HP Utilities for the Vectra

Note

This manual documents utilities, except for disc caching, for MS-DOS 3.3 and 4.0. If you are using disc cache with MS-DOS 3.3, see the *HP Vectra Disc Cache Program* manual. If you are using disc cache with MS-DOS 4.0, see the documentation that comes with the MS-DOS 4.0 software.

However, if you are NOT using the MS-DOS operating system, do not install any of the utilities in the *HP Utilities* packet. Instead, return to your *System Assembly Guide* and follow the instructions there.

HP Part No. 5959-9852
Printed in Singapore March 1989

Edition 1
E0389

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

Notice

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Hewlett-Packard assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Hewlett-Packard.

Personal Computer Group
974 E. Arques Avenue
P.O. Box 486
Sunnyvale, CA 94086, USA

Printing History

March 1989 Printed in Singapore

Contents

1

Introduction to HP Vectra Utilities

Before You Install the Utilities

Before you install any of the utilities in the *HP Vectra Utilities* pack, you must already have done five things:

1. You should have set up and connected your computer as described in the *Setting Up Your Vectra* manual. This includes running the SETUP program.
2. You should have partitioned your hard disc.
3. You should have installed your MS-DOS operating system.
4. You should update your keyboard driver ONLY if you have:
   - a non-U.S. keyboard

   AND
   - an RS/20C, RS/25C, or a QS/16S

   AND
   - MS-DOS version 3.3 revision C.01.01.

   To update the keyboard driver for MS-DOS version 3.3 revision C.01.01, insert the Vectra SETUP and Utilities Program Disc in drive A and type

   ```
   REPLACE A:KEYB.COM  C:\  /S
   ```

   and press Enter.

5. You should have copied the SETUP program onto your hard disc from the Vectra SETUP and Utilities Program Disc by typing

```
COPY  A:SETUP.EXE  C:\
```

and pressing Enter.

Installing Your Utilities

Your Vectra SETUP and Utilities Program Disc may contain a READ.ME file that contains up-to-date information about your HP Utilities. You should read this file before you install your utilities by typing:

```
TYPE A:\READ.ME | MORE
```

and pressing Enter (in this example, we assumed that you put the Vectra Set up and Utilities Program Disc in the A: drive). Write down any needed information that appears on the screen, or turn on your printer and print the entire READ.ME file.

To install an HP utility, refer to its particular installation chapter in this manual for detailed instructions.

Note

Depending on what Vectra model you have, your *HP Utilities* packet may contain some or all of the utility manuals mentioned in this section.

You should install the utilities in this order:

1. 3.5 in. Disc Drive Software
2. HPMODE Command
3. HP-HIL Pointing Device Driver
4. HP Expanded Memory Manager Program/386 (should NOT be used with Vectra ES and ES/12 models)
5. HP Vectra Disc Cache Program. (If you are using disc cache with MS-DOS 3.3, see the *HP Vectra Disc Cache Program* manual. If you are using disc cache with MS-DOS 4.0, see the documentation that comes with the MS-DOS 4.0 software.)

What's Next?

You have finished installing your HP Utilities. Next, you should return to your *System Assembly Guide* and follow the instructions there.

2

3.5-Inch Disc Drive Software Driver Installation

Do I Need this Driver?

If you are using the MS-DOS operating system and want to be able to exchange information on double-sided discs used in the **HP 110,** the **HP Portable PLUS,** the **HP 150,** the **HP 150II** or HP Vectra **external** 3.5-inch flexible disc drives, you need to install the driver.

If you do not wish to exchange data on discs used in the above devices, then you do not need to install the driver and may skip these instructions.

Requirements

- These instructions apply to those users that have an HP Vectra system with a factory-installed 3.5-inch internal flexible disc drive installed in either the computer's top drive slot (called Drive A:), or the second drive slot down (called Drive B:).
- You must have already installed the MS-DOS operating system on your computer's hard disc.

Installation

There are two ways to install the driver for the 3.5-inch flexible disc drive.

If your 3.5-inch flexible disc drive is in the topmost drive slot of your computer, go to the section "Instructions for a 3.5-inch Drive A:" and begin reading.

If your 3.5-inch flexible disc drive is in the second drive slot down in your computer, go to the section "Instructions for a 3.5-inch Drive B:" and begin reading.

Instructions for a 3.5-inch Drive A:

If your drive is installed in the topmost drive slot of your computer (as Drive A:), follow these steps to install the driver on your hard disc.

1. Turn on the display and the computer. Make sure the MS-DOS prompt or the PAM (Personal Applications Manager) main menu is displayed.
2. Insert the disc labeled *SETUP and Utilities Disc* into drive A:.
3. At the MS-DOS prompt, type

   ```
   COPY A:INDSKBIO.* C:\
   ```

   and press Enter.
4. Remove the *SETUP and Utilities Disc.*
5. For your own protection, if you have a CONFIG.SYS file, make a backup copy of your CONFIG.SYS file called CONFIG.OLD.

   Type

   ```
   COPY CONFIG.SYS CONFIG.OLD
   ```

   and press Enter.
6. At the MS-DOS prompt, type:

   ```
   COPY CONFIG.SYS + CON CONFIG.SYS
   ```

   and press Enter. The following will be displayed.

   ```
   CONFIG.SYS
   CON
   ```

7. Type:

```
DRIVPARM=/D:0 /F:7 /T:80 /S:18 /H:2 /C
DEVICE=\INDSKBIO.SYS /D:0
```

8. When you have finished entering the lines, hold down Ctrl and press Z once. You will see ^Z also displayed on the screen.

9. Then press Enter. You should see the message:

```
1 File(s) copied
```

   Your new CONFIG.SYS file has been created.

10. Reset your computer by holding down Ctrl and pressing Alt and Del at the same. After you have used your drive successfully, delete the CONFIG.OLD file you created.

11. Refer to your MS-DOS *User's Reference* for information on how to format your flexible discs.

Note

To exchange data on discs formatted in the **HP 110** and **HP Portable PLUS** computers, change the `DEVICE=\INDSKBIO.SYS /D:0` line in your CONFIG.SYS file to:

```
DEVICE=\INDSKBIO.SYS /D:0 /HP110
```

Instructions for a 3.5-inch Drive B:

If your drive is installed in the second drive slot down (as Drive B:), follow these instructions to install the driver on you hard disc.

1. Turn on the display and the computer. Make sure the MS-DOS prompt or the PAM (Personal Applications Manager) main menu is displayed.
2. Insert the disc labeled *SETUP and Utilities Disc* into drive A: and turn the drive lever down.
3. At the MS-DOS prompt, type

   ```
   A:35INSTAL
   ```

   and press Enter.
4. Press the appropriate key for your language.
5. Follow the instructions on your screen. When the installation is complete continue with step 6.
6. Remove the *SETUP and Utilities Disc.*
7. Hold down Ctrl and Alt, and press Del to reset your computer and install the 3.5-inch flexible disc driver.
8. Refer to your MS-DOS *User's Reference* for information on how to format your flexible discs.

Note

To exchange data on discs formatted in the **HP 110** and **HP Portable PLUS** computers, change the `DEVICE=\INDSKBIO.SYS /D:1` line in your CONFIG.SYS file to:

```
DEVICE=\INDSKBIO.SYS /D:1 /HP110
```

Sharing Data with Computers that Use 3.5-Inch Discs

With the HP 3.5-inch internal flexible disc drive and its software driver installed in an HP Vectra personal computer using MS-DOS 3.2 version B.01.02 or later, you can share data with 3.5-inch discs of other HP and IBM personal computers as indicated in Table 2-1.

Note

You may not use single-sided discs, or discs formatted as single-sided in the 3.5-inch internal flexible disc drive for any reason.

Table 2-1. 3.5-inch Disc Exchange Chart

Computer	Black HP Discs 1.44 MB Format	Gray HP Discs 720 KB IBM Format	Gray HP Discs 710 KB HP Format
HP 110	NO	NO	YES[1]
HP Portable PLUS	NO	YES	YES[1]
HP 150 and **HP 150II**	YES[2]	YES	YES[3]
HP Vectra using 3.5-inch internal drive	YES	YES[4]	YES[1,3]
HP Vectra using 3.5-inch external drives	YES[2]	YES[5]	YES[6]
IBM PC, XT or AT	YES	YES	NO
IBM PS/2	YES	YES	NO

1. For HP 110 and Portable PLUS data exchange, `/HP110` parameter must be in HP Vectra's CONFIG.SYS file.
2. You must have either an HP 9122C or HP 9153C external disc drive.
3. To format these discs in an HP Vectra, use the FOR150 command.
4. `/n:9` and `/t:80` parameters must be specified in format command.
5. The HP 9122D will read and write, but CANNOT format discs to this format.
6. To format these discs, use HPFORMAT utility that came with external disc drive.

3

Vectra Software Utility: HPMODE Command

What is the HPMODE Command?

The HPMODE command is an MS-DOS command that:

- allows computers that support multiple speed operation (such as the HP Vectra ES/12, and all HP Vectra RS/QS personal computers) to temporarily change SPU speed. This command is used best in a batch file to run applications that require the computer to run at a lower speed.
- allows HP Vectra RS/20C and RS/25C PC memory cache to be temporarily disabled. HP Vectra systems are shipped with memory cache enabled. If required, you can disable memory cache using HPMODE.

Information on installing HPMODE, using HPMODE to change SPU speed, and using HPMODE to disable/enable memory cache is given in the sections below.

Installing HPMODE

The most effective way to use the HPMODE command is to copy it to your MS-DOS work disc. Therefore, before you begin, you must have created a work copy of MS -DOS on either your hard disc or separate flexible disc(s) as described in your MS-DOS manual.

After you've done so, follow the instructions below (commands that you type are in "computer" type).

1. Start your computer into PAM or MS-DOS.
2. Get the **Vectra SETUP and Utilities Program Disc** (located at the back of your computer's *Setting Up Vectra* binder), place it in drive A: and type:

   ```
   A:
   ```

   and press Enter.
3. Do whichever applies to you.

   - If you have a **hard disc,** type:

     ```
     COPY A:HPMODE.*  C:
     ```

     and press Enter.
   - If you **don't have a hard disc, but have more than one flexible disc drive,** place your non-write protected MS-DOS work disc in drive B: (*see note*) and type:

     ```
     COPY A:HPMODE.*  B:
     ```

     and press Enter.

Note

If drive B: is not the same capacity or size as your work disc, copy the HPMODE command to a separate disc in drive B: first. Then, copy the command from the disc in drive B: to your MS-DOS work disc in drive A:.

   - If you have **one disc drive ONLY,** type:

     ```
     COPY A:HPMODE.*  B:
     ```

     and press Enter. When prompted for another disc, place your non-write protected MS-DOS work disc into drive A: and press Enter.

This copies the HPMODE command onto your work disc.

Using HPMODE to Change SPU Speed

The HPMODE command allows you to change the computer's speed during a work session. (Note that HP Vectra computers that support multiple speeds come preset from the factory to run at their highest speed.) You can either issue this command from MS-DOS, or have it issued automatically in a batch file when you start an application that requires a lower computer speed.

It would be necessary to set your computer to operate at a lower speed with the HPMODE command if you are:

- using an application that needs to run at a lower computer speed when it is started, such as some copy-protected software, or
- using an application that needs to run at a lower computer speed all the time, such as communications programs and games.

In the above cases, it is best to place the HPMODE command in a batch file that lowers the computer's speed, starts the application, and resets the computer's speed back to normal when the application is exited. Instructions for doing this are included in the following sections.

Syntax for Using the Command

The following is the syntax you should use when issuing the HPMODE command to change SPU speed. Note that the command is entered at the MS-DOS prompt, and that parameters enclosed in brackets ("[" and "]") are optional.

To change the computer speed, type

```
[<d>:][<path>]HPMODE SPEED [<s>]
```

where

<d>:	=	the drive that contains the HPMODE command.
<path>	=	the path to the HPMODE command.
<s>	=	the computer speed. Valid values are the words **LOW**, **HIGH**, and, if you have an RS/20C or RS/25C, **MEDIUM**. If you do not specify a computer speed, the current setting is displayed.

Note: The first three letters are all that is required for a parameter, for example `SPE` for speed, `HIG` for high, or `MED` for medium.

Some Examples

To change the computer's speed from high (the default) to low, the following is entered from the MS-DOS prompt:

```
HPMODE SPEED LOW
```

To change from low to high, enter:

```
HPMODE SPEED HIGH
```

To change from high to medium, enter:

```
HPMODE SPEED MEDIUM
```

To display the current computer speed (its numeric value), enter:

```
HPMODE SPEED
```

Note

On the RS/20C and RS/25C, entering the `LOW` or `MEDIUM` command also temporarily sets the alternate (lower) speed initially set in the SETUP program to low or medium.

Example: If you initially set the alternate speed in the SETUP program as medium, Ctrl Alt \ toggles between high and medium. Then, if you use the command `HPMODE SPEED LOW`, the alternate speed will be set to low and Ctrl Alt \ will toggle between high and low. To again toggle between high and medium, give the command `HPMODE SPEED MEDIUM` (or reset or restart the system).

Setting the Speed When Starting an Application

The best use of the HPMODE command is to put it in a batch file along with the name of the application that needs to run at a slower speed. For example, a batch file called BATCH1.BAT could include:

```
HPMODE SPEED LOW
123.EXE
HPMODE SPEED HIGH
```

where `HPMODE SPEED LOW` sets computer to low speed operation, `123.EXE` is the command that starts the application, and `HPMODE SPEED HIGH` resets the computer to high speed operation upon exiting the application. This batch file can then be issued from MS-DOS by entering the following at the MS-DOS prompt:

```
BATCH1
```

Changing Speeds Within an Application

Since some applications (for example, Lotus^{R} 1-2-3^{R}) only require the computer to be set to low speed when the application is being started, after it has been started you can then use a special key sequence to increase the processing speed of the application.

Note

For Lotus^{R} 1-2-3^{R} versions prior to 2.0, low speed is valid. Later versions require low speed only during hard disc installation, or if you are operating the application from a flexible disc.

On HP Vectra computers made for the U.S., holding down CTRL and pressing Alt and \ keys at the same time (then releasing all three keys) will toggle the computer speed between the lower speed and high. If you have a non-U.S. computer this key sequence may differ; refer to the table that follows or the *Learning About the HP Vectra Computer and Keyboard* manual in your *Setting Up Vectra* binder.

Note

RS/20C and RS/25C users can toggle between high and medium or high and low. (See note above under "Some Examples".)

Switching Speeds with Non-U.S. Keyboards

For most non-U.S. keyboards, refer to the table below.

Table 3-1. Switching Computer Speed on Non-U.S. Keyboards

Keyboard	Key Sequence
Belgian	Ctrl Alt μ
Danish	Ctrl Alt '
French	Ctrl Alt *
French Canadian	Ctrl Alt }
German	Alt Strg #
Italian	Ctrl Alt ù
Norwegian	Ctrl Alt '
Spanish	Control Alt Ç
Swedish / Finnish	Ctrl Alt '
Swiss	Ctrl Alt $
U.K./English	Ctrl Alt #

Using HPMODE to Disable/Enable Memory Cache

The HPMODE command allows you to disable memory cache during a work session. Memory cache, and thus this option, is available on RS/20C and RS/25C machines only. Cache memory is dedicated RAM, and is used to speed up memory access. Memory cache is preset at the factory in the *on* position. If you are using an application for which you need to disable cache memory, you can issue this command from MS-DOS. You can enable memory cache again by resetting or restarting the system, or using the HPMODE command.

Syntax for Using the Command

The following is the syntax you should use when issuing the HPMODE command to disable/enable memory cache. Note that the command is entered at the MS-DOS prompt, and that parameters enclosed in brackets ("[" and "]") are optional.

To enable/disable memory cache, type

```
[<d>:][<path>] HPMODE MEMCACHE [x]
```

where

<d>	=	the drive that contains the HPMODE command.
<path>	=	the path to the HPMODE command.
<x:>	=	Valid values are the words **ON**, and **OFF**. If you do not specify on or off, the current setting is displayed.

For the parameter **MEMCACHE**, the first three letters **MEM** is all that is required.

Some Examples

To disable memory cache, the following is entered from the MS-DOS prompt:

```
HPMODE MEMCACHE OFF
```

To enable memory cache:

```
HPMODE MEMCACHE ON
```

To display the current setting, enter:

```
HPMODE MEMCACHE
```

4

The HP-HIL Mouse and Pointing Device Driver

What is HP-HIL?

The Hewlett-Packard Human Interface Link (HP-HIL) is the Hewlett-Packard standard interface for linking HP-HIL pointing devices (such as an HP Mouse or HP Graphics Tablet) with your personal computer.

The HP-HIL interface simplifies the connection of a pointing device. With the HP-HIL interface, you no longer need to configure your computer, set switches, or hunt for I/O ports when connecting pointing devices.

What is the HP-HIL Pointing Device Driver?

This HP-HIL driver controls the HP-HIL interface. This driver is installed in Random Access Memory (RAM). The RAM-installed driver allows an HP-HIL device to communicate with software applications.

Use the following instructions to install the HP-HIL driver. Refer to the instructions that come with your HP Mouse or other HP-HIL device to attach that pointing device to the HP-HIL interface in your computer system.

Do You Need to Install the HP-HIL Driver?

If you are currently using or plan to use an HP-HIL pointing device such as an HP Mouse or an HP Graphics Tablet, you need to install this driver.

Installing the Driver

You can choose one of two ways to install the HP-HIL driver. We recommend that you use Method 1.

- **METHOD 1.** Run the INSTALL Program to automatically install the HP-HIL driver. This is the easiest way to install your driver. Refer to the instructions on the next page.

OR

- **METHOD 2.** Manually install the driver if you are familiar with MS-DOS and you want to specify an exact driver location within the `CONFIG.SYS` file or `AUTOEXEC.BAT` file. Refer to the instructions in the section entitled "Manually Installing the HP-HIL Driver."

When you are finished installing the HP-HIL driver, make sure you put the Utilities and Drivers disc in a safe place with your other master discs.

The INSTALL Program

This program automatically installs the HP-HIL driver. To run the INSTALL program, you need a personal computer with two flexible disc drives or at least one hard disc drive and one flexible disc drive.

Note

If your computer has only one flexible disc drive, you need to manually install the HP-HIL driver. See the instructions in the section "Manually Installing the HP-HIL Driver."

Follow these steps to use the INSTALL program:

1. Start your computer. Make sure the MS-DOS prompt or PAM (Personal Application Manager) appears on your screen.

   If you are in PAM, select:

   ```
   DOS COMMANDS
   ```

   Press Enter.

2. Have you previously installed an HP-HIL driver?

   - **NO.** Skip to Step 5.
   - **YES.** Continue with Step 3.

3. Type:

   ```
   TYPE CONFIG.SYS
   ```

   Press Enter.

4. Does a line containing the file **MOUSE.SYS** appear in your **CONFIG.SYS** file?

   - **NO.** Continue with Step 5.
   - **YES.** Go to the section "Removing MOUSE.SYS from CONFIG.SYS."

5. Insert the Utilities and Drivers disc in Drive A.

6. Type this command to change the active drive to Drive A:

   ```
   A:
   ```

   Press Enter.

7. Type this command:

   ```
   INSTALL
   ```

   Press Enter.

   Follow the instructions on your screen.

8. Hold down Ctlr and Alt, and press DEL to reset your computer.

The HP-HIL driver is now installed. Make sure you put the Utilities and Drivers Disc in a safe place with your other master discs.

Removing MOUSE.SYS from CONFIG.SYS

Follow this procedure only if you have previously installed an HP-HIL Driver and want to remove the line containing `MOUSE.SYS` from your `CONFIG.SYS` file.

1. Write down all the lines in the `CONFIG.SYS` file *except* the line containing `MOUSE.SYS`. The lines should be copied exactly. The correct spacing and punctuation is critical.
2. Save the present file in case of errors by typing:

   ```
   COPY CONFIG.SYS  CONFIG.SAV
   ```

   Press Enter.
3. Create a new `CONFIG.SYS` file by typing:

   ```
   COPY CON CONFIG.SYS
   ```

   Press Enter.

4. Now type all the lines exactly as you wrote them in Step 1.
5. Hold down CTRL and press Z. Then, press Enter.
6. Go back to Step 5 in the previous section "The INSTALL Program."

Manually Installing the HP-HIL Driver

There are several ways to manually install the HP-HIL driver.

Note

Attempt these procedures only if you are familiar with the MS-DOS Commands.

Follow the steps below to determine which instructions you need to follow:

1. Do you want the HP-HIL driver loaded automatically each time you start your system?

   - **NO.** Follow the instructions in the section entitled "Copy HP-HIL Files."
   - **YES.** Go on to Step 2.

2. We recommend that you install the HP-HIL driver in your `CONFIG.SYS` file. Follow the steps in the section entitled "Installing the Driver in CONFIG.SYS" if you have a `CONFIG.SYS` file containing only a few lines.

   If you have a `CONFIG.SYS` file containing more than 20 lines, you may prefer to automatically load the HP-HIL driver by editing your `AUTOEXEC.BAT` file (if it exists). Follow the steps in the section entitled "Adding the Driver to AUTOEXEC.BAT."

Installing the Driver in CONFIG.SYS

Follow these steps if you do not want to use the INSTALL program:

1. Use the MS-DOS **MKDIR** command to create a subdirectory called HPHIL on a disc containing your MS-DOS files.
2. Insert the Utilities and Drivers disc in Drive A:. Change the active drive to Drive A:.
3. Copy the **MOUSE.SYS** file from your Utilities and Drivers disc to the HPHIL subdirectory. Type a command with the same format as this example:

   ```
   COPY MOUSE.SYS  <d>:\HPHIL\MOUSE.SYS
   ```

   Where <d> is the drive containing your MS-DOS system files.
4. For your own protection, make a backup copy of your **CONFIG.SYS** file called **CONFIG.OLD**. You can delete the **CONFIG.OLD** file when you have successfully completed this procedure.
5. Add the following line to your **CONFIG.SYS** file.

   ```
   DEVICE = \HPHIL\MOUSE.SYS
   ```

   Use a word processing application or refer to the EDLIN command in your *MS-DOS User's Reference* to learn how to add a line to your **CONFIG.SYS** file.
6. Hold down CTRL and Alt, and press DEL to reset your computer.

The HP-HIL driver is installed and ready to use whenever you start your computer.

Adding the Driver to AUTOEXEC.BAT

Follow these steps if you do not want to install the driver in your `CONFIG.SYS` file:

1. Use the MS-DOS `MKDIR` command to create a subdirectory called HPHIL on the disc containing your MS-DOS system files.
2. Insert the Utilities and Drivers disc in Drive A:. Change the active drive to Drive A:.
3. Copy the MOUSE.COM file from your Utilities and Drivers disc to the HP-HIL subdirectory. Type a command with the same format as this example:

   ```
   COPY MOUSE.COM  <d>:\HPHIL\MOUSE.COM
   ```

   Where <d> is the drive containing your MS-DOS system files.
4. For your own protection, make a backup copy for your `AUTOEXEC.BAT` file. You can delete the backup copy when you have successfully completed this procedure.
5. Add the following line to your `AUTOEXEC.BAT` file.

   ```
   \HPHIL\MOUSE
   ```

   Use a word processing application or refer to the EDLIN command in your *MS-DOS User's Reference* to learn how to add a line to your `AUTOEXEC.BAT` file.
6. Hold down CTRL and Alt, and press DEL to reset your computer.

The HP-HIL driver is installed and ready to use whenever you start your computer.

Copying HP-HIL Files

Follow these instructions if you do **not** want the HP-HIL driver loaded automatically when you start your computer.

1. Use the MS-DOS **MKDIR** command to create a subdirectory called HPHIL on a disc containing your MS-DOS system files.
2. Insert the Utilities and Drivers Disc in Drive A:. Change the active drive to Drive A:.
3. Copy the MOUSE.COM file from your Utilities and Drivers disc to the HP-HIL subdirectory. Type a command with the same format as this example:

   ```
   COPY MOUSE.COM  <d>:\HPHIL\MOUSE.COM
   ```

   Where <d> is the drive containing your MS-DOS system files.
4. You are finished installing the HP-HIL driver. However, each time you want to use an HP-HIL pointing device, you must type:

   ```
   \HPHIL\MOUSE
   ```

   at the MS-DOS prompt.

5

HP Expanded Memory Manager Program/386

Who Should Use HPEMM/386?

Read this section to decide whether you should use the HP Expanded Memory Manager Program/386 (HPEMM/386).

Do NOT Install HPEMM/386 If

- You are using an operating system other than MS-DOS.
- You plan to use Windows/386 all the time. (Windows/386 includes the features of HPEMM/386.)

Install HPEMM/386 If

- You are planning to use software written to the Lotus-Intel-Microsoft Expanded Memory Specification (LIM EMS), version 4.0 or earlier. This includes HP Vectra Disc Cache, versions of Microsoft^{R} Windows/286, Lotus^{R} 1-2-3^{R} (Release 2), and dBase III^{R}, to name a few.
- You have a Weitek floating point accelerator (FPA) and FPA applications that require a "386-based expanded memory manager."

Before You Start

You should have already installed your operating system as directed in your computer's *System Assembly Guide.*

What Is HPEMM/386 and How Does It Work?

Do you want details about HPEMM/386 and how it works?

- **NO.** Skip to the section, "Installing HPEMM/386."
- **YES.** Read on.

What Is HPEMM/386?

The HP Expanded Memory Manager Program/386 (referred to in this chapter as HPEMM/386) is a software package for 80386-based computers that

- expands the memory available to certain MS-DOS applications
- enables certain applications to use the Weitek FPA

HPEMM/386 converts into **expanded memory** portions of your computer's built-in memory that were not previously usable by MS-DOS software. This expanded memory can be used by MS-DOS software that has been written to LIM EMS (version 4.0 or earlier), such as the HP Vectra Disc Cache Program, Windows 2.0, Lotus 1-2-3, dBase III, and many others. (LIM EMS is a set of rules governing the development of software so that it can use expanded memory.)

Why Use HPEMM/386?

If you plan to use your computer for a variety of fairly complex tasks, you might find that the 640 KB of memory traditionally allowed by MS-DOS for applications is not enough.

With software written to LIM EMS, HPEMM/386 "breaks the 640 KB MS-DOS barrier" and provides these benefits:

- **Allows Larger Programs and Data Files**

  Many application programs (such as spreadsheets, databases, CAD packages, and desktop publishing software) require large amounts of memory. If you also use an environment manager (such as Windows), RAM-resident programs (such as a desk organizer or a spelling checker), and network software (such as HP OfficeShare), you need even more memory. You also need room for your data files. In such circumstances, your memory needs might exceed the MS-DOS 640 KB limit.

  With MS-DOS applications written to LIM EMS, HPEMM/386 enables you to store more program code and data in memory. With increased memory capacity, you can, for example, increase the size of a spreadsheet, sort more information in a data base, and create a text file hundreds of pages long.

- **Makes Your Applications Run Faster**

  HPEMM/386 helps to increase system performance; that is, it maximizes the speed of various computer operations so that your LIM EMS applications run faster.

For example, when more memory is available, some applications store more program code and data in memory. This reduces the need for your computer to access your disc drive frequently. Therefore, with expanded memory, these applications run faster.

In addition, HPEMM/386 supports the HP Vectra Disc Cache Program, which enables you to read information faster from your hard disc. (The Disc Cache also can be run in extended memory, but it runs faster in **expanded** memory.)

- **Facilitates Multitasking**

  If you use LIM EMS multitasking software (such as Windows 2.0) and HPEMM/386's expanded memory, you have enough memory to run multiple large programs with large data files concurrently, without losing speed.

- **Supports Weitek Floating Point Accelerator**

  If you have a Weitek FPA and FPA applications that require a 386-based expanded memory manager, you need HPEMM/386. HPEMM/386 enables these applications to gain access to the FPA, which performs fast processing of mathematical operations.

Kinds of Memory

Your computer has several different kinds of memory:

- **Base memory** is memory that is located from 0 KB to 640 KB in the address space of your computer (see Figure 5-1). Base memory is the memory traditionally used by MS-DOS applications to store programs and data.
- **Reserved memory** is memory that is located from 640 KB to 1 MB in the address space of your computer (see Figure 5-1). Most applications using current versions of MS-DOS use reserved memory to control the video screen and other computer operations.
- **Extended memory** is memory located above 1 MB in the address space of your computer (see Figure 5-1). Most MS-DOS applications **cannot** use extended memory for programs and data. (An exception is VDISK.)
- **Expanded memory** is the portion of your computer's memory that is under the control of HPEMM/386 and therefore can store program code and data and make them available to MS-DOS applications written to LIM EMS (4.0 or earlier).

HPEMM/386 takes control of portions of base, reserved, and extended memory and converts them into expanded memory. HPEMM/386 uses base memory between address 256 KB and address 640 KB, up to 256 KB of reserved memory, and (with its default setting) all available extended memory, as shown in Figure 5-1.

(The amount of reserved memory that is converted depends on the accessories you've installed. In most systems, between 96 and 176 KB of reserved memory is converted.)

Once expanded memory is created, LIM EMS software can store programs and data there (in 16 KB blocks called "pages").

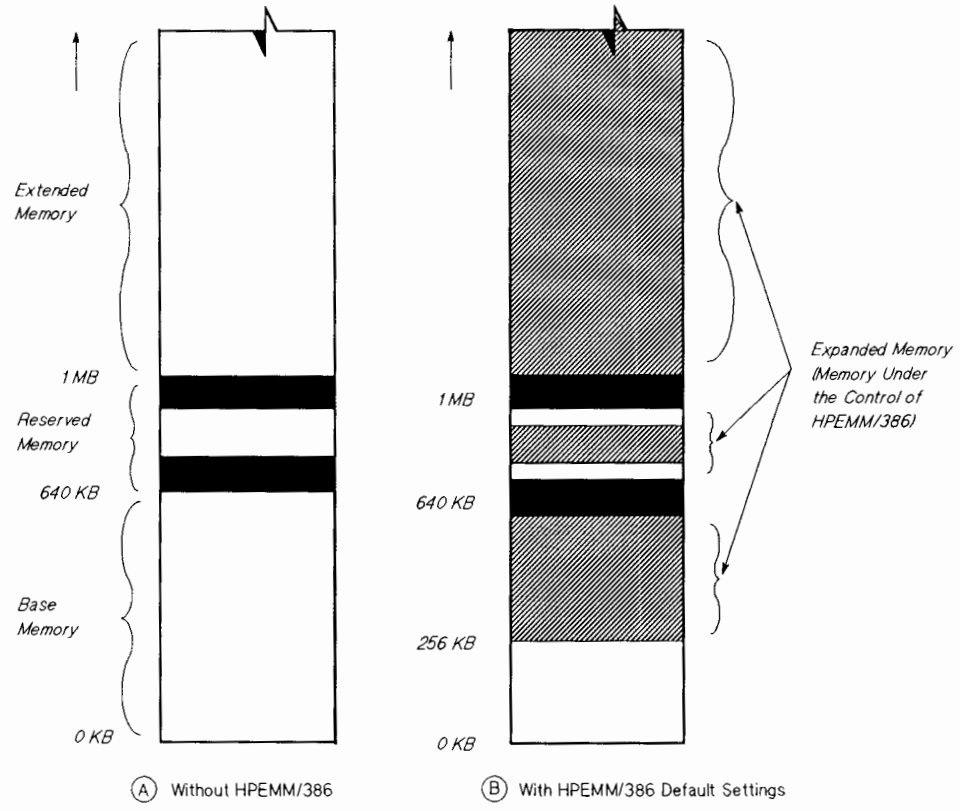

Figure 5-1. Kinds of Memory Available With Your Computer

How HPEMM/386 Works

Whereas traditional MS-DOS applications can only access memory up to 640 KB, applications written to LIM EMS can access more memory, by "mapping" it to certain addresses between 640 KB and 1 MB. In addition, LIM EMS version 4.0 goes farther than earlier LIM EMS versions by allowing applications to map program code (as well as data) to addresses below 640 KB.

As pages of information in expanded memory are needed by your MS-DOS application, HPEMM/386 finds unused logical addresses under 1 MB and maps ("switches") the needed pages to these addresses. (The "address list" is stored in a page table.) The pages can then be used by the application since they have logical addresses less than 1 MB.

Switching is done continually as pages in expanded memory are needed by the application. All of this switching takes place "behind the scenes," at your computer's normal RAM speed.

An unused block of addresses under 1 MB that is used as described above is called a "page frame". To function, HPEMM/386 must have at least one 64 KB page frame between 768 KB and 960 KB. HPEMM/386 can automatically specify this page frame address, or you can manually specify the address. (For details, see the discussion on FRAME in the section *Modifying HPEMM/386 Parameters.*)

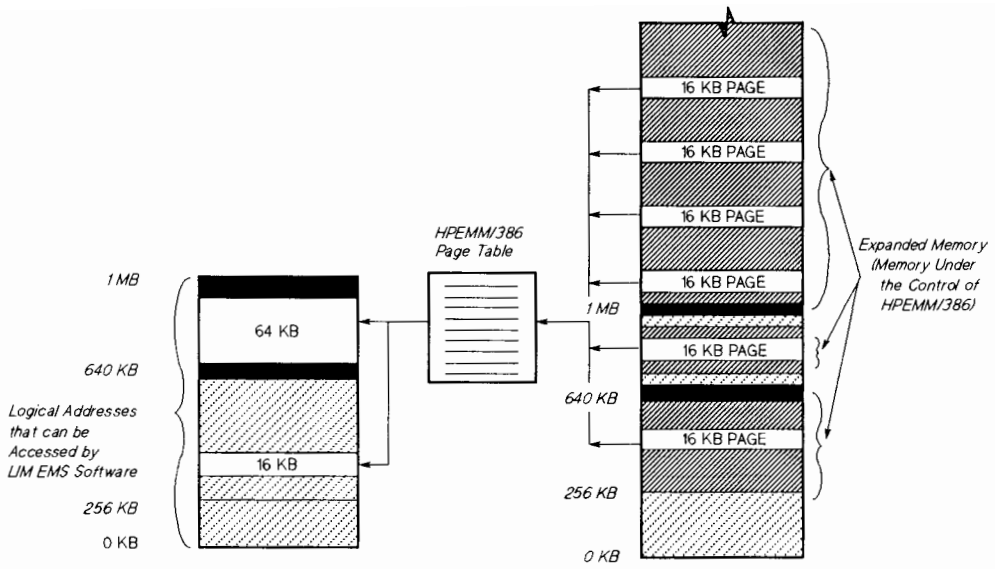

Figure 5-2. How HPEMM/386 Works

Installing HPEMM/386

To install HPEMM/386, you must

- Copy two files onto your hard disc.
- Change your CONFIG.SYS file.

Copying Files to Your Hard Disc

To copy HPEMM/386 to your hard disc, do the following:

1. Turn on your computer. Make sure that the MS-DOS prompt is displayed.
2. Find the HP SETUP and Utilities disc in the back of the *Setting Up* binder. Insert the disc in drive A:.
3. Type:

   ```
   COPY  A:HPEMM386.*  C:\
   ```

   and press Enter. This copies two files:

- HPEMM386.SYS, which provides expanded memory and supports the Weitek FPA.
- HPEMM386.COM, which enables you to change certain HPEMM/386 parameters from the MS-DOS prompt.

Note

This section tells you how to copy the files to the **root** directory of your hard disc drive C:. To copy the files to a different directory, see the COPY command in your MS-DOS *User's Reference* manual.

Changing Your CONFIG.SYS File

To install HPEMM/386, you also need to change your CONFIG.SYS file. This means that you must

1. Decide on the HPEMM/386 command form.
2. Add the HPEMM/386 command to your CONFIG.SYS file.

Note

If you have already installed HPEMM/386 but want to change the parameters that are in effect when you restart your computer, you must **modify** the HPEMM/386 command line in your CONFIG.SYS file. (Use the instructions on the following pages.)

Deciding on the Command Form

In order for HPEMM/386 to function, you must have a command line in your CONFIG.SYS file telling your computer that you want to use HPEMM/386.

In most cases, you can use the default command (shown in step 2 below). However, in certain cases, you must type a customized form of the command, including special values for various parameters.

1. To decide whether you need a customized command form, answer these questions:
   - Did you copy your HPEMM/386 files to a directory other than the root directory?
   - Will you be using a version of Microsoft Windows/286 with its own memory driver, HIMEM.SYS?
   - Do you want to install other programs in extended memory **after** you install HPEMM/386?
   - Are you an experienced MS-DOS user who wants more control over the HPEMM/386 installation process?

2. How did you answer the questions in step 1?

   - **YES to one or more questions.** You need a customized command. Skip to step 3.
   - **NO to all questions.** Use the default command:

     ```
     DEVICE = HPEMM386.SYS
     ```

     Go to step 4.

3. If you need a customized command form, go to the section, "Modifying HPEMM/386 Parameters," and decide what command form to use. Then return to step 4 in this section.

4. Write your HPEMM/386 command line here:

   ```
   DEVICE=
   ```

   Go to the next section.

Adding the Command to Your CONFIG.SYS File

To change your CONFIG.SYS file, do the following:

1. For extra protection, make a backup copy of your CONFIG.SYS file called CONFIG.OLD by typing:

   ```
   COPY CONFIG.SYS CONFIG.OLD
   ```

   and press Enter.

   After you have used HPEMM/386 successfully for the first time, you can delete the CONFIG.OLD file.

2. To your CONFIG.SYS file, add the HPEMM/386 command line you decided on in the previous section. To use the MS-DOS editor EDLIN, follow the instructions given here. If you prefer, you can use any word processor that creates unformatted (ASCII) files.

   a. Type

      ```
      EDLIN CONFIG.SYS
      ```

      and press Enter.

   b. To display the file on the screen, type

      ```
      1P
      ```

      and press Enter.

   c. Decide where you want to insert your HPEMM/386 command line.

      If you have other device drivers that use extended or expanded memory, their command lines should appear in the following order in your CONFIG.SYS file:

      - HPEMM386.SYS device driver
      - VDISK.SYS device driver
      - other expanded memory device drivers

      Otherwise, you can insert the command line anywhere in the file (for example, at the beginning).

d. Type the number of the line where you want to insert your command, type `I` and press Enter. For example, if you want to insert your command **in front of** line 4, type `4I` and press Enter.

e. Type your HPEMM/386 command line and press Enter. (You wrote it at the end of the previous section, "Deciding on the Command Form.")

   Then hold down Ctrl and press Break.

f. To display your file (to check for typing errors), type

```
1P
```

   and press Enter. If your file is correct, go on to step g. If it is incorrect, make corrections (see the chapter on EDLIN in your MS-DOS *User's Reference*); then go to step g.

g. To save your new CONFIG.SYS file and return to MS-DOS, type

```
E
```

   and press Enter.

3. Remove the SETUP and Utilities disc from drive A:, and reset your computer by holding down Ctrl and Alt and pressing Del.
4. Copy your other utilities onto your hard disc.
5. When you are ready to use HPEMM/386, read the section, "Using HPEMM/386."

Using HPEMM/386

Once you install HPEMM/386, you can use it without any extra effort. HPEMM/386 is loaded automatically as soon as your CONFIG.SYS file is executed. Then HPEMM/386 works "behind the scenes" to provide expanded memory and support your Weitek FPA (if you have one).

This section tells you how to check the status of expanded memory and to change HPEMM/386 parameters during a work session.

To Find Out How Much Expanded Memory You Have

As soon as you turn on your computer, you get a message that tells how much Total Memory, Base Memory, Reserved Memory, and Extended Memory you have. (Total Memory = Base + Reserved + Extended.) Since HPEMM/386 has not been loaded yet, this message does **not** include the amount of expanded memory you have.

A few seconds later, when CONFIG.SYS is executed (and HPEMM/386 is loaded), you get a revised memory message, as shown in Figure 5-3. (If you only have 1 MB Total Memory, the message is much shorter.)

```
640K Base Memory
  xxxK Usable as Expanded Memory
384K Reserved Memory
  xxxK Previously Allocated
  xxxK Converted to Expanded Memory
xxxK Extended Memory
  xxxK Previously Allocated
  xxxK Converted to Expanded Memory
  xxxK Occupied by HPEMM386
  xxxK Available
yyyK Expanded Memory Available
```

Figure 5-3. Message Displayed After HPEMM/386 is Loaded

The values for Base Memory, Reserved Memory, and Extended Memory should be unchanged from the previous message. The other lines in the message are explained on the next page.

1. **Usable as Expanded Memory:** The amount of base memory under the control of HPEMM/386.
2. **Converted to Expanded Memory:** The amount of reserved memory under the control of HPEMM/386.
3. **Previously Allocated:** In the case of Reserved Memory, this is memory that cannot be used because other installed accessory cards are using it. In the case of Extended memory, this is the amount of extended memory being used by programs such as VDISK.
4. **Converted to Expanded Memory:** The amount of extended memory under the control of HPEMM/386.
5. **Occupied by HPEMM386:** The amount of extended memory used to store the HPEMM386.SYS file.
6. **Available:** The amount of extended memory not being used by HPEMM/386 or other programs. (This amount equals total extended memory minus the values listed in 3, 4, and 5.)
7. **Expanded Memory Available:** The total amount of reserved memory and extended memory under the control of HPEMM/386. (This amount equals the sum of the values listed in 2 and 4.) If you specified a size parameter in your CONFIG.SYS file, this amount also equals that value.

Note

The MS-DOS command CHKDSK only shows the amount of **base memory** you have (up to 640 KB). Do **not** use CHKDSK to find out how much expanded memory or extended memory you have.

To Change Certain Parameters Temporarily

If you want to turn expanded memory or support for the Weitek FPA on or off during the current work session, you can type a special command at the MS-DOS prompt. (This command runs the HPEMM386.COM program.) The command has this format:

```
HPEMM386 [state] [W=ON|OFF]
```

(Remember that the options for state are AUTO, ON, and OFF.)

After you use this command, your new HPEMM/386 parameters are in effect for the rest of the work session (or until you use the command again). As soon as you restart your computer, however, the HPEMM/386 parameters set up in the CONFIG.SYS file are restored. (To modify CONFIG.SYS, see the section called "Changing Your CONFIG.SYS File".)

Here are some examples of how to use this command:

1. To find out the On/Off state of expanded memory and (if you've installed a Weitek FPA) whether support for the FPA is on or off, type

   ```
   HPEMM386
   ```

   and press Enter.

   You get a message that resembles one of these:

   ```
   HPEMM386  ON
   Weitek support ON
   HPEMM386  AUTO
   ```

   (Note: If you have **not** installed a Weitek FPA, the message does not include the status of Weitek FPA support.)

2. To change the On/Off state of expanded memory, type one of these:

```
HPEMM386 AUTO
HPEMM386 ON
HPEMM386 OFF
```

   and press Enter.

   If you try to turn expanded memory off while you have a TSR (Terminate and Stay Resident) program in expanded memory (such as the HP Vectra Disc Cache Program), you will get an error message.

3. To turn support for the Weitek FPA on or off, type one of the following:

```
HPEMM386 W=ON
HPEMM386 W=OFF
```

   and press Enter.

4. To control expanded memory **and** Weitek FPA support with one MS-DOS command, type `HPEMM386`, the desired option for state (`AUTO`, `ON`, or `OFF`), and the desired option for Weitek FPA support (`W=ON` or `W=OFF`); then press Enter.

   For example, to turn expanded memory and Weitek FPA support off, type

```
HPEMM386 OFF W=OFF
```

   and press Enter.

Modifying HPEMM/386 Parameters

If you have special requirements for installing and using HPEMM/386, you need to use a customized form of the HPEMM/386 command line in your CONFIG.SYS file. This section explains in detail all parameters that can be used in that command line.

Command Syntax

The syntax for the HPEMM/386 command line is:

```
DEVICE=[d:] [path] HPEMM386.SYS [size] [state] [FRAME=frame]
[W=ON|OFF]  [INCLUDE=xxxx-yyyy] [EXCLUDE=zzzz-aaaa] [EXT=ext]
[DMA=nnn] [NOXRAM] [AMRS=xx] [LOWFRAME] [REBOOT]
```

For instructions on how to insert the HPEMM/386 command line in your CONFIG.SYS file, see the section called "Adding the Command to Your CONFIG.SYS File".

Note

If you are using a version of Microsoft Windows/286 which uses its own memory driver (HIMEM.SYS), you must specify both the REBOOT and EXT parameters (EXT must equal at least 64) in your CONFIG.SYS file. REBOOT and EXT are explained in this section.

Command Parameters

To modify the way HPEMM/386 functions, create a customized form of the command line using non-default values for parameters. Each parameter is explained below:

d:

Refers to the drive where HPEMM/386 is installed.

Default: If no drive is specified, the active drive is assumed.

Path

Specifies the path from the root directory to the directory where HPEMM/386 is installed.

Default: If no path is specified, the current directory is assumed.

Size

Specifies, in kilobytes (KB), the amount of memory to convert into expanded memory. The size must be a multiple of 16 and can range from 16 to the total amount of memory available to HPEMM/386. If you specify a size that is greater than the amount of memory available, all available memory is converted.

Memory available to HPEMM/386 equals the sum of all extended memory not being used by other programs plus a portion of reserved memory (to a maximum of 256 KB, depending on the accessory cards you've installed), minus about 80 KB to store the HPEMM386.SYS file.

We suggest that you specify a size only if you plan to install other programs (e.g. VDISK) in extended memory after HPEMM/386. In this case, to calculate the value for size, subtract the amount of extended memory you wish to leave for these programs from the amount of memory available to HPEMM/386.

Default: If no size is specified, HPEMM/386 converts into expanded memory all memory available to HPEMM/386.

State

Specifies the on/off state of expanded memory as soon as CONFIG.SYS is executed. (In all cases, HPEMM/386 is loaded, but depending on the state you select, it might or might not convert any memory into expanded memory.) Options for state are AUTO, ON, and OFF.

- AUTO makes expanded memory available **only** when it is requested by an application. This is the recommended value.
- ON makes expanded memory available as soon as MS-DOS has executed the CONFIG.SYS file. If a LIM EMS application does not function properly with AUTO, use ON.
- OFF "turns off" expanded memory. Use OFF if you get an error message stating that your application is not compatible with expanded memory.

To change the state of HPEMM/386 during a work session, see the section called "To Change Certain Parameters Temporarily".

Default: If no value is specified, the default value of AUTO is used.

FRAME=frame

Specifies the beginning address (in hexadecimal) of the 64 KB primary page frame. The beginning address must be a multiple of 16 KB (or 400 hex) and must fall between 768 and 896 KB (C000 and E000 hex); see Table 5-1. (This address is called the "page frame address".)

We strongly recommend that you do **not** specify a page frame address, but let HPEMM/386 choose the most appropriate value. If you find, however, that HPEMM/386 interferes with the operation of another I/O device (such as a network card, video card, or external disc drive card), you might want to specify a page frame address. From the table below, pick an address that is not being used by any I/O card; for example, C000. Then type `FRAME=C000` in your HPEMM/386 command line (or its shortened form `FRAME=C0`).

Table 5-1. Various Page Frame Addresses You Can Use

Type:	Then Type a Page Frame Address (in Hex):
FRAME=	C000 or C0
	C400 or C4
	C800 or C8
	CC00 or CC
	D000 or C0
	D400 or D4
	D800 or D8
	DC00 or DC
	E000 or E0

Default: If no FRAME parameter is specified, HPEMM/386 chooses the most appropriate page frame address for you, depending on the accessory cards installed in your system.

W=ON|OFF

Specifies whether support for the Weitek FPA is on or off. Choose the ON option only if you are using a Weitek FPA and application(s) that require an expanded memory manager to access the FPA. (Type `W=ON` in your CONFIG.SYS command line.)

Default: If nothing is specified, W=OFF.

INCLUDE=xxxx-yyyy EXCLUDE=zzzz-aaaa

Specifies (in hexadecimal) portions of address space between 0 KB and 1 MB to add (INCLUDE) or subtract (EXCLUDE) from the default addresses to which HPEMM/386 maps pages of expanded memory. (The default addresses are 256 to 640 KB, or 4000 to A000 hex, as well as 64 KB of addresses starting at the FRAME address.) Each address used with INCLUDE or EXCLUDE must be a multiple of 16 KB (400 hex).

Note

The values that you can use for INCLUDE and EXCLUDE depend on the optional hardware installed in your system. We strongly recommend that you do NOT specify INCLUDE or EXCLUDE values unless you are familiar with how your optional hardware and LIM EMS 4.0 operate.

Suppose you want HPEMM/386 also to map expanded memory to addresses from 640 to 704 KB (A000 to B000 hex) and addresses from 800 to 832 KB (C800-D000) in addition to default addresses from 256 to 640 KB. You would type:

```
INCLUDE=A000-B000,C800-D000
```

Suppose you have a large number of installed drivers and do NOT want HPEMM/386 to map memory to addresses from 256 to 384 KB (4000 to 6000 hex). (You still want HPEMM/386 to map memory to addresses from 384 to 640 KB.) You would type:

```
EXCLUDE=4000-6000
```

Default: If INCLUDE and EXCLUDE parameters are not specified, HPEMM/386 maps expanded memory to addresses from 256 KB to 640 KB and to the 64 KB of addresses starting at the FRAME address (see the discussion on FRAME above).

Note

If you have an **HP 82328A Intelligent Graphics Controller Adapter** card installed, you must specify the card's address range using the EXCLUDE option. The address range for this card is typically CC00-D000. If you have configured the card to use a different address range, the value will be different. Refer to the documentation that comes with your graphics card for more information.

EXT=ext

Specifies, in kilobytes, the amount of extended memory to leave when HPEMM/386 is installed. The rest of available memory is converted to expanded memory. If you specify EXT, do not specify Size, and vice versa. Use the EXT parameter when you want to install other programs (e.g. VDISK) in extended memory after you install HPEMM/386.

Default: If no value is specified for EXT, HPEMM/386 converts into expanded memory (1) all available memory OR (2) the amount of memory you specified for Size.

DMA=nnn

Specifies the number of internal DMA (Direct Memory Access) buffers used by HPEMM/386. Each DMA buffer is 1 KB in size. The number of DMA buffers may be any number between 8 and 128.

When applications or drivers perform DMA, the data being transferred must first pass through buffers inside HPEMM/386. The number of DMA buffers must be large enough to accommodate the largest DMA request made by your application. However, allocating unneeded DMA buffers increases the amount of memory used by the HPEMM/386 program, thus reducing the amount of expanded memory that can be provided to applications. In almost all cases, the default value provides sufficient DMA buffers.

You may wish to increase the number of DMA buffers if you suspect that HPEMM/386 is interfering with the operation of a peripheral controller card (such as a tape drive or flexible disc controller).

You may wish to decrease the number of DMA buffers if you need a little more expanded memory and doing so does not interfere with the operation of other devices in your system.

Default: If no DMA parameter is specified, 16 DMA buffers are allocated.

NOXRAM

This option will prevent HPEMM/386 from using reserved memory.

You may wish to use this option if you suspect that HPEMM/386's use of reserved memory is interfering with the operation of an accessory card. Using this option will result in less expanded memory being available for use by your application.

Default: If this option is not specified, HPEMM/386 will use as much reserved memory as possible.

AMRS=xx

Allocates Alternate Map Register Sets. These are useful to speed program switching under some environments, such as Windows. Each AMRS increases the memory used by HPEMM/386 by 4 KB. Possible xx values are 0 - 15, default is zero.

LOWFRAME

Allows the EMS page frame to appear in the base memory region (below 640 KB). Since this option consumes 64 KB of base memory, it should only be used if hardware cannot be reconfigured to allow a free 64 KB page in the memory address region above the base 640 KB.

REBOOT

Causes HPEMM/386 to filter access to the circuitry which controls resets to the 80386 processor. This may be required to be compatible with software that resets the processor (such as your computer's SETUP program). However, use of this option increases the amount of processing associated with the keyboard. This may cause problems when high-speed communication occurs simultaneously with keyboard usage.

Sample Commands

This section gives two examples of the HPEMM/386 command line that you might put in your CONFIG.SYS file.

Sample 1

```
DEVICE=HPEMM386.SYS W=ON EXT=64
```

This tells the computer:

1. Look for HPEMM/386 files in the root directory of the current drive (C: assumed) and convert all of extended memory to expanded memory when requested by an application [the state is AUTO]. Let HPEMM/386 choose the most appropriate page frame address [FRAME].
2. Turn on support for the Weitek FPA [W=ON].
3. Reserve 64 Kilobytes of memory for other programs that require some extended memory.

(In this command line, all parameters have their default settings except for the Weitek FPA and EXT parameters.)

Sample 2

```
DEVICE=C:\UTILITY\HPEMM386.SYS 8192 ON FRAME=C0 W=ON
INCLUDE=A000-B00 0
```

This tells the computer:

1. Look on drive C: in the UTILITY subdirectory for the HPEMM/386 file.
2. Convert 8192 KB (8 MB) of reserved memory plus extended memory into expanded memory.
3. Expanded memory is turned ON when CONFIG.SYS is executed.
4. Set the page frame address to C0000 (768 KB).
5. Turn ON support for Weitek FPA.
6. In addition to mapping expanded memory to the default addresses from 256 to 640 KB, let HPEMM/386 map memory to addresses from 640 to 704 KB (A000 to B000 hex).

Error Messages

This section lists, in alphabetical order, HPEMM/386 error messages and an explanation of what to do in each case.

```
Converting all available memory,
but unable to supply all requested expanded memory
```

Explanation: You requested that HPEMM/386 take control of more memory than is currently available. Therefore, HPEMM/386 simply takes control of all extended memory that **is** available.

```
Expanded Memory in Use - Unable to turn OFF
Remove resident program using expanded memory
```

Explanation: You tried to turn off HPEMM/386 while you have a TSR (Terminate and Stay Resident) program in expanded memory. First remove the TSR program from expanded memory (see the instructions in your TSR program manual). Then you can turn off expanded memory.

```
Extended memory in use - Unable to turn ON or AUTO
Remove resident program using extended memory
```

Explanation: You installed HPEMM/386 with the OFF option in your CONFIG.SYS file, then installed a driver or Terminate-Stay-Resident (TSR) program which uses extended memory, and afterwards used HPEMM386.COM to change the the state of HPEMM/386 to ON or AUTO. In this case, HPEMM/386 is unable to create expanded memory until the extended memory used by the TSR program is released. You must either remove the TSR program which is using extended memory or change CONFIG.SYS to install HPEMM386.SYS using the AUTO or ON option.

```
FRAME value overlaps accessory hardware
Specify a different FRAME value in CONFIG.SYS
```

Explanation: You specified a page frame address [FRAME] that is already being used by an accessory card. Change your CONFIG.SYS file in one of these two ways: (1) Remove the FRAME parameter from your command line and let HPEMM/386 choose the most appropriate value (the recommended solution); OR (2) Specify a different value for FRAME, i.e. an address that is not being used by an accessory card (see the discussion on FRAME).

```
HPEMM386 internal error #xx at address XXX:YYY
Press any key to restart your computer
```

Explanation: You have encountered an error in the HPEMM/386 software. Restart your computer. If the problem persists, contact your dealer or your HP representative.

```
HPEMM386 not found
Add "DEVICE=HPEMM386.SYS" to CONFIG.SYS and
ensure that HPEMM386.SYS is on your system disc
```

Explanation: You tried to run HPEMM386.COM without first installing HPEMM386.SYS. Make sure you have copied HPEMM386.SYS to your hard disc and have added the HPEMM/386 command line to your CONFIG.SYS file. (Use the command line `DEVICE=HPEMM386.SYS` or refer to the section, *Modifying HPEMM/386 Parameters,* for more information.)

This message may also appear if you run HPEMM386.COM with an old version of HPEMM386.SYS. Make sure you have copied the new version of HPEMM386.SYS on your hard disc, then rerun the HPEMM386.COM program.

```
HPEMM386 not installed
```

Explanation: You cannot install HPEMM/386. (This message is displayed with another message that tells why.)

```
HPEMM386 - Privileged Operation Detected
This application must run with HPEMM386 OFF
Deactivate HPEMM386 and (C)ontinue or (R)estart? (C/R)
```

Explanation: You tried to load a protected-mode application that is incompatible with HPEMM/386. You can do one of the following: (1) Type `C` to turn off HPEMM/386 and restart your application; or (2) type `R` to restart your computer. In the future, remember to type HPEMM386 OFF before you run this program. Then, when you finish running the program, type `HPEMM386 AUTO` or `HPEMM386 ON`.

```
HPEMM386 unable to access extended memory --
error code xx.
```

Explanation: HPEMM/386 found a hardware problem. Try one of the following: (1) Continue working without expanded memory; OR (2) Restart your computer; if the problem persists, check your hardware.

```
HPEMM386 unable to enter protected mode --
error code xx.
```

Explanation: HPEMM/386 found a hardware problem. Try one of the following: (1) Continue working without expanded memory; OR (2) Restart your computer; if the problem persists, check your hardware.

```
Incorrect version of HPEMM386.SYS installed
Ensure that HPEMM386.SYS and HPEMM386.COM
are the same version
```

Explanation: You tried to use HPEMM386.COM with an old version of HPEMM386.SYS. Install the new version of HPEMM386.SYS on your hard disc and restart your computer. Then type your HPEMM386 command again at the MS-DOS prompt.

```
Insufficient Extended Memory Available
Allocate Less Extended Memory to other programs
```

Explanation: You've already installed one or more programs (e.g. VDISK) that are using most of extended memory; and you have not left HPEMM/386 enough extended memory to convert to expanded memory.

To obtain expanded memory, change your CONFIG.SYS file so that your other programs use less extended memory. Then restart your computer.

```
Invalid Address specified
Must be a multiple of 16 KB
```

Explanation: In the HPEMM/386 command line in your CONFIG.SYS file, you specified an unacceptable value for FRAME, INCLUDE, or EXCLUDE. Edit your CONFIG.SYS file (using EDLIN or a word processor that creates unformatted files) so that the values for these three parameters are all multiples of 16 KB (or 400 hex).

```
Memory Size rounded
Must be a multiple of 16 KB
```

Explanation: In the HPEMM/386 command line in your CONFIG.SYS file, you specified a value for SIZE that is not a multiple of 16 KB. HPEMM/386 rounded down to the next lower size that is a multiple of 16, and converted that amount of memory to expanded memory.

```
No Page Frame Available
Reconfigure hardware to make a page frame available
```

Explanation: HPEMM/386 must have a 64 KB page frame between 768 and 960 KB. If you have installed several cards with option ROMs, they might be using all of these addresses. To remedy the situation, reconfigure your cards (e.g. move the jumpers to assign different addresses to the cards) so that 64 KB is free. For details, see the manuals that came with your cards. **If you cannot reconfigure your cards,** you may use the [LOWFRAME] option (described in the section, *Modifying HPEMM/386 Parameters*).

```
Preceding EMS manager found
Remove it or set HPEMM386 size to zero
```

Explanation: You have put command lines to install two expanded memory managers in your CONFIG.SYS file. Either remove one of them, or specify a zero size parameter for HPEMM/386 (in this way, you can still maintain HPEMM/386 support of your Weitek FPA).

```
Size and EXT both specified
Use at most one of them
```

Explanation: In the HPEMM/386 command line in your CONFIG.SYS file, you specified values for both Size and EXT; you can use only one parameter or the other (see section, *Modifying HPEMM/386 Parameters*). Correct your CONFIG.SYS file.

```
Stack fault at memory address XXX:YYY
Restart your computer
```

Explanation: You have encountered an error in the LIM EMS or FPA software you are using with HPEMM/386. Restart your computer and then start that software again. If the problem persists, contact your dealer.

`Unable to create expanded memory`

Explanation: You have only 1 MB of total memory and several optional cards installed. Therefore, you don't have enough reserved memory for HPEMM/386 to convert to expanded memory.

`Unrecognized Parameter in CONFIG.SYS`
`Modify CONFIG.SYS`

Explanation: You made an error in the HPEMM/386 command line in your CONFIG.SYS file. Correct it using EDLIN or a word processor that creates unformatted files. For more information on parameters, refer to the section, *Modifying HPEMM/386 Parameters.*

`Unrecognized Parameter on Command Line`
`Valid options are ON, OFF, AUTO, W=ON, W=OFF`

Explanation: You typed an incorrect form of the HPEMM386 command at the MS-DOS prompt. Try again; the format is `HPEMM386 [state] [W=ON|OFF]`.

`Virtual Machine already in use`
`Remove software using virtual machine`

Explanation: You might have put the HPEMM/386 command line in your CONFIG.SYS file twice. To check, type `TYPE C:\CONFIG.SYS` at the MS-DOS prompt. To correct your CONFIG.SYS file, use EDLIN or any word processor that creates unformatted (ASCII) files.

`Weitek FPA not found`

Explanation: You specified W=ON in your CONFIG.SYS file or in the HPEMM386 command at the MS-DOS prompt; however, you do NOT have a Weitek FPA.

Weitek FPA unavailable while OFF

Explanation: You tried to turn on support for your Weitek FPA (W=ON) with HPEMM/386 in the OFF state. You must first set HPEMM/386 to AUTO or ON mode.

Wrong Machine Type
Must run on an 80386

Explanation: You tried to install HPEMM/386 on the wrong kind of computer. You must install HPEMM/386 on a 80386-based computer.