# Using Your 5247 Disk

IBM®

System/23

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IBM

System/23

Federal Communications Commission (FCC) Notice

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

About this book

This book is about the 5247 Disk. It has three aims:

- To explain what the disk is.
- To explain how information is stored on it.
- To help you use the disk efficiently.

This book will not make you a disk expert. Only practice and experience with the disk will do that.

If you have not taken the *Learning to Use System/23* course, you should do that now. It will also help if you keep the *Operator Reference* for System/23 handy.

Now you are ready to learn about your new disk system.

About this book

How to use this book

Chapter 1 is about the disk system. It compares the disk to diskettes, and talks about some of the advantages the disk offers you.

Chapter 2 is like your *Learning to Use System/23* course. You will be asked to do some exercises. They will help you learn how the disk works and the way the Customer Support Functions help you use the disk.

Read chapter 2 carefully, and follow all the steps. They will take you through some basic actions you will use with the disk each day. By the end of the chapter you will have practiced each of them.

After each of the first two chapters, you will find questions. They will help you to judge how well you know the disk system. The right answers are on the pages following the questions.

Answer the questions first—then check your answers against the correct ones.

When you can answer the questions correctly, you will know that you are ready to move on.

Chapter 3 covers what to keep in mind when you use the disk.

There is a section about system commands, and a section with hints about how to get the most out of your disk system.

There is also a discussion about the need to back up the information on the disk, as well as how and when to back it up. Chapter 3 also gives you advice on such things as:

- How to use the DIR, VOLID, and PROTECT commands with the disk.
- How to keep track of what's on the disk.
- How to arrange important programs and files for easy backup.
- How to operate smoothly with up to four computers attached to the disk.
- How to organize training and work sessions on the disk.
- How to control the use of programs.

The last chapter, Chapter 4, is for someone who will be writing programs for the disk system.

Contents

Contents

Chapter 1. Learning about your disk

About this chapter

When you have finished reading this chapter, and answered a few questions about what you have read, you should understand your new disk unit better.

We will:

- Compare the disk to diskettes.
- Talk about a volume on the disk.
- Discuss the advantages of the disk storage system.

Learning about your disk

Comparing the disk to diskettes

Until now, you have used diskettes to hold your information. They are convenient and reliable, and they will still play an important role as you use your System/23.

Your disk is different from diskettes in some important ways:

1. You cannot actually handle the disk the way you can diskettes, because the disk is sealed in a special container inside the 5247 Disk Unit.

2. The disk can hold a lot more information than a diskette.

3. You can get to information on the disk more quickly because you don't have to keep changing diskettes.

4. Up to four computers can use the disk at the same time.

A volume on the disk

A *volume* is an area in which you can store related information. However, a disk volume differs from the volume on a diskette in two important ways:

- The size of a disk volume can change as the amount of information in it changes. A diskette volume cannot change size.

- You can put more than one volume on the disk. A diskette can contain only one volume.

Let's look at each of these differences.

Learning about your disk

A volume on the disk (continued)

A volume on the disk can change size

A diskette is like a hardcover notebook and the volume on a diskette is like the pages in that notebook.

Just as the number of pages in a hardcover notebook cannot be changed (unless you rip some out), so the size of a volume on a diskette cannot change.
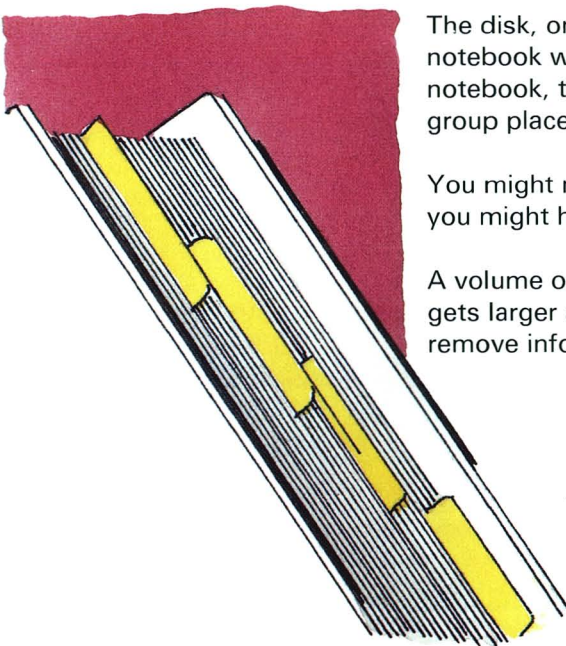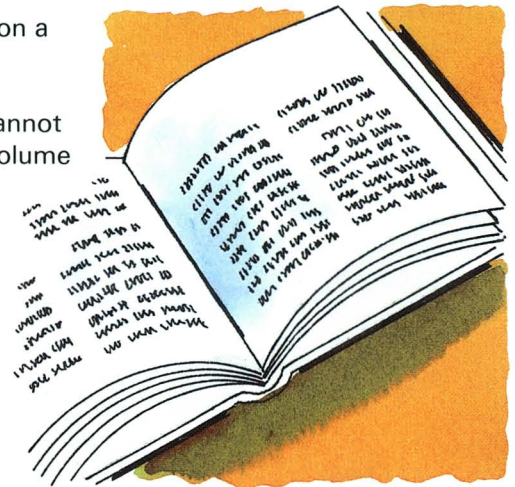
The disk, on the other hand, is like a very thick, loose-leaf notebook which may hold a large number of pages. In this notebook, there may be groups of loose leaf pages, each group placed between two dividers.

You might not have any pages between a pair of dividers, or you might have many pages.

A volume on the disk is like one of those groups of pages. It gets larger as you add information to it, and smaller as you remove information from it.

The disk may have more than one volume

Let's continue to think of that thick loose leaf notebook. The notebook may have only one large group of pages that fills it from cover to cover, or it may have many smaller groups of pages separated by dividers.

The same is true of the disk. In fact you can create as many as 25 groups, or volumes, on the disk, or as few as one.

For each of the volumes you create on the disk, you must specify a VOLume IDentifier (VOLID). You may also specify an owner IDentifier (owner-ID), just as you did with the volume you created on a diskette.
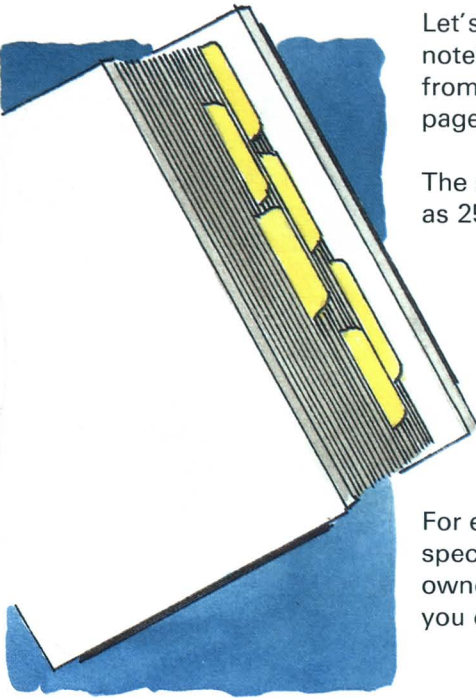
Learning about your disk

The advantages of disk storage

There are a number of advantages to your disk:

1. You can store more information in one place.

2. You can put programs and other information that you use a lot into one volume on the disk. You will not have to change diskettes and keep track of more than one drive number.

3. You can use your Customer Support Functions from the disk and save your master diskette copy of the Customer Support Functions as a backup.

4. You can copy application programs you use a lot into a disk volume of their own.

5. More than one person can use the disk at the same time. As many as four computers can be attached to the disk at one time.

6. More than one person can use the same file at the same time.

Summary

Let's pause here to review what you have learned about the disk and about volumes on the disk:

1. A diskette holds only one volume.

2. The disk holds up to 25 volumes.

3. A volume is a place to keep related information together.

4. A volume on a diskette always takes up all of the space on the diskette. It can have a lot of empty space if you have not put much information into it.

5. A volume on the disk gets bigger as you add information. It gets smaller as you remove information. It never has empty space in it unless you put empty space there.

6. Up to four computers can use the disk at the same time.

7. You can store a lot more information on the disk than you can on the largest size diskette.

Learning about your disk

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Questions

Decide whether the following statements are TRUE or FALSE (the correct answers are on the next page, but no peeking!):

1. A diskette can only hold one volume.
2. The volume on a diskette cannot change size.
3. The disk can hold up to 25 volumes.
4. A volume on the disk cannot change size.
5. Only one computer at a time can use the disk.

Learning about your disk

Answers

Here are the answers to the questions in the last section:

1.   TRUE. A diskette always holds only one volume which takes up all the available space on the diskette.

2.   TRUE. The size of a volume on a diskette always equals the capacity of the diskette. If you do not fill the volume with information, it contains empty space.

3.   TRUE. Your disk may contain any number of volumes between 1 and 25. The actual number of volumes your disk will hold depends on how big each volume is. You could have only one volume that was big enough to take up all the room on the disk. Or you could have 25 volumes and still have room to spare (in which case, you could not add any more volumes, but could add files to the volumes already there until all the room on the disk was used up).

4.   FALSE. A volume on the disk *can* change size. Like a balloon it gets larger as you add information, and smaller as you remove information. A disk volume never has empty space in it unless you put it there on purpose.

5.   FALSE. Up to four computers may use the disk at the same time. The ability to attach up to four computers is one of the advantages of the 5247 Disk Unit.

Chapter 2. Learning to use your disk

About this chapter

Follow the instructions carefully, and by the end of this chapter you will be able to:

- Switch on the disk.
- Use the Customer Support Functions you will need most often.
- Use some system commands.

A volume called VOL002, which contains all the Customer Support Functions, is already on the disk.

How to use the steps

Note: For you to complete all the exercises in this chapter, your computer must have at least one diskette drive.

Most of the information in Chapter 2 is presented in step-by-step exercises to help you learn some of the basic, everyday disk operations. The steps appear on the left side of the page, and contain instructions for you to follow.

To the right of these steps, you will often see a paragraph or two of explanation. All the text to the right of a step has to do with that step. The text may:

- Tell you more about what you are doing in the step and why.
- Tell you more about what will happen after you complete the step.
- Give you help, if you have a problem.
- Help you decide whether to go on to the next step.

Always read the text to the right of a step before you do the step.

Learning to use your disk

About this chapter (continued)

A word about input and output

The terms "input" and "output" appear a number of times in this book. Whenever they are used, they have the following meaning:

- *Input* refers to information coming into the computer.

  For example, the *input* VOLID is the name of the volume from which information will come into the computer.

- *Output* refers to information coming out of the computer.

  For example, the *output* VOLID is the name of the volume that will contain the information coming out of the computer.

The key word is *computer*. Input means into the *computer*. Output means out of the *computer*.

Some reminders before you start

Here are some things you should always keep in mind:

- Always check what you have typed before you press the Enter key. You will catch any typing errors that way.

- Check that the name of the diskette you insert into a diskette drive is *exactly* the same as the name the book asks for.

- When you are asked to type a zero (0), be careful not to type the letter "O" instead.

- When you are asked to type the number 1, be careful not to type the lowercase letter "l" instead.

- The disk is always referred to as drive 5.

Learning to use your disk

Switching on the disk
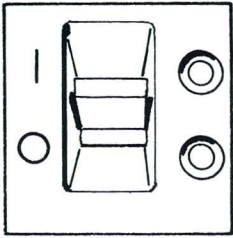
Use the following steps to switch on the disk:

1. If your computer is not switched off, switch it off now. If the 5247 disk is already switched on and the Ready light is on, skip steps 2 and 3, and go to step 4.

2. Switch on the 5247 disk. Check that the Power light is on (it may take a few seconds).

3. Wait for the disk Ready light to come on. It may take up to two minutes.

4. If you have a printer, switch on the printer.

5. If you have a 5246 diskette unit, switch on the 5246.

6. Now switch on the computer.

   Note: Always switch on the computer last.

7. Perform PROC START, using the Customer Support Functions diskette named VOL002. Insert the VOL002 diskette into any diskette drive and close the diskette drive handle. Then press the Enter key.

Ready

Power

Ready

Power

Is VOL002 on the disk?

1

Remove the Customer Support Functions diskette (VOL002) from the diskette drive.

All diskette drives should be empty.

Use steps 1 and 2 to find out if VOL002 is on the disk.

2

**Type:
VOLID**

**Press:
Enter key**

The VOLID command asks the computer to list all the volumes on the system. Since all your diskette drives are empty, VOLID will show you only the volumes on the disk.

Note: There may already be some other volumes on the disk. You will add three more volumes to the disk during the exercises in this chapter. Since the maximum number of disk volumes is 25, count the number of volumes on the disk now. If there are more than 22, check with your supervisor before continuing.

You are looking for a volume called VOL002, which should already be on the disk. You should see:

5   VOL002   CSF

It means that VOL002 is already there, and you can go now to "VOL002 is already on the disk" on page 2-25.

If you did not see VOL002 on the screen, continue to "VOL002 is not on the disk" on page 2-6.

Learning to use your disk

VOL002 is not on the disk

Since VOL002 is not on the disk, you will use steps 3 through 27 to add a volume to the disk, and copy your Customer Support Functions into it.

Before you do that, you need to learn about the disk Customer Support Functions. You also need to know how many Customer Support Functions diskettes you have—one or two.

The Customer Support Functions

Among the Customer Support Functions, there are three for the disk. You will learn about them in this chapter:

1. ADD.DELETE (Add or Delete a Volume)
2. BACKUP.RESTORE (Backup and Restore files or disk volumes)
3. DISK.RECOVER (Recover Disk files)

If you have one Customer Support Functions diskette, the outside label says: Customer Support Functions, VOLID=VOL002.

The three Customer Support Functions for the disk are on VOL002.

CUSTOMER SUPPORT FUNCTIONS
VOLID=VOL002
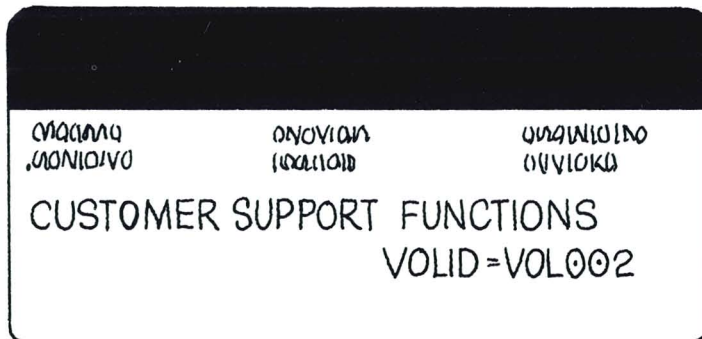
If you have two Customer Support Functions diskettes, the label on one says: Customer Support Functions, Diskette 1 of 2, VOLID=VOL001.

The label on the other says: Customer Support Functions, Diskette 2 of 2, VOLID=VOL002.

The three Customer Support Functions for the disk are on VOL001.

Learning to use your disk

VOL002 is not on the disk (continued)
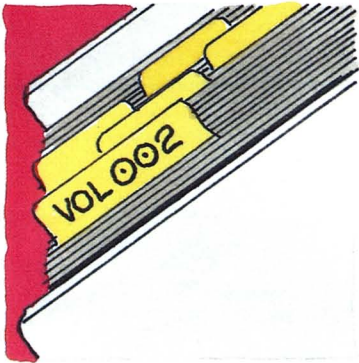
Adding VOL002 to the disk

Since you must add a volume on the disk before you can use the disk to hold information, the next steps will help you put one there. You will add this volume using the ADD part of the Customer Support Function called ADD.DELETE (Add or Delete a volume). You will name the volume VOL002, and copy all of the Customer Support Functions into it.

The aim of this exercise is to give you practice adding a volume to the disk, and to help you copy your Customer Support Functions into the disk volume you are about to add. Remember that the disk can hold up to 25 volumes.

Before you start step 3, read "What ADD.DELETE does" and "How to use ADD.DELETE to add a volume to your disk," under ADD.DELETE in *Customer Support Functions,* Volume I, binder 5.

3

Find the Customer Support Functions diskette containing ADD.DELETE, insert it into any diskette drive, and close the diskette drive handle.

If you have two Customer Support Functions diskettes, ADD.DELETE will be on VOL001.

If you have one Customer Support Functions diskette, ADD.DELETE will be on VOL002.

Note: The name of each disk Customer Support Function is made up of two words separated by a period, with no spaces. You must enter both words and the period.

4

Type:
LINK   ADD.DELETE

Press:
Enter key

The ADD.DELETE menu screen 42–010 appears.

Note: Option 1 gives you a description of ADD.DELETE. If you wish, you may choose this option before continuing to step 5.

Learning to use your disk

VOL002 is not on the disk (continued)

5

Type:
2

Press:
Enter key

Choose to add a volume by selecting option 2. This brings Add a Volume screen 42-052 to your display.

6

Type:
1

Press:
Enter key

Typing 1 tells the computer to display messages and information on your screen only. When you choose the Screen only option, the computer ignores the printer entry.

If you do *not* have a printer attached to your system, you *must* choose option 1, Screen only, or you will cause an error.

After step 6, you see Add a Volume screen 42-102, which tells you how many volumes are already on the disk.

On screen 42-102, which you will complete in step 7, the computer asks you to pick a VOLume IDentifier (VOLID) for the volume you are about to add.

The VOLID is like the ID you are often asked to produce when you cash a check—it shows the volume name.

7

Type:
VOL002

Press:
New Line key once

Type:
CSF

Press:
Field Exit key

Press:
Enter key

Enter the VOLID, *the volume name,* for the new volume you are about to add.

Use the letters "CSF" (for Customer Support Functions) as the owner-ID for this volume. The owner-ID may not be longer than 14 English letters or numbers. The computer fills in the word "OWNERID" if you ignore this option.

After step 7, you see screen 42-132 that tells you Add a Volume is in progress. This is followed by screen 42-142 that tells you Add a Volume was successful.
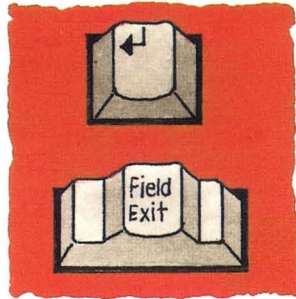
The *New Line* key advances the cursor to the next field.

The *Field Exit* key removes information from the rest of a field and advances the cursor to the next field.
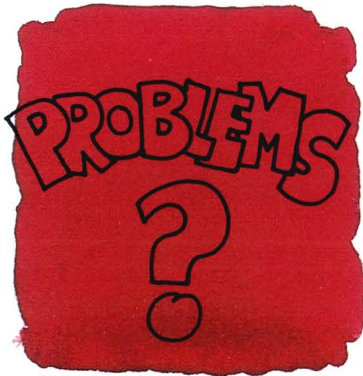
If Add a Volume was unsuccessful (you see screen 42-152), **follow the instructions on the screen.**

If an error code other than 4055 appears, look up that error code in the *System Messages* manual, binder 3, and do steps 5 through 7 again.

Learning to use your disk

VOL002 is not on the disk (continued)

If error code 4055 appears on the status line, then VOL002 already exists on the disk. End ADD.DELETE by typing 9 and pressing the Enter key. Then type: DIR /VOL002/5. If a list of files appears, go to "The Customer Support Functions" on page 2-26. If a list of files does *not* appear, go to "Copying from diskette to disk" on page 2-13.

8

Press:
Enter key

You have now created a new volume on the disk, named it VOL002, and returned to the main menu for ADD.DELETE.

9

Type:
9

Press:
Enter key

ADD.DELETE ends and you are back to READY INPUT.

```
READY    INPUT
```

Copying from diskette to disk

In this exercise you will copy all the Customer Support Functions from diskette to disk.

Before you begin, read the section called "Copy one file, a group of files, or all files" under COPY in *Customer Support Functions,* Volume I, binder 5; then, return here.

Copying VOL002 to the disk.

Copy VOL002 from your Customer Support Functions diskette into the volume on the disk called VOL002 using the steps in this section.

If you have two Customer Support Functions diskettes, COPY will be on the diskette labeled: Diskette 1 of 2, VOLID=VOL001.

If you have one Customer Support Functions diskette, COPY will be on that diskette, labeled: VOLID=VOL002

Note: If you have a 32k computer with one diskette drive, see "COPY" in the *Customer Support Functions* manual, Volume I, binder 5, for more information about about how to use COPY with one diskette drive.

10

Insert the Customer Support Functions diskette that contains COPY into any diskette drive.

Close the diskette drive handle.

Learning to use your disk

Copying from diskette to disk (continued)

11 Type: LINK COPY Press: Enter key.	You will now see the COPY menu (screen 03-010). **Note:** If you wish, you may choose option 1 for a description of COPY before continuing with step 12.
12 If you inserted VOL001 in step 10, replace it now with VOL002.	If you have only one Customer Support Functions diskette, you will take no action in step 12.
13 Type: 2 Press: Enter key	Choose to copy one file, a group of files, or all files by typing 2. After step 13, you see screen 03-082 on your display.

14

Type:
(Your choice of
1 or 2)

Press:
Enter key

If you do *not* have a printer attached to your system, you *must* choose option 1, Screen only, or you will cause an error.

If you *do* have a printer attached, type 2 to send messages and information to your screen and to your printer.

After step 14, you see screen 03-092 which asks four questions about the COPY operation.

15

Press:
Enter key

By pressing the Enter key, you tell the computer to use the choices already on the screen.

After step 15, you see screen 03-102.

16a

Type:
(diskette drive
VOL002 is in)

The next five steps, 16a through 16e, help you fill in the fields in screen 03-102. Your entries tell the computer to copy all the files from diskette VOL002 into the volume called VOL002 on the disk in drive 5.

Learning to use your disk

Copying from diskette to disk (continued)

16b

Press:
New line key once.

Type:
VOL002

This step tells the computer to copy from diskette VOL002.

16c

Press:
New line key once.

Type:
*****

The " * " means that you want copies of all the files on diskette VOL002.

16d

Press:
New line key once.

Type:
5

This step tells the computer to put the copies it makes of the files on diskette VOL002 onto the disk, which is always referred to as drive 5.

16e

Press:
New line key once.

Type:
VOL002

Press:
Enter key

This step tells the computer what disk volume to copy the files into. You must always enter the VOLID of the disk volume when you specify drive 5 (as you did in step 16d).

After step 16e, you see screen 03-202, which lists each file on diskette volume VOL002 as it is copied to disk volume VOL002.

While COPY is operating, you may notice '' *1 '' flickering on the status line. This shows that the disk and the computer are passing information back and forth, and it's normal.

Since there are a number of files to be copied, if you wish you may learn more about the status line while COPY finishes up. Read about the status line in Chapter 2 of the *Operator Reference*, binder 2.

When COPY is finished you see screen 03-142 which tells you that COPY was successful. It also tells you how many files were copied.

Learning to use your disk

Copying from diskette to disk (continued)

17

Press:
Enter key

This step returns you to the main COPY screen, 03-010.

18

Type:
9

Press:
Enter key

COPY ends and you are back to READY INPUT.

READY INPUT

If you have only one Customer Support Functions diskette (VOL002), go now to "Review" on page 2-27.

Copying VOL001 to the disk

Copy your Customer Support Functions diskette VOL001 into the volume called VOL002 on the disk using the following steps.

19

Insert diskette VOL001 in any diskette drive.

Close the diskette drive handle.

COPY is on the Customer Support Functions diskette marked: Diskette 1 of 2, VOLID=VOL001.

20

**Type:
LINK COPY**

**Press:
Enter key.**

The COPY menu (screen 03-010) appears.

Note: If you wish, you may choose option 1 for a description of COPY before continuing with step 21.

Learning to use your disk

Copying from diskette to disk (continued)

21

Type:
2

Press:
Enter key

Choose option 2, Copy one file, group of files, or all files.

After step 21, you will see screen 03-082.

22

Type:
(Your choice of
1 or 2)

Press:
Enter key

If you do *not* have a printer attached to your system, you must choose option 1, Screen only, or an error will occur.

If you *do* have a printer attached, type 2 to send messages and information to your screen and to your printer.

After step 22, you see screen 03-092 which asks four questions about the COPY operation.

23

Press:
Enter key

By pressing the Enter key, you tell the computer to use the choices already on the screen. In most cases, if you're not sure what choice to make, pressing the Enter key is okay.

After step 23, you see screen 03-102.

24a

Type:
(number of the
diskette drive
VOL001 is in)

The next five steps, 24a through 24e, help you complete the fields on screen 03-102. Your entries tell the computer to copy all the files from diskette VOL001 into a volume called VOL002 on the disk in drive 5.

24b

Press:
New Line key once

Type:
VOL001

This step tells the computer to copy from diskette VOL001.

24c

Press:
New line key once.

Type:
*

The " * " means that you want copies of all the files on diskette VOL001.

Learning to use your disk

Copying from diskette to disk (continued)

24d

Press:
New Line key once

Type:
5

This step tells the computer to put the copies it makes of the files on diskette VOL001 onto the disk, which is always referred to as drive 5.


24e

Press:
New Line key once

Type:
VOL002

Press:
Enter key

This step tells the computer what disk volume to put the copies into. You must always give the computer the VOLID of the disk volume when you specify drive 5 (as you did in step 24d).

After step 24e, you see screen 03-202, which lists each file on diskette volume VOL001 as it is copied to disk volume VOL002.

While COPY is operating, you may notice '' *1 '' flickering on the status line. This shows that the disk and the computer are passing information back and forth, and it's normal.
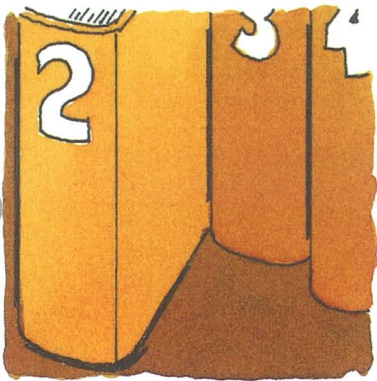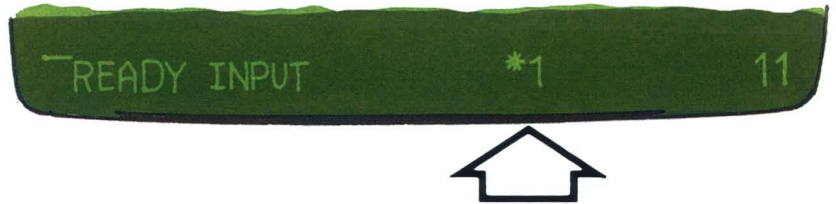
While COPY is working, if you have not already done so, read about the status line in chapter 2 of the *Operator Reference*, binder 2.

When COPY is finished you see screen 03-142 which tells you that COPY was successful. It also tells you how many files were copied.

Learning to use your disk

Copying from diskette to disk (continued)

25

Press:
Enter key

You are back to the main COPY screen 03-010.

26

Type:
9

Press:
Enter key

COPY ends and you are back to READY INPUT.

READY INPUT

27

Remove the Customer
Support Functions
diskette from the
diskette drive.

After you have done step 27, go to "Review" on page 2-27.

VOL002 is already on the disk

If the disk is already switched on, go to "The Customer Support Functions" on page 2-26.

If the disk is switched off, continue with the following steps.

Switching on the disk

Use the following steps to switch on the disk:

1. Make sure that your computer is switched off.
2. Switch on the disk power.
3. Check that the POWER light is on (it may take a few seconds).
4. Wait for the disk READY light to come on. It may take up to two minutes.
5. If your printer is switched off, switch on the printer.
6. If you have a 5246 diskette unit and it is switched off, switch on the 5246.
7. Now switch on the computer.

    Note: Always switch on the computer last.

8. Perform a PROC START using the Customer Support Functions in disk volume VOL002 by pressing the Enter key when PROC START appears on the screen. The computer will use the files in the disk volume for the START.

Learning to use your disk

VOL002 is already on the disk (continued)

The Customer Support Functions

The Customer Support Functions are contained in a disk volume called VOL002.

Among them are three for the disk which you will learn about in this chapter:

1. ADD.DELETE (Add or Delete a Volume)
2. BACKUP.RESTORE (Backup and Restore files and disk volumes)
3. DISK.RECOVER (Recover Disk files)
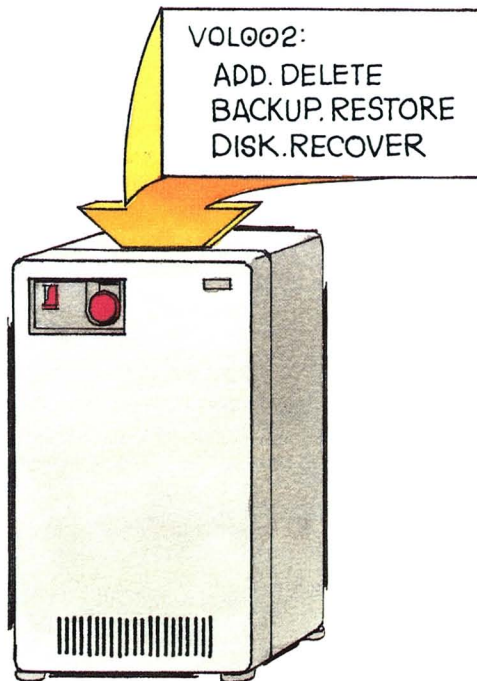
Review

You are now ready to continue with the exercises. Before you do, however, let's review the steps for switching on the disk because you will use them often:

1. Check that your computer is switched off.

2. Switch on the 5247 disk and wait for the Ready light.

3. Switch on your printer, if you have one attached.

4. Switch on your 5246 Diskette Unit, if you have one attached.

5. Switch on the computer last.

6. Perform a PROC START by pressing the Enter key when PROC START appears on the screen.

Naming a volume

A *VOLID*, or volume name, must have no more than six English letters or numbers, and contain no spaces.

222VOL would be all right for a volume name. So would **MYVOL**, because you may use less than 6 characters.

VOL0022 would not be proper, because it has one character too many.

VOL 22 would not be right because it contains a space.

Learning to use your disk

VOL002 is already on the disk (continued)

Choosing an owner-ID

When you add a volume to the disk, or name the volume on a diskette, you may choose an additional word to describe that volume. This added word is called an *owner IDentifier*, or owner-ID.

The owner-ID must be no more than 14 English letters or numbers.

You may use the owner-ID to show that **you** added the volume by using your name, or to describe the kind of information the volume contains (for example, ''CSF'' for VOL002 on the disk, to show that it contains the Customer Support Functions).

If you decide not to choose an owner-ID, the computer will use the word ''OWNERID.''

Changing an owner-ID

If you wish to change the owner-ID for a volume, use the VOLID command. For example, if you wished to change the owner-ID of a volume named PQR222 from BETTY to ADDRESSES, you would type:

VOLID PQR222,PQR222,ADDRESSES

ADDRESSES would then replace BETTY as the owner-ID of the volume named PQR222.

You can read more about the VOLID command in chapter three of this book and in the chapter called ''Commands'' in the *Operator Reference*, binder 2.

Using the VOLID and disk drive number

Remember that the disk can contain as many as 25 volumes. Since you now have all your Customer Support Functions in one disk volume called VOL002, it is good practice to give the computer the VOLID and disk drive number (5) whenever you ask for a Customer Support Function.

Whenever you include the VOLID in a command, it must be separated from the other parts of the command with a slash (/).

For example, to use the COPY Customer Support Function, you would type: **LINK COPY/VOL002/5**

Notice that the VOLID is separated from the Customer Support Function filename (COPY) with a slash (/), and from the drive number with a slash (/).
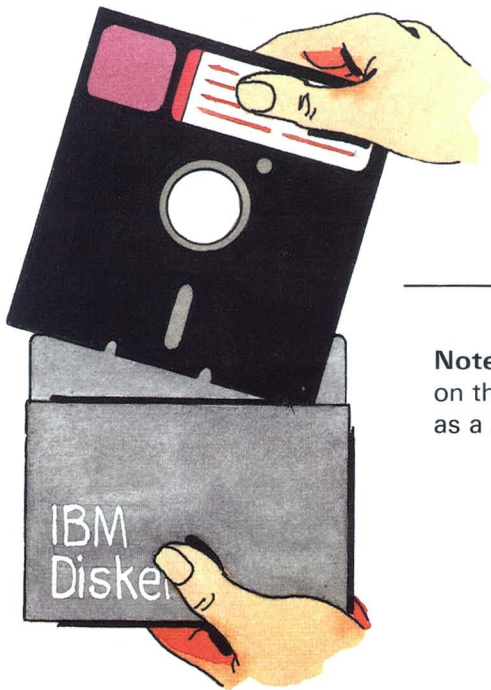
Note: Since the Customer Support Functions are in VOL002 on the disk, store each Customer Support Functions diskette as a backup copy.

Learning to use your disk

Adding volumes to the disk

In this section, you will add three volumes to the disk using ADD.DELETE three separate times. Use your initials followed by the number 001 as the VOLID of the first volume you add. For example, if your initials were ABC, you would name this volume ABC001.

When you add the other two volumes, name them with your initials and the numbers 002 and 003.

If you used our example initials (ABC), you would end up with three volumes called ABC001, ABC002, and ABC003.

Write down the names you choose for the volumes, because you'll need them later.

If you have not already done so, read "What ADD.DELETE does" and "How to use ADD.DELETE to add a volume to your disk" under ADD.DELETE in the *Customer Support Functions,* Volume I, binder 5, before going on to step 28.

28

Check that all diskette drives are empty.

29

Type (on one line):
LINK   ADD.DELETE
/VOL002/5

Press:
Enter key

In step 29, you are giving the computer a complete description of the name and location of the ADD.DELETE Customer Support Function.

Note: The name of a disk Customer Support Function is made up of two words separated by a period, with no spaces. **You must enter both names and the period.**

Remember, the VOLID must be separated from the other parts of the command with a slash (/). The parts of the command are:

LINK   ADD.DELETE /VOL002/5

Command | Function name | VOLID | Drive no.

Space | Separator | Separator

After step 29, ADD.DELETE screen 42-010 appears.

Learning to use your disk

Adding volumes to the disk (continued)

30

Type:
2

Press:
Enter key

You choose to add a volume by selecting option 2.

After step 30, Add a Volume screen 42-052 appears.

31

Type:
1

Press:
Enter key

By typing 1, you tell the computer to display messages and information on your screen only.

If you do *not* have a printer attached to your system, you *must* choose option 1, Screen only, or you will cause an error.

After step 31, you see Add a Volume screen 42-102, which tells you how many volumes are already on the disk.

On screen 42-102, which you will complete in step 32, the computer asks you to pick a VOLume IDentifier (VOLID) for the volume you are about to add.

The VOLID is like the ID you are often asked to produce when you cash a check—it shows the **volume name**.

32

Type:
(VOLID you pick)

Press:
New Line key once

Type:
(your first name)

Press:
Field Exit key

Press:
Enter key

Enter the VOLID, the volume name, for the new volume you are about to add. Remember to use your initials followed by a three digit number.

You may also choose an additional name, called an owner-ID. Use your first name for these exercises.

The computer uses the word "OWNERID" if you ignore this option.

After step 32, you see screen 42-132, which tells you that Add a Volume is in progress. This is followed by a screen 42-142, which tells you that Add a Volume was successful.
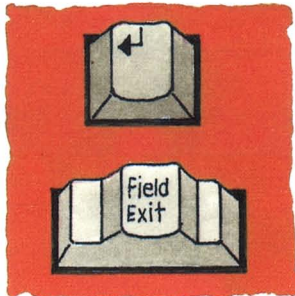
The *New Line* key advances the cursor to the next field.

The *Field Exit* key removes information from the rest of a field and advances the cursor to the next field.

If the last screen tells you that Add a Volume was unsuccessful (screen 42-152), and you see error code 4055, you have picked a VOLID that already exists on the disk. Try using different initials or different numbers.

Follow the instructions in the lower left hand corner of the screen and go back to step 30.

Learning to use your disk

Adding volumes to the disk (continued)

33

Press:
Enter key

You have now created a new volume on the disk, named it yourself, and returned to the main menu screen for ADD.DELETE.

Adding two more volumes

Go back now and do steps 30 through 33 two more times to add two more volumes to the disk.

When you finish you will have added three volumes. These volumes will have names consisting of six characters: the first three characters are your initials and the last three are the consecutive numbers 001, 002, and 003.

Of course, if you have only two initials, the volume names will have five characters: your two initials followed by the three numbers. That's okay, too, because you can have less than six characters in a VOLID.

34

Type:
9

Press:
Enter key

ADD.DELETE ends and you are back to READY INPUT.


```
─
  READY    INPUT
```

Checking your progress

The VOLID command lists the names of all the volumes on your diskette drives and your disk.

Now that you have created three new disk volumes, check that those volumes are on the disk by using the VOLID command.

Learning to use your disk

Adding volumes to the disk (continued)

35

Type:
VOLID

Press:
Enter key

The computer shows you the drive number, name, and owner-ID of every active volume on your diskette drives and on the disk.

The listing that the computer gives you for a volume when you use the VOLID command has the following form:

```
VOLID
5 VOL002 CSF
5 PROG3   TEST
5 SALES   TOBY
5 ABC001  TOM
```

Drive no. ─────┘   │   └──── OWNERID

VOLID

There may be other volumes on the disk so you may have to search for yours. Look for:

5   ???001   (your first name)
5   ???002   (your first name)
5   ???003   (your first name)

(??? stands for your initials).

More practice with COPY

For the next steps, you will need volumes with files in them.

Use COPY, in disk volume VOL002, to copy the file called SETUP1 (it's also one of the files in VOL002 on the disk) into each of the three volumes on the disk you named (with your initials and the numbers 001, 002, and 003) back in step 32.

36

Type:
LINK   COPY/VOL002/5

Press:
Enter key.

After step 36, you see the COPY menu (screen 03-010).

37

Type:
2

Press:
Enter key

Choose option 2, Copy one file, group of files, or all files, by typing 2.

Learning to use your disk

More practice with COPY (continued)

38

Type:
1

Press:
Enter key

By typing 1, you tell the computer to display messages and information on your screen only. When you choose option 1, the computer ignores the printer entry.

If you do *not* have a printer attached to your system, you *must* choose option 1, Screen only, or you will cause an error.

After step 38, you see screen 03-092 which asks four questions about the COPY operation.

39

Press:
Enter key

By pressing the Enter key, you are telling the computer to use the choices already on the screen.

After step 39, you will see screen 03-102.

40a

Type:
5

The next five steps, 40a through 40e, will help you complete the fields in screen 03-102. Your entries tell the computer to make a copy of a file called SETUP1 in VOL002 on the disk (drive number 5), and store it in one of the three volumes you named in step 32, which is also on the disk (drive number 5).

Always use drive number 5 to refer to the disk.

40b

Press:
New Line key once.

Type:
VOL002

In this step, you tell the computer which volume to copy from (VOL002 on the disk).

40c

Press:
New Line key once.

Type:
SETUP1

This step tells the computer to make a copy of a file called SETUP1.

40d

Press:
New Line key once.

Type:
5

This step tells the computer to put the copy of SETUP1 onto the disk.

Learning to use your disk

More practice with COPY (continued)

40e

Press:
New Line key once.

Type:
(VOLID from step 32)

Press:
Enter key

Here you tell the computer which disk volume to put the copy of SETUP1 into. The VOLID you enter here is one of the three you picked back in step 32, made up of your initials and three numbers.

After step 40e, you see screen 03-212 (Copy in progress), and then screen 03-142 which tells you that COPY was successful. Since you only copied one file, the computer does not list the filename, but it does tell you how many files were copied.

If you see screen 03-152 (COPY failed), follow the instructions at the bottom of the screen. Then do the following:

1. Type: 9 and press the Enter key to end COPY.

2. Type: **DIR /VOL002/5**

   If you have a printer attached, you may add the **,PRINT** option.

3. Check the directory of VOL002 for the file called **SETUP1**.

   a. If **SETUP1** is listed, go back now and do steps 36 through 40e. **Follow the steps very carefully.**

   b. If **SETUP1** is *not* listed, someone may have accidentally erased it from disk volume VOL002. You will have to copy SETUP1 from your Customer Support Functions diskette VOL002 into disk volume VOL002 using the COPY Customer Support Function (it's already on the disk in VOL002).

   See "Copying from diskette to disk" on page 2-61 for help copying from diskette to disk. When you have copied SETUP1 into disk volume VOL002, go back to step 36.

41

Press:
Enter key

This step returns you to the main COPY menu (screen number 03-010).

Go back now and repeat steps 37 through 41 until you have put a copy of SETUP1 into each of your three new disk volumes.

When you have copied SETUP1 into each of your three new disk volumes, go on to step 42.

Learning to use your disk

More practice with COPY (continued)

42

Type:
9

Press:
Enter key

COPY ends and you are back to READY INPUT.

READY   INPUT
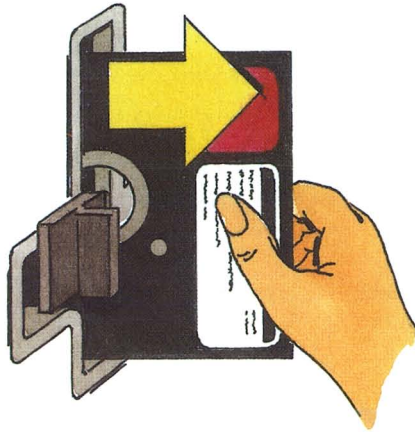
43

Check that all
diskette drives
are empty.

If you left a diskette in any of the diskette drives, remove the
diskette now. This step makes sure that when you check your
progress, in the next section, you will be looking only at disk
volumes and disk files.

Checking your progress

Now that you have created three volumes on the disk and copied files into each of them, you will check your progress by using the DIR command which shows you the *directory* of a volume—that is, a list of all the files in the volume.

Back in *Learning to Use System/23*, you learned to display the directory of the volume on a diskette by typing the command, DIR, followed by a space and the drive number. That works fine for a diskette because it holds only one volume.

The disk, however, can hold as many as 25 volumes. Therefore, you must use the DIR command properly to be sure that you see the directory of the disk volume you want.

Always include the VOLID and drive number when you use the DIR command to display the directory of a disk volume. For example, to use the DIR command correctly to display the directory of disk volume named ABC001, you would type:

DIR /ABC001/5

Here are the rules for using DIR with disk volumes:

- The command, DIR, must always be followed by a space.
- The VOLID must always be specified, and must always be separated from the other parts of the command with a slash (/).
- The disk is always referred to as drive 5.

Learning to use your disk

More practice with COPY (continued)

44

Type:
DIR /(your VOLID)/5

Press:
Enter key

In step 44, you look at the directory of one of the three new volumes you named back in step 32. You should see the file SETUP1 listed in that volume. The DIR command gives you information that looks like this:

```
DIR /ABC001/5

ABC001      29256704 0097 0000 512
05 SETUP1            00000512 00000512 000
```
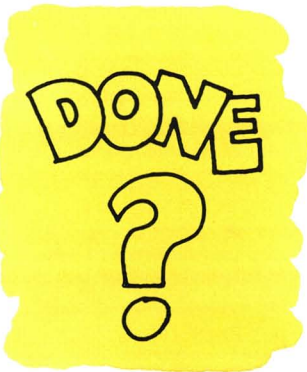
Now, repeat step 44 for the other two volumes you named in step 32. If SETUP1 is not listed in a volume, go back and do steps 36 through 42 for that volume.

When you finish copying SETUP1 into each of the three volumes you named in step 32, go on to the next section.

Deleting a volume from the disk

In this section, you will use the DELETE part of ADD.DELETE, in VOL002 on the disk, to delete each of the three disk volumes you named in step 32.

In daily work, you might choose to delete a volume because:

- The volume contains temporary files you no longer need.

- You have copied all the files from one volume into another volume and want to add to the free space on the disk.

Before you can delete a volume on the disk, each file in that volume must be freed. Go now to the *Operator Reference* manual, binder 2, and read the explanation of the FREE command in the section called "Commands," and come back here.

To use the FREE command correctly, the following rules apply:

- The command, FREE, must always be followed by a space.

- The VOLID must always be shown, and must always be separated from the other parts of the command with a slash (/).

- The disk is always referred to as drive 5.

Note: Do not type VOL002 for the VOLID in step 45. Use the VOLIDs of the volumes you named in step 32.

Learning to use your disk

Deleting a volume from the disk (continued)

45

Type (on one line):
**FREE SETUP1
/(your VOLID)/5**

Press:
Enter Key

In step 45, you free the file called SETUP1 in one of the disk volumes you named in step 32. Make sure you include the VOLID of one of those volumes.

After step 45, the command you typed in moves up one line and READY INPUT appears, showing you that the FREE operation is complete.

FREE SETUP1 / ABC001 / 5

| Command | Filename | | VOLID | Drive no. |

Space   Separator   Separator

Do step 45 two more times to free SETUP1 in each of the remaining two volumes you named in step 32.

When you have freed SETUP1 in each of the three volumes you named in step 32, you are ready to delete each of those volumes.

46

Type (on one line):
LINK ADD.DELETE
/VOL002/5

Press:
Enter Key

The ADD.DELETE menu (42–010) appears.

47

Type:
3

Press:
Enter Key

By typing 3, you choose to delete a volume.

After step 47, you see screen 42–053.

48

Type:
1

Press:
Enter Key

By typing 1, you tell the computer to display messages and information on your screen only.

If you do *not* have a printer attached, you *must* choose option 1, Screen only, or you will cause an error.

Learning to use your disk

Deleting a volume from the disk (continued)

49

Type:
(VOLID you picked
in step 32)

Press:
Enter Key

In this screen, (42-113), you enter the VOLID of the volume you want to delete. Use the VOLID of one of the volumes you named in step 32.

After step 49, you see screen 42-133 which tells you that Delete a Volume is in progress. This will be followed by screen 42-143, which tells you that Delete a Volume was successful.

If screen 42-153 appears, first follow the instructions in the lower left hand corner of the screen. Then, check whether you have freed SETUP1 in this volume with these steps:

1. Type: **9**
2. Press: **Enter key**
3. Type: **DIR /(VOLID of this volume)/5**

If SETUP1 is still listed, do steps 45 through 49 again for this volume.

50

Press:
Enter key

This step returns you to the main menu for ADD.DELETE.

Repeat steps 47 through 50 for each remaining volume you named in step 32 that contains SETUP1.

When you have deleted the three volumes you added in step 32 and named with your initials, read the **caution** below and then go on to step 51.

CAUTION

Deleting a disk volume should only be done with great care. If the volume has important files in it, make sure that they are copied to another volume before you free them and delete the volume.

Except for these exercises, check with your supervisor or programmer before you delete a disk volume. Be sure that the files in the volume should be erased.

Learning to use your disk

Deleting a volume from the disk (continued)

51

Type:
9

Press:
Enter key

ADD.DELETE ends and you are back to READY INPUT.

READY   INPUT

You have now finished the main exercises in this chapter. The next section talks about making backup copies of disk files, and how you can use the BACKUP.RESTORE Customer Support Function to make those copies.

Making backup copies of disk files

The BACKUP.RESTORE Customer Support Function allows you to make backup copies of the files in disk volumes. It is especially useful when the disk volume you want to copy contains more information than one diskette can hold.

You will find a section in Chapter 3 of this book that talks in more detail about making backup copies of your files. For now, go to your *Customer Support Functions*, Volume I, binder 5, and read "What BACKUP.RESTORE does," "BACKUP.RESTORE choices," and "Why and when to use BACKUP.RESTORE."

You may see some examples while you are reading. They are intended only to show you how to use BACKUP.RESTORE. Do *not* try these examples on the computer, because the filenames that are used are imaginary, and those files are not on the disk.

After you finish reading about BACKUP.RESTORE, go on to the next section, which introduces you briefly to a special-purpose Customer Support Function called DISK.RECOVER.

Learning to use your disk

Recovering files on the disk

DISK.RECOVER is the Customer Support Function that helps you try to get back a file that you have accidentally dropped or freed.

A complete description of the way DISK.RECOVER works is contained in *Customer Support Functions,* Volume I, binder 5. Read the sections called "What RECOVER does," and "Why and when to use RECOVER."

When you have finished reading about DISK.RECOVER, come back to this book.

Checklist

This checklist will help you pick the proper Customer Support Function or command to use for each of the operations listed; it also tells you where to find information about each function and command:

To:	Use:
Add a volume	ADD.DELETE (binder 5)
Delete a volume	ADD.DELETE (binder 5) See also the FREE command in the *Operator Reference* (binder 2)
Copy a file	COPY (binder 5)
List volumes	VOLID command (binder 2)
List files	DIR command (binder 2)
Back up files	COPY or BACKUP.RESTORE (binder 5)
Restore files	BACKUP.RESTORE (binder 5)
Recover a disk file	DISK.RECOVER (binder 5)

Learning to use your disk

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Questions

1. If you want to remove from the disk a volume containing four files, what Customer Support Function should you use?

   Would you need to use any other command, first?

2. Can you copy a file from one place on the disk to another place on the disk?

   What Customer Support Function would you use?

3. Can you copy from diskette to disk?

   What Customer Support Function would you use?

4. Can you copy from disk to diskette?

   What Customer Support Function would you use?

5. What command lists all the files in a volume?

6. What command lists all the volumes on the system?

7. What Customer Support Function would you use to create a new volume on the disk?

8. Do you now need your Customer Support Functions diskette containing VOL002 to perform a PROC START or to prepare a diskette?

Learning to use your disk

Answers

1. Use ADD.DELETE to delete a volume from the disk. Since you must free all files in a disk volume before you can delete it, you must also use the FREE command.

2. Yes. Use the COPY Customer Support Function.

3. Yes. Use the COPY Customer Support Function.

4. Yes. Use the COPY Customer Support Function (or the BACKUP.RESTORE Customer Support Function if the disk file is too large to fit on one backup diskette).

5. The DIR command list all the files in a volume.

   Type: DIR /(volid)/(drive number) and press the Enter key.

6. The VOLID command lists all the volumes on the disk and any volumes in diskette drives.

   Type: VOLID and press the Enter key.

7. Use ADD.DELETE to create a new disk volume.

8. No. Since you have all your Customer Support Functions in VOL002 on the disk, you do not need a Customer Support Functions diskette to perform a PROC START or to prepare a diskette.

   Type: PROC START and press the Enter key to perform the PROC START.

   Type: LINK PREPARE/VOL002/5 and press the Enter key to prepare a diskette.

More practice

Here is a chance for you to practice what you have learned in chapter 2, using the files and functions in disk volume VOL002.

Note: You will need to use diskettes for some of the following practice exercises. If your computer does not have a diskette drive, or does not have a 5246 Diskette Unit attached, you may skip those exercises which call for a diskette.

PROC START

Let's practice a PROC START using the disk only:

1. Switch off your computer.
2. Switch on your computer.
3. When PROC START appears on the command line, press the Enter key.
4. Enter the date on the screen that asks for it.
5. Enter the time on the screen that asks for it (do not worry about the seconds; just use 00).

As you see, you do not need a Customer Support Functions diskette for a PROC START, now that you have all of your Customer Support Functions in disk volume VOL002.

Learning to use your disk

More practice (continued)

Preparing a diskette

Use the following steps to prepare a diskette:

1. Locate the diskette you want to prepare. If it has already been used, make sure that the information it contains can be erased.

2. Type: LINK PREPARE/VOL002/5

3. Press the Enter key.

4. Follow the instructions on the screens and pick your own VOLID (the rules for picking a VOLID are listed under "Naming a volume" on page 2-27).

5. Write down the VOLID and save the diskette because you'll use it in the next exercise.

6. End PREPARE by typing: 9 and pressing the Enter key.

Copying from disk to diskette

In the main exercises, you practiced copying from a disk volume to a disk volume when you made three new volumes and copied SETUP1 into each of them.

The following steps will show you how to copy from a disk volume to a diskette volume:

1. Insert the diskette you just prepared into any diskette drive.
2. Close the drive handle.
3. Type: LINK COPY/VOL002/5
4. Press the Enter key.
5. Choose option 2 on screen 03-010.
6. Choose option 1 on screen 03-082.
7. Press the Enter key on screen 03-092
8. On screen 03-102:

    a. Input drive is 5.
    b. Input VOLID is VOL002.
    c. Input filename is SETUP1.
    d. Output drive is the number of the drive with your diskette in it.
    e. Output VOLID is the VOLID you picked when you prepared the diskette in the last exercise.
    f. Use the name NEWSETUP for the Output filename (this will give the name NEWSETUP to the copy of SETUP1 on the diskette)
    g. Press the Enter key.

9. When COPY is finished, press the Enter key.

Learning to use your disk

More practice (continued)

10. End COPY by typing: 9 and pressing the Enter key.

11. Type: DIR (the drive the diskette is in)

12. You should see a file with the name NEWSETUP listed as the only file on the diskette.

Copying from diskette to disk

In this exercise, you will copy one or more files from a diskette into a volume on the disk. Use these steps:

1. Insert your diskette into any diskette drive. **If you came here from step 40e, insert the Customer Support Functions diskette called VOL002.**

2. Close the drive handle.

3. Type: LINK COPY/VOL002/5

4. Press the Enter key.

5. Choose option 2 on screen 03-010.

6. Choose option 1 on screen 03-082.

7. Press the enter key on screen 03-092.

8. On screen 03-102:

   a. Input drive is the drive the diskette is in.

   b. Input VOLID is the VOLID of the diskette.

   c. Input filename is the name of the diskette file that you want to copy to the disk. **If you came here from step 40e, type: SETUP1.** If you want to copy all the files on the diskette, use "*"

   d. Output drive number is 5.

   e. Output VOLID is the name of the disk volume you want to copy into. **If you came to this exercise from step 40e, type: VOL002.**

   f. If you do *not* enter an output filename the file will have the same name in the disk volume as it did on the diskette. If you *do* enter a filename, that will be the name the file will have in the disk volume. If you came to this exercise from step 40e, leave the output filename blank, because you want the file SETUP1 to have the same name on both diskette and disk. If you're just practicing, type: NEWSETUP.

   g. Press the enter key.

Learning to use your disk

More practice (continued)

9. When COPY is finished, press the Enter key.

   Note: If you came to this section from step 40e, stop here, and do the following steps:

   a. **Type: 9**

   b. **Press: the Enter key**

   c. **Go back to step 36**

10. End COPY by typing: 9 and pressing the Enter key.

11. Type: DIR /VOL002/5

12. You should see a list of all the files in VOL002 on the disk. Look for a file named NEWSETUP.

13. After you locate the file named NEWSETUP, type: FREE NEWSETUP/VOL002/5

14. When the command moves up one line, and Ready Input appears on the screen, the file has been freed.

15. To make sure, type: DIR /VOL002/5

16. The file named NEWSETUP should be gone.

17. Now type: FREE NEWSETUP//(drive number the diskette is in)

18. This will free the copy of the file on the diskette.

19. Remove the diskette from the diskette drive.

What you have done so far

Now that you have completed Chapter 2, you have done the following:

- You learned the steps for switching on the disk.

- You used ADD.DELETE to create volumes on the disk, and to delete volumes from the disk.

- You used COPY to copy from diskette to disk, from disk to diskette, and from one volume on the disk to another volume on the disk.

- You became familiar with BACKUP.RESTORE and DISK.RECOVER.

- You did some additional exercises for practice.

When you look back on it, you have mastered quite a lot of new information and have learned to operate your 5247 disk.

In Chapter 3, you will find more information about system commands and some helpful hints about how to manage the disk system and make it work efficiently for you.

Chapter 3. Managing your disk

About this chapter

Chapter 3 is for you, the system operator. It contains information about using the disk.

First are some system commands you will use daily with the disk.

Following that are some hints about:

- What to keep on the disk.
- How to keep track of what is on the disk.
- How to put information on the disk so you can make backup copies easily.
- How to put backup copies of your disk files onto diskettes.
- How to restore backup copies to the disk.
- How to manage the system when you have more than one computer.

Managing your disk

System commands

There are three system commands you will use often with the disk. They are the DIR, VOLID, and PROTECT commands.

You have already used two of them, DIR and VOLID. In this section, you will learn more about all three of them.

The DIR command

Use DIR to ask for the *directory* of a volume. The directory is a list of all the files in the volume. The DIR command is explained in detail in the *Operator Reference*, binder 2, under "Commands."

Here are some ways to use the DIR command with your disk:

1. **DIR /VOL002/5**

    This form lists the files in disk volume VOL002 on drive number 5.

    Note: The VOLID must always be separated from the other parts of a command by a slash (/).

    You can add the ",**PRINT**" option to print the directory if you have a printer. For example:

    DIR /VOL002/5,PRINT

    The PRINT option works with all forms of the DIR command.

2.   **DIR /VOL002**

This form finds the volume named VOL002 and shows
the directory for that volume. The VOLID must always
start with a slash (/).

3.   **DIR 5**

This form shows you the files in the *first* volume on the
disk (drive number 5). If you have a printer, adding the
",PRINT" option will give you a printed list.

Note: If you give the computer only the VOLID, it will look for
the volume on each drive in order, starting with drive 1.

The order is drive 1, drive 2, drive 3 and drive 4 (if you have a
5246 Diskette Unit), and drive 5 (if you have the 5247 Disk
Unit).

You may also use DIR to check for file sharing restrictions, and
to see whether a file is open or protected.

Managing your disk

System commands (continued)

The VOLID command

The VOLID command is described in detail in the *Operator Reference*, binder 2, under "Commands."

Use the VOLID command:

- To list all the volumes on all the drives.
- To change the name of a volume.
- To prevent other computers from using a volume and the files in it.
- To remove the protection that prevents other computers from using a volume.

Here are four ways to use the VOLID command:

1. **VOLID**

   This form lists all the volumes on your diskette drives and on the disk.

   With diskette ABC555 in drive 1, diskette OUT001 in drive 2, and the disk attached (drive 5), you would see the VOLIDs of the diskettes in drive 1 and drive 2, and of every volume on the disk (drive 5).

   For the above case, the listing might look like this:

   ```
   1   ABC555   TOBY
   2   OUT001   DORIS
   5   VOL002   CSF
   5   PAYVOL   OWNERID
   5   PAYKEY   SALLY
   5   TES001   TOM
   ```

Note: The first disk volume listed is the first volume on the disk (in our example, VOL002). If you type DIR 5 (leaving out a specific VOLID), you will see the directory of the first volume on the disk (in this case, VOL002).

Here's some practice:

a.   Type: VOLID

b.   Press: the Enter key.

c.   Look at your listing. From the left:

   •   The first part is the drive number.

   •   The second part is the VOLID.

   •   The last part is the owner-ID.

Managing your disk

System commands (continued)

2. **VOLID TES001,TES002**

    This form of the VOLID command changes the name of a volume. The volume named TES001 is renamed as TES002.

    This change would not work if:
    - TES002 was already the VOLID of a volume on the disk.
    - One of the files in TES001 was open.

    CAUTION
    Changing the name of a volume is a serious action. Check with your supervisor or programmer before you change the name of any volume. A program which asks for a volume must use the current VOLID. If you change that VOLID, someone will have to change the program. When you change the VOLID of a disk volume, you may prevent a program running on another computer from doing its work.

3. **VOLID TES001,,,ON**

    The "ON" option stops all computers from using the volume or the files in it.

4. **VOLID TES001,,(owner-ID),OFF**

    The "OFF" option removes the protection set by the "ON" option. All computers may use the files in the volume.

    Note: You must include the owner-ID with the "OFF" option.

The PROTECT command

The PROTECT command is the one you will use least. You can stop everyone from reading from, or writing to, a file by using the PROTECT command.

Don't use the PROTECT command until you have read the full description of the PROTECT command given in the *Operator Reference*, binder 2, under "Commands."

Two options of the PROTECT command, RELEASE and RELEASE ALL, may be used with the disk:

- **RELEASE:**
    - Gives you an error if the file you name is one that you still have open.
    - Takes away any temporary protection set on for the file you name if it is closed, and the protection was left on because of a system failure, such as a loss of power.
    - Takes away any reserve condition you had set for the file, if it is closed.
    - Does not take away reserve condition set on by any other computer that is switched on when you enter the command.

    For example:

    PROTECT (filename)/MYVOL/5,RELEASE

Managing your disk

System commands (continued)

- **RELEASE ALL:**
  - Gives you an error if the file is still open.
  - Takes away any temporary protection that you had set on for the file you name.
  - Takes away any protection that was set on by any computer that is not switched on.
  - Takes away any protection for the file, if it is closed, and that protection was left on because of a system failure, such as a loss of power.
  - Does not affect protection set on by any other computer that is switched on.

For example:

PROTECT (filename)/MYVOL/5,RELEASE ALL

Note: The "CLOSE" option of the protect command is ignored for disk files, because the disk closes all open files when contact with the computer is lost.

The "CLOSE" option works for files on diskettes only.

Some hints

Here are some hints to help you use your disk efficiently.

What to keep on the disk

The disk is a good place to keep programs you use often. You won't need to change diskettes so much, and more than one computer will be able to use the same file at the same time.

Your accounts receivable file, or inventory file (if your inventory changes often) would be good files to keep on the disk.

The disk is *not* the best place to keep programs or files that you only use once in a while. They should be kept on diskettes, so that space on the disk will not be used simply to hold information. A diskette does that just as well.

For example, if you refer to your employees file only once in a while, keep it on diskettes.

Your payroll file, if you want to lock it away, is another file to keep on diskettes.

Knowing what is on the disk

You should always know what you have on the disk. Here are some ways to keep track of the disk contents:

- Log all the volumes on the disk, and all the files stored in each volume. The log will tell you at a glance:
  - How many volumes have been added to the disk.
  - Where to find a particular file.

  The computer finds a file faster when you give it the filename, the VOLID of the volume, and the drive number.

Managing your disk

Some hints (continued)

- Use the VOLID command (see "The VOLID command" on page 3-4) to list the volumes on the disk. If you have a printer, use DIR with the PRINT option (see "The DIR command" on page 3-2) to list the files in each volume.

  Do this as often as necessary to keep up with additions and removals.

- There is a procedure you may use to list your disk files. "Using DIR to keep track of your disk files" on page 4-20 tells you how to use it.

Organizing files for backup

Here are ways to organize your disk files for easy backup:

1. Whenever you can, use COPY to back up important information onto diskettes. The information on the backup diskette can then be used by any BASIC program.

2. Use BACKUP.RESTORE to back up files that hold more information than one diskette can hold.

   To split up a file onto two or more diskettes, BACKUP.RESTORE uses a special way of storing the information on the diskettes.

   A BASIC program cannot use information backed up with BACKUP.RESTORE until it has been returned from the diskettes to the disk.

3. Always keep your backup diskettes in a place away from the disk. Store them in another building, if you can.

   Make backup copies of your important disk files to protect them from an event that might damage the disk; for example, an office fire.

4. How often you make a backup copy of a file may depend on how often the information in the file changes, or how often you need an up-to-date version of the file.

   If you update your inventory file every week, you could save the backup copies for two weeks. Put your your next backup copies on the inventory diskettes that contain two-week-old information.

   Get in the habit of making backup copies of your important files regularly. Keep the backup diskettes away from where the disk is.

   Note: Some application programs will ask you to make a backup copy of a file.

Managing your disk

Some hints (continued)

Making backup copies of files on the disk

When you use BACKUP.RESTORE to back up disk files onto
diskettes:

- Use the same type diskettes for the backup copies.

- Prepare all the backup diskettes before you begin. Use
  the PREPARE Customer Support Function.

- The instructions for naming backup diskettes are under
  BACKUP.RESTORE in the *Customer Support Functions*,
  Volume I.

- Write the VOLID of each backup diskette on the diskette
  label as you prepare it.

  The VOLID should have three letters and a three-number
  value. As you prepare the next diskette, the letters in the
  VOLID should remain the same, but the number value
  should increase by one.

  For example, if your first VOLID was BAK101, then your
  second should be BAK102, the third VOLID should be
  BAK103, and so on.

  Write the VOLID on each diskette label with a soft pen. It
  will help you restore the information from the diskettes in
  the right order. Write down the method you used to
  make the backup copy (COPY or BACKUP.RESTORE).
  Record the date and condition (for example, ''After pay
  period ending 03/06/82'').

Note: The information you copy onto diskettes using
BACKUP.RESTORE cannot be used by a BASIC program. The
information must be restored to the disk before it can be used.

Restoring files to the disk

Insert the backup diskettes in the same order that they were copied. Start with the VOLID with the lowest number value. The computer will not accept the diskettes out of order.

If you wrote the proper VOLID on each diskette label, you should have no problem inserting the diskettes in the right order.

Operating with more than one computer

The disk can operate with up to four computers attached:

- Be considerate of your fellow operators. Certain commands (like PROTECT RELEASE ALL) and functions (like BACKUP.RESTORE) will affect all other disk users when they take effect.

   Always check with other operators before taking any action which would interrupt their work.

- Now and then, you may have to wait to use a particular file because another program has reserved it. This may happen if more than one operator is using the same file.

   The computer shows you that another computer has temporarily reserved the whole disk by displaying a "*2" on the status line. When the disk is available, the "*2" will change back to a "*1" indicating that the disk and computer are passing information to each other again.

   You may also see a "*4" on the status line. That shows that the computer is waiting to read from an area on the disk that another computer has reserved. When the area is released, the "*4" will change back to "*1," and the computer will continue its work.

Managing your disk

Some hints (continued)

For more information about the status line see the *Operator Reference*, binder 2.

- Certain programs may require that all other computer operations stop.

  For example, if you need an up-to-date, printed listing of your inventory, you would not want any additions to, or removals from, the inventory while you are printing.

  To make sure that the listing is accurate, you would want to stop all other computer operations on the inventory file until the listing was completed.

- Be careful when changing the name of a disk volume. Many different programs may have to be changed, if they refer to that volume by its original name.

  Other computers may want to use the volume. If you change the name, you may prevent them from finding it.

If you are not a programmer, you do not have to read Chapter 4.

Chapter 4. Programming for your disk

About this chapter

This chapter is for someone who will write or modify programs to work with the disk. It covers the ways in which a shared-file system can affect the programs you write for your System/23.

If you are not experienced with BASIC, you should take the time to get familiar with the System/23 *BASIC Language Reference*, binder 7. You will then have enough information handy about System/23 BASIC to be helpful as you read this chapter. The information in this chapter will help you to:

- Understand volumes on the disk.
- Use file sharing with the disk.
- Create and use disk workspace.
- Change existing programs to use the disk.
- Use some special BASIC commands and statements.
- Use PRESORT and SORT
- Use a special function of ADD.DELETE.
- Create a procedure to print volume directories.
- Count files with LISTDISK

Note: The disk is always referred to as drive 5.

Programming for your disk

Volumes on the disk

Volumes on the disk have a number of special characteristics which will be covered in the next sections.

A disk volume can change size

The volume on a diskette stays one size. A volume on the disk acts like a balloon. The more you put into it, the bigger it gets. The more you take out of it, the smaller it gets.

A disk volume never contains empty space the way a diskette volume often does.

The disk can have more than one volume

A diskette holds only one volume. The disk can hold up to a maximum of 25 volumes. This maximum applies to both the Model 11 (15 million character capacity) and the Model 12 (30 million character capacity). You simply have twice as much storage to share among the volumes on the Model 12.

The maximum size of a volume

Since disk volumes vary in size with the amount of information they contain, a single disk volume may expand to fill the whole disk.

The maximum possible size of any volume, then, depends on the amount of empty space left on the disk.

The maximum number of directory entries

When you create a volume on the disk, 100 blank directory entries are set up for the files you might store in that volume. Two of those are reserved for the disk management system, leaving 98 for your files. This first group of 100 entries is known as an extent.

A volume may contain 100 extents, the first with 98 entries available to you, and each of the rest with 100. Thus, you could store up to 9998 files in a disk volume (assuming that you didn't run out of space on the disk before you stored the 9998th file).

The maximum record size

The maximum size of a record is the same as for diskettes: 4096 characters.

Programming for your disk

File sharing

The disk can have up to four computers operating at the same time. In view of this added capability, you as a programmer must take into account that different programs, running on different computers, may all be using the same file.

To help you keep control of this flexibility, the disk and System/23 BASIC have special file sharing controls.

A full description of the file sharing options available to the System/23 BASIC programmer is given in the *BASIC Language Reference*, binder 7, under "File Sharing."

When you open a file on System/23, the OPEN statement allows you to show how you plan to use the file and the kind of sharing you will allow.

OPEN statement options

These usage and sharing options can be listed in two groups:

- Planned Use
    - **INPUT**: the file may be read from only.
    - **OUTPUT**: the file may be written to only.
    - **OUTIN**: the file may be read from and written to.
- Allowed Sharing
    - **NOSHR**: the file may not be shared.

        Use NOSHR when you want exclusive use of a file. This is the default sharing mode if none is specified.
    - **SHRI**: the file may be shared for reading only.

        Use SHRI when you want to allow other programs to read from the file only.
    - **SHR**: the file may be shared for both reading and writing.

        Use SHR when you want to allow other programs to read from the file at the same time, but only one program to write to the file.
    - **SHRU**: the file may be shared for both reading and writing by more than one program at the same time.

        Use SHRU when you want to allow other programs to update the file at the same time.

        Note: SHRU only works with disk files. You will cause an error if you use it with files on diskettes.

When an OPEN statement takes effect, the sharing you have allowed with the statement options also takes effect for that file.

Programming for your disk

File sharing (continued)

BASIC statements for the disk

The RESERVE and RELEASE statements of System/23 BASIC allow you to have temporary exclusive use of a file within a BASIC program.

- They are completely separate from the Reserve option of the OPEN statement, and the Release option of the CLOSE statement. They apply only to files on the disk.

  A program containing RESERVE and RELEASE statements will be stored in a type 81 file. A type 81 file cannot be run or loaded on a computer that is not connected to the disk.

- The reserve status lasts until the program reaches a CLOSE or RELEASE statement with the same file reference.

- The RESERVE statement may only apply to an open file. It must use the same file reference that was used to open the file.

- The RESERVE statement prevents other computers from using the file. Use it when more than one update will be made to a file.

- Single updates do not need the RESERVE statement. No other computer may use a file during a read or write operation.

- The RELEASE statement ends the protection set with the RESERVE statement and lets other computers use the file.

Reserving a file can make the file unavailable to other programs that may only want to read from the file.

The following example is one way to reduce the time a file is unavailable to other programs:

```
    •
    •
    •
110    READ #1:......
    •
    •
    •
   (Process Data)
    •
    •
    •
190    RESERVE #1:
200    REWRITE #1:
210    READ #1:......
220    REWRITE #1:
230    RELEASE #1:
```

In this example, the file is reserved while the program is executing lines 190 through 220. Line 230 releases the file to other programs.

These sample statements are only needed for many updates that must be synchronized.

Programming for your disk

File sharing (continued)

WSID$

WSID$ is a BASIC function. It tells a program which I/O connector the computer is attached to.

WSID$ is two characters long. The first character refers to the disk, using the following code:

- 0 – The disk is not attached, or is not switched on.
- 1 – The computer is attached to disk connector 1.
- 2 – The computer is attached to disk connector 2.
- 3 – The computer is attached to disk connector 3.
- 4 – The computer is attached to disk connector 4.

The second character refers to the 5246 Diskette Unit, using the following code:

- 1 – The 5246 is not attached, is not switched on, or the computer is attached to connector 1 of the 5246.
- 2 – The computer is attached to connector 2 of the 5246.

The value in WSID$ is set when the computer is switched on. It cannot change unless the computer is switched off. The next time the computer is switched on the value in WSID$ will show the status of the disk and diskette unit at that time. The WSID$ value may, in fact, be different. For example:

1. If the computer is attached to connector 3 of the disk and to connector 2 of a 5246 diskette unit, WSID$ contains:

   32

2. If the 5246 is switched off and the computer has been switched off and then on again, WSID$ then contains:

   31

If, in the first case, a file called BLUE is created with WSID$ added to the filename, the result is **BLUE32**.

If, at a later time, the second case above is true, the same program tries to open a file called **BLUE31**, and a ''file not found'' results, because the file was created the previous time as **BLUE32**.

Some suggestions:

- Use WSID$ only on temporary files you open with an OPEN statement, delete after a CLOSE statement, and recreate after a power failure or shutdown.

- For files which are permanent, use only the portion of WSID$ that refers to the device the file is stored on.

  For example, for a file called BLUE:

  BLUE & WSID$(1:1) refers only to the disk status.

  BLUE & WSID$(2:2) refers only to the 5246 status.

Note: If the same file will be used on more than one device, create a unique filename **without** using WSID$.

Programming for your disk

File sharing (continued)

Disk workspace using WSID$

You can make private disk work space for each computer by adding WSID$ to the VOLID. Add a volume to the disk for each computer. The VOLID of each volume should have a common prefix (in our example below we have used "VOL") with the disk portion of WSID$ added.

If you had four computers using the disk, you would add four volumes with the names VOL1, VOL2, VOL3, and VOL4. Each computer, then, would use only the volume containing its WSID$ value. The computer attached to disk connector 2, for example, would only look for files and store data in VOL2.

Here's how you would do it:

```
10  LET A$=NAME=FILEA/VOL&WSID$(1:1),SIZE=100
20  OPEN #1:A$,INTERNAL,INPUT
    •
    •
    •
```

The four computers attached to the disk would open four different files in four different volumes.

This example does not protect the files. It simply makes sure that each computer will use files from its own volume. You can protect your files permanently by using the Reserve option on the OPEN statement. That will permanently connect the file with the sharing options you set down in the OPEN statement. For example:

```
10  Open #2:"NAME=MYFILE,NOSHR,RESERVE",
        INTERNAL,OUTPUT
```

prevents any computer from using MYFILE until a CLOSE RELEASE statement or a PROTECT RELEASE command is issued at the same computer.

Block locking

Block locking prevents any other computer from using a block (512 bytes), or blocks, assigned to another computer. It is a function of the disk management system. No special BASIC code is needed to use it.

Block locking occurs only with disk files opened for OUTPUT/OUTIN, with SHR or SHRU. The lock is put in place by a READ operation from the computer.

The lock is released when:

- The program closes the file.
- A record is read that is not in the locked block.
- A WRITE or REWRITE is done to the file.
- The link between the computer and the disk is lost.

If the record is large enough to span more than one block of storage, all the blocks containing the record will be locked.

If the block contains more than one record, the block will not be released until the first record outside the block is read.

The RESERVE statement in a BASIC program locks the entire file until the program issues a RELEASE statement.

Programming for your disk

File sharing (continued)

Loss of link

Loss of link means that the computer and the disk cannot send each other messages.

This occurs if:

- The computer is switched off or loses power.
- The cable between the computer and the disk is disconnected.
- The disk is switched off or loses power.

Loss of link causes a number of actions to take place:

1. If the disk receives no answer from a computer, it:

    - Cancels any read or write requests from that computer.
    - Releases any blocks locked to that computer.
    - Resets the OPEN statement sharing options for all files opened by that computer. Files on the disk cannot be accidentally left open, the way they can on a diskette.
    - Records the loss of link. No information can pass between the computer and the disk until the computer is switched off and then switched on again.

2. If the computer receives no answer from the disk:

    - Read or write requests to the disk cause an error.
    - The link may be restored if the computer is switched off and then on again.
    - Work may continue on the computer, as long as it needs no files that are on the disk.

End-of-data (EOD)

More than one computer may write new records to a disk file at the same time. Therefore, the disk keeps a common end-of-data point.

When a computer requests an action at or beyond that end-of-data point:

1. The disk is locked.
2. The file's directory entry, called its data set label (DSL), is read.
3. The total record count in the DSL is then compared to the total record count in the computer.
4. If the DSL count is different, the count in the DSL replaces the count in the computer.
5. The requested action takes place, the DSL is updated with a new EOD.
6. The disk is unlocked.

File types and access methods

All of the file types (except BX and HX) and access methods used by the System/23 computer may be used with the disk.

The presence of RESERVE and RELEASE statements in a BASIC program cause that program to be stored in a new file type (81) that will not run or load on a computer that is not connected to the disk.

Programming for your disk

Programs and disk files

Here are some facts about programs using disk files:

- "NOSHR" is the default sharing mode. Programs that share disk files must specify that more than one computer may use those files at the same time.

- Programs that refer to files by filename will use the disk without change.

- Programs that use a VOLID must use one that matches a volume on the disk.

- The same filename can exist in a number of volumes on the disk (although it's not a good idea to use the same filename twice). For that reason:

  — Make sure that similar filenames actually refer to the same file.

  — If the files are different but have the same filename, programs must use both the filename and the VOLID to use the right file.

- If programs running on a particular computer are intended to use only files created at that computer, create the filenames with WSID$ added.

- Programs on different computers that share the same file must use the same filename. The file may not always be available to a particular computer. The program should allow for a "file busy" condition.

- An OPEN statement with no sharing options is treated as NOSHR. NOSHR is the default sharing mode.

- Block locking happens when disk files are opened for OUTPUT/OUTIN, with SHR or SHRU. Programs that use those sharing options may not always be able to use a file when it is requested.

Programming for your disk

Programs and disk files (continued)

- While a file is closed, other programs may use that file without restriction (unless it is reserved).

  For example: program 1 opens a file, makes some changes to be used by program 2 on the same computer, and then closes the file. Other programs would be able to change the data in that file while it was closed.

  To prevent this, program 1 should open the file with a Reserve option on the OPEN statement, and close it *without* a Release option on the CLOSE statement.

  Then, program 2 on the same computer could use the file, and then close it with a Release option on the CLOSE statement. The file would be locked to other computers between the OPEN statement with the Reserve option in program 1 and the CLOSE statement with the Release option in program 2.

- The Reserve option may lock a file for a long period of time. If you must use the file, the PROTECT RELEASE ALL command will release the Reserve option.

  Note: Use PROTECT RELEASE ALL with caution. **All** reserve restrictions will be reset for the file named in the PROTECT statement. Some restrictions may have to be reset.

  The PROTECT RELEASE command will not work with a disk file that is currently opened by the computer that issued the command.

- Programs containing RESERVE and RELEASE statements are stored as type 81 files, not type 09. Type 81 files cannot be run or loaded on a computer that is not connected to the disk.

PRESORT and SORT

If you have purchased the PRESORT and SORT Customer Support Functions, they will not be on the disk, in VOL002, when the disk is delivered.

Before you can use PRESORT or SORT from the disk, you will have to copy them into disk volume VOL002, using the COPY Customer Support Function.

If you received two Customer Support Functions diskettes with your 5247 Disk Unit, PRESORT and SORT will be on the diskette labeled Diskette 1 of 2, VOLID=VOL001.

If you received one Customer Support Functions diskette with your 5247 Disk Unit, they will be on that diskette.

Programming for your disk

A special option of ADD.DELETE

The ADD.DELETE Customer Support Function has a special option called "Delete a volume containing files." It does **not** appear on the ADD.DELETE menu screen.

You should only use this option when you are sure that it is okay to erase all the files in the volume you want to delete.

What Delete a volume containing files does. With this option, you can delete a volume *without* freeing the files it contains. However, all the files must be closed, and no file may be write-protected.

How to use Delete a volume containing files. To choose this option, type the uppercase letter "H" instead of a number on the ADD.DELETE menu.

You see the same screens as when you use option 3, Delete a volume. However, the uppercase letter "H" will end all the screen numbers.

CAUTION
"Delete a volume containing files" should only be used when you are sure that the files in the volume are no longer needed, or have been copied to another volume and can be erased.

Variations of the DIR command

The next examples are intended to help programmers and experienced operators locate files more quickly:

1. **DIR SETUP1/VOL002/5**

   This shows you a single directory entry for the file SETUP1 in VOL002 on the disk (drive number 5).

   Note: The VOLID must always be separated from the other parts of a command with a slash (/).

2. **DIR SET*/VOL002/5**

   This form of the DIR command lists all the files on VOL002 that begin with the three letters SET.

   Let's say that VOL002 contained four files called SETUP1, SETUP2, SETHI1, and SETLO1. You would see all four listed because all the names begin with the three letters SET.

3. **DIR SET*//5**

   If you leave out the VOLID, you can list every file with a name that starts with the three letters SET in the first volume on the disk. The computer assumes you mean the first volume on the disk if you do not give it a VOLID.

   Note: If you use only the drive number, the space where the VOLID would have been is shown with two slashes (//). The computer then knows that the VOLID has been omitted. If you used only one slash:

   DIR SET*/5

   "5" is the VOLID the computer would look for.

Programming for your disk

Using DIR to keep track of your disk files

The disk lets you keep a large amount of data in one place. It's important, then, to know what files you have on the disk, and where they are.

One way to keep track of your files is to write a procedure like the one shown below. We have called ours PROC DIR.ALL:

```
00010:subproc dir.header
00020:dir /(VOLID),print
00030:subproc dir.footer
```

The procedure contains two subprocedures (PROC DIR.HEADER and PROC DIR.FOOTER) and one DIR statement. It prints the directory of the volume you name. The header and footer explain the different fields in the listing.

For more than one volume, expand the procedure by repeating the group of three lines for each volume you want information about.

On the following pages, you will find the BASIC statements for the two subprocedures that format the output. We named them PROC DIR.HEADER and PROC DIR.FOOTER. You can pick different names, if you wish.

You will also find an example of the output, in this case using only one example volume (VOL002).

PROC DIR.HEADER

```
00010:print #255:newpage
00020:print #255:"*————————————————————————————————————————————————————————————*"
00030:print #255:"*                                                            "
00040:print #255:"*                                                            "
00050:print #255:"*            FORMAT OF VOLUME INFORMATION                    "
00060:print #255:"*                                                            "
00070:print #255:"    +—————————————— Volume Identifier (VOLID)               "
00080:print #255:"    |                                                        "
00090:print #255:"    |        +—————————— Space Available                    "
00100:print #255:"    |        |                                               "
00110:print #255:"    |        |      +————————— Labels Available             "
00120:print #255:"    |        |      |                                        "
00130:print #255:"    |        |      |                                        "
00140:print #255:"    V        V      V                                        "
```

PROC DIR.FOOTER

```
00010:print #255:" A      A                A        A       A  A  A   A    A    A"
00020:print #255:" |      |                |        |       |  |  |   |    |    |"
00030:print #255:" |      |                |        |       |  |  |   |    |    |"
00040:print #255:" |      |                |        |       |  |  |   |    |    |"
00050:print #255:" |      |                |        |       |  |  |   |    |    |"
00060:print #255:" |      |                |        |       |  +—— File Protection Indicator"
00070:print #255:" |      |                |        |       |"
00080:print #255:" |      |                |        |       +—— Extents (Pieces)"
00090:print #255:" |      |                |        +——— Space Used"
00100:print #255:" |      |                +——— Total Space "
00110:print #255:" |      +——— File Name                  "
00120:print #255:" +——— File Type                         "
```

Programming for your disk

Using DIR to keep track of your disk files (continued)

An example of PROC DIR.ALL output

```
*................................................................................*
*
*
*               FORMAT OF VOLUME INFORMATION
*
       +.................. Volume Identifier (VOLID)
       |
       |      +.................. Space Available
       |      |
       |      |      +.................. Labels Available
       |      |      |
       |      |      |
       |      |      |
       V      V      V

VOL002     0012800 0021 0000 512
    10 UPDATE            0005120 0005120 0001
    10 COLSEQ            0025600 0025600 0001
    10 SELECT            0022016 0022016 0001
    10 REPLACE           0011264 0011264 0001
    10 RECOVER           0044032 0044032 0001
    10 SELECT16          0022528 0022528 0001
    05 START             0000512 0000512 0001
    05 START.SUBPROC     0000512 0000512 0001
    09 START.PROGRAM     0016384 0015872 0001
    12 IMFOM             0004096 0001536 0001
    12 IMFLM01           0004096 0003072 0001
    12 IMFLM02           0004096 0003072 0001
    05 SETUP1            0000512 0000512 0001
    05 SETUP2            0000512 0000512 0001
    12 IOM16             0041984 0038400 0001
    12 ILM1601           0018944 0017920 0006
    12 ILM1602           0011264 0003584 0001
    09 CSUPGM            0013312 0012800 0001
    05 XDIRHDR           0003072 0003072 0001
    05 XDIR              0000512 0000512 0001
    05 XDIRHDRX          0000512 0000512 0001
    05 DH                0003072 0001024 0001
    05 DF                0003072 0001536 0001
    05 DIRPROC           0000512 0000512 0001
    05 DIR.ALL           0000512 0000512 0001
    05 DFM4              0001536 0001024 0001
    05 DIR.HEADER        0001536 0001024 0001
    05 DIR.FOOTER.ALT    0001536 0001536 0001
    05 DIR.FOOTER.NOSHR  0001024 0001024 0001
    A     A              A       A       A  A  A   A   A   A
    |     |              |       |       |  |  |   |   |   |
    |     |              |       |       |  |  |   |   |   |
    |     |              |       |       |  |  |   |   |   |
    |     |              |       |       |  |  |   |   +---- File Protection Indicator
    |     |              |       |       |  |  |   |
    |     |              |       |       |  |  +---- Extents (Pieces)
    |     |              |       |       |  |
    |     |              |       |       +---- Space Used
    |     |              |       |
    |     |              |       +---- Total Space
    |     |              |
    |     +---- File Name
    +---- File Type
```

Using LISTDISK to count files

The LISTDISK Customer Support Function can be used to find out how many files a volume contains.

Use the following steps:

1. Type **LINK LISTDISK**.

2. On screen 14-010, choose option 3, List all diskette and disk information.

3. On screen 14-023, enter the VOLID of the volume and drive number 5.

4. On screen 14-053, if you have no printer attached or switched on, you must choose option 1.

5. Screen 14-063 is a listing of the information. On the third line of the listing, notice the numbers under the letters "G" and "H."

```
List All Diskette or disk information                        /  /   22:54:54   14-063
A       B                  C    D        E       F        G     H     I    J       K
VOL002  OWNERID           --    -     ------     1        98    74    512 ----   -----
L                        M    N    O    P    Q R  S       T     U       V           W
COLSEQ                  200  128   50   1 ---- 0 110 0000 0000   00/00/00  00/00/00
LISTDISK                128  128   32   1 ---- 0 110 0000 0000   00/00/00  00/00/00
LISTFILE                156  128   39   1 ---- 0 110 0000 0000   00/00/00  00/00/00
LISTSTOR                188  128   47   1 ---- 0 110 0000 0000   00/00/00  00/00/00
REPLACE                  88  128   22   1 ---- 0 110 0000 0000   00/00/00  00/00/00
SELECT                  172  128   43   1 ---- 0 110 0000 0000   00/00/00  00/00/00
SELECT16                176  128   44   1 ---- 0 110 0000 0000   00/00/00  00/00/00
```

The number under the "G" represents the number of file labels available. The number under the "H" is the number of labels not in use.

Subtract the number under "H" from the number under "G," and the result is the number of files in the volume.

6. Follow the instructions on the bottom of the screen to complete LISTDISK.

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