17 — Working Faster with FXP Cache Memory

INTRODUCTION

The FXP software, located on the supplemental disk, contains a sophisticated, yet easy-to-use program that allows DOS to enhance the performance of your personal computer. The FXP software uses what we call RAM (random-access memory) *cache memory* to significantly speed up memory storage and retrieval. In addition, the FXP software creates a *print buffer* that allows you to print files in the background at the same time that you're working with other files.

In this section we'll begin with a very brief explanation of what cache-memory management is, how it works, and how it differs from the RAM disks, which use VDISK.SYS, described in Section 7. We'll then quickly show you just how simple it is to load and use the FXP software. For most users this is all the instruction you'll need. Once it's loaded, FXP operates automatically and invisibly. You can use your computer and your application programs the same way you always have while FXP works as your silent partner to speed up system operations.

For those of you who are advanced users of personal computers, we'll conclude this section with a technical description of FXP, showing you how to change FXP default parameters by issuing FXP commands and how to interpret FXP information messages.

WHAT IS CACHE-MEMORY MANAGEMENT?

Cache-memory management increases overall performance and efficiency by dramatically reducing disk access time. Like a RAM disk (VDISK), a cache disk reserves an area of system RAM. This reserved memory is used for two functions. The first function provides a disk cache for storage and rapid retrieval of frequently accessed information, and the second provides a print buffer that serves as a holding area for information to be printed. Let's look at each of these functions separately.

When the FXP cache memory software is active, it monitors all disk-drive activity. When a program requests information from the disk, the software checks the cache area first. If the required

information is in the cache, it is loaded directly, and the disk request is bypassed. Only the areas of the disk that are most frequently used are updated, replaced, and retained in the cache. This greatly reduces disk access time because information can be transferred much more quickly from the electronic RAM storage than from the mechanical disk drives. FXP even has the intelligence to sense when a new or different disk is being used. When this happens, the cache is automatically cleared of the old information and replaced with information likely to be required by the new disk.

The FXP software can also use a portion of the disk cache as a print buffer. Information can be placed in and gradually removed from the print buffer without interfering with other programs that are running. This frees your computer to perform other tasks while printing occurs. And both tasks are allowed to operate quickly and efficiently.

HOW IS AN FXP CACHE DISK DIFFERENT FROM A RAM DISK?

FXP and a RAM disk (VDISK) both use RAM memory to provide faster system operation. But there are some disadvantages in using a RAM disk. The following comparison table should help you understand the major differences between a RAM disk and an FXP cache disk.

RAM Disk	FXP Cache Disk
A time-consuming copy is necessary to preload the RAM disk each time a different application is desired.	No preload is necessary. Just load the program. The speedup is immediate, and average operating speed grows faster with time.
Information in the RAM disk is always vulnerable to a system lockup or power failure.	Information in FXP is always stored on the disk before the disk-drive light goes out.
RAM disks consume large amounts of RAM memory (180K for a single-sided disk or 360K for a double-sided disk).	FXP can be effective with as little as 16K of RAM. That is enough to halve the time required to back up a floppy disk.
Any information stored on a RAM disk that you want to save must be manually copied onto disk.	Information in FXP is constantly and automatically updated onto the disk.
All disk operations that you want to speed up must be redirected onto the RAM disk.	FXP automatically intercepts all disk operations and intelligently decides what operations to redirect.
You must change the way you use your computer.	You don't have to do anything different when using your computer.

And one of the major advantages of the FXP software is its automatic print-buffering capability. Of course, a RAM disk can also add great flexibility as well as speed to your computer system. But for many applications, nothing can beat the speed or simplicity of the FXP software.

LOADING FXP

Application programs like FXP are easy to install and use, especially when you copy them onto your hard disk. We recommend that you copy the FXP file into the root directory of your hard disk. You should then include the command FXP as part of the AUTOEXEC.BAT file in your root directory. In this way, FXP will automatically start working each time you load DOS from your hard disk. To access the root directory or create an AUTOEXEC.BAT file, review the information in Sections 3, 4, and 6.

If you have a hard-disk drive and have copied the files from the supplemental diskette as described in Section 1, you can start the program by typing `fxp` and pressing [Retrn].

If you have a floppy-drive system, you will first boot up using your DOS system diskette, and then insert the supplemental diskette, type `fxp`, and press [Retrn]. You can also copy FXP.COM onto an application diskette that you use to boot your system.

Remember that we recommend that you place the FXP command in the AUTOEXEC.BAT file. And that's all you really need to know to successfully use FXP. The following material is directed to those advanced users who want to better understand the technical aspects of FXP and some of its optional commands.

USING THE FXP COMMANDS

Whenever FXP is loaded, it establishes the following *default* conditions:

- Drives A and C are automatically enabled for caching and print buffering. Note that if the hard disk is partitioned into several logical drives, these drives are always enabled for caching whenever drive C is enabled.
- Line printer 1 is the default for print buffering.
- 64K of system memory is automatically devoted to the cache/print buffer unless the optional extended memory card is present. When the optional extended memory card is present, FXP will use all of the available memory (512K or 1024K) as the cache buffer without, of course, interfering with any RAM disks that might also be using extended memory.

The FXP commands allow you to review or to change any of these parameters. To enter any of these commands from the DOS prompt (A> or C>), simply type `fxp /` followed by the three-character command. For example, to view the current status of FXP as well as a list of all available commands, enter the following Help command and press [Retrn]:

```
fxp /hlp
```

Note that the same command could also be included as an entry in an AUTOEXEC.BAT file. Note also that you can include more than one command in a single entry as in the following example:

```
fxp /256/cpb
```


This command would allocate 256K of memory for caching (`/256`) and clear the print buffer (`/cpb`).

A description of each of the FXP commands follows. Remember that each command must be preceded by the characters FXP. If you enter a nonexistent command, FXP will display the `YOU ENTERED AN INVALID /COMMAND` message and then display the complete list of FXP commands on the screen.

NOTE

The buffer size that FXP allocates may be slightly less than the size you specified: memory is allocated in units of 4.5K each. FXP adjusts the buffer for the space it occupies in memory and for the number you request. The two summed together may not be divisible by 4.5.

FXP General Commands

/XXXX = ALLOCATE XXXX K BYTES OF MEMORY
This command designates the amount of memory used for the cache buffer. You can allocate as little as 16K and as much as 1024K. Of course, your selection will depend on the requirements of your application program and the amount of available RAM (don't forget to subtract from the total amount of RAM storage the requirements of any installed RAM disks). For programs that can use all of your computer's available memory, try using 64K. For programs that cannot use all available system memory—BASIC programs, for example—choose a large value such as 256 or 320K. If the automatic operation of FXP is used, 64K of memory is allocated when no extended memory card is present. When the extended memory card is present, FXP automatically allocates all available extended memory as the cache buffer.

Note that this command and the /ULM command, unlike all other FXP commands, must be used as a part of the command that loads FXP. Once FXP is installed, the buffer size cannot be changed until DOS is reset or rebooted. Consequently, if you're using an AUTOEXEC.BAT file to load FXP, you'll need to edit the AUTOEXEC file and add the /xxxx buffer allocation to the FXP command already present in the AUTOEXEC.BAT file. Then, when

you reload DOS, the new buffer size will become effective. If you frequently switch between application programs, you may find it easier to simply use FXP's default buffer size for all applications.

/ULM = USE LOWER MEMORY
This command forces FXP to use your computer's main system memory as the cache buffer rather than the memory on the optional extended memory board. Like the /XXXX command, this command must be included as a part of the command that first loads FXP. Once FXP is installed, the buffer size or location cannot be changed until DOS is reset or rebooted.

/CPS = CHECK PROGRAM STATUS
This command shows what FXP parameters are currently active and lists each of the FXP commands. It functions much the same as the /HLP Help command.

FXP Caching Commands

As all cache drives are automatically enabled when FXP is loaded, we'll organize our discussion of the caching commands in the order that you would probably use the commands: clearing, disabling, and enabling.

/CFn = CLEAR FLOPPY DISK *n* BUFFER
/CHD = CLEAR HARD DISK BUFFER
These commands allow you to clear the caches of all information presently stored. Since the caches are self-clearing, these commands are needed only under the rarest of circumstances when a new disk has exactly the same *file allocation table* and directory as the disk previously used (for example, a backup disk). In the unlikely event that this situation should occur, you can use these commands to clear the cache in less than a second. Note that *n* can be 1 or 2.

/DFn = DISABLE FLOPPY *n* CACHING
/DHD = DISABLE HARD DISK CACHING
These commands disable or turn off the caching for the designated disk drive. During certain periods you may not want to have caching in effect. These commands would be used for that purpose. The print buffer will still be in effect unless you selectively turn it off as well.

/EFn = ENABLE FLOPPY DISK *n* CACHING
/EHD = ENABLE HARD DISK CACHING
These commands turn on the buffering of disk read and write operations by FXP for the designated drive.

/EBW = ENABLE BUFFERED DISK WRITES
/DBW = DISABLE BUFFERED DISK WRITES
These commands allow you to turn on or off the buffering of disk write operations.

FXP Print-Buffer Commands

Whenever FXP is loaded, it automatically enables print buffering. When you're not printing, the RAM memory reserved by FXP is primarily devoted to caching. When information is sent to the print buffer, FXP temporarily clears the least-used information from the cache to free space for the print buffer. FXP then monitors the speed of your printer and optimizes itself to match the throughput requirements of the printer without affecting other system operations. If you ever need to abort a printing task, simply turning the printer off will clear the FXP print buffer.

Note that FXP, like DOS, directs all printer output to the parallel printer port (LPT1). If you have a serial printer, you'll have to use the DOS MODE command to redirect output to the serial port as explained in Section 3.

/CPB = CLEAR PRINT BUFFER
This command may be used to clear the print buffer of any unwanted data. It may be used while in DOS without having to reboot the system.

/DPB = DISABLE PRINT BUFFER
This command allows you to turn off the print buffer at any time. It can be used in DOS and does not require that the system be rebooted.

/EPB = ENABLE PRINT BUFFER
This command activates or turns on the operation of the print buffer. This command would be required only had you issued the /DPB (Disable Print Buffer) command earlier during the same work session.

/LPn = BUFFER LINE PRINTER *n*
This command buffers the printer output to line printer number *n* (*n* can be 1, 2, or 3).

/SAP = SUSPEND ALL PRINTING
This command is used to temporarily store information in the print buffer before printing it. Although printing is suspended, data is allowed to accumulate to be printed at a later time. Any documents sent to the buffer will be held in the sequence they are sent. When the /RAP (Resume All Printing) command is invoked, the data that was being held in the buffer will be sent to the printer.

/RAP = RESUME ALL PRINTING
This command is used to resume all printing that has been temporarily halted by the /SAP (Suspend All Printing) command. Any data that has been loaded into the buffer while print was suspended will be accumulated. When this command is invoked, the printer will resume printing of that data.

FXP INFORMATION MESSAGES

FXP CANNOT ALTER THE BUFFER SIZE AFTER IT HAS BEEN CREATED
You tried to change the amount of memory for FXP after it was allocated. To change the size of the buffer, you must change the FXP load command in the AUTOEXEC.BAT file and then reset the system.

FXP CANNOT CREATE A BUFFER OF THAT SIZE
The amount of memory allocated for the buffer size is too large. Reconfigure the buffer size and reset the computer.

FXP CANNOT CREATE A MINIMUM BUFFER AND STILL LEAVE 48K OF FREE MEMORY
FXP IS TERMINATING WITHOUT INSTALLING ITSELF
There is not enough available memory for FXP to operate. You must free more memory before using the program.

FXP REQUIRES A BUFFER SIZE OF AT LEAST 8K BYTES
You asked for too little memory for the buffer size. FXP needs at least 8K of memory for the buffer.

FXP CANNOT FIND ANY COMMANDS TO EXECUTE
You entered an invalid entry. Check the letter combination to find the correct entry, and make sure that the slash (/) is entered correctly.

FXP WAS ALREADY RESIDENT IN MEMORY
FXP has already been loaded.

YOU ENTERED TOO MANY COMMANDS AT ONE TIME
ONE OR MORE OF THE LAST /COMMANDS WERE IGNORED
Make sure you're sending the correct FXP commands.

YOU USED LESS THAN 3 LETTERS FOR A /COMMAND
You entered an invalid entry. Check the letter combination for the correct three-letter command.

YOU ENTERED AN INVALID /COMMAND
All of the valid /commands are listed below
NOTE: The / plus all 3 characters are required!
You entered an invalid entry. Check the letter combination for the correct three-letter command.