOT:[SYSLIB]UISSHR.EXE
    SYS$SYSROOT:[SYSLIB]UISUSRDEF.*
    SYS$SYSROOT:[SYSHLP]UISHELP.HLB
    SYS$SYSROOT:[SYSMGR]STARTVWS.COM
    SYS$SYSROOT:[SYSMSG]UISBG.DAT
    SYS$SYSROOT:[SYSMSG]UISBGMSG.EXE
    SYS$SYSROOT:[SYSMSG]UISMSGLOA.EXE

Note that the file SYS$SYSROOT:[SYSEXE]UISSETUP.DAT is recreated each time the system is re-installed. The result of this recreation is that the Workstation Setup options are reset to their original default values. Therefore, you may need to reset any site-specific setup attributes.

The files SYS$LIBRARY:DEBUG.EXE and SYS$LIBRARY:TRACE.EXE must also be installed if you intend to debug programs that use the UIS programming interface. The reason for this requirement is that the window management services are implemented as a privileged shareable image, and MicroVMS requires that all shareable images used with privileged shareable images be included in the installed file list. You can modify the installed file list by editing the SYS$MANAGER:SYSTARTUP.COM procedure and adding the following lines:

```
$ RUN SYS$SYSTEM:INSTALL
SYS$LIBRARY:DEBUG
SYS$LIBRARY:TRACE
```

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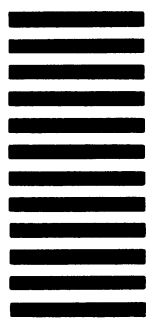
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