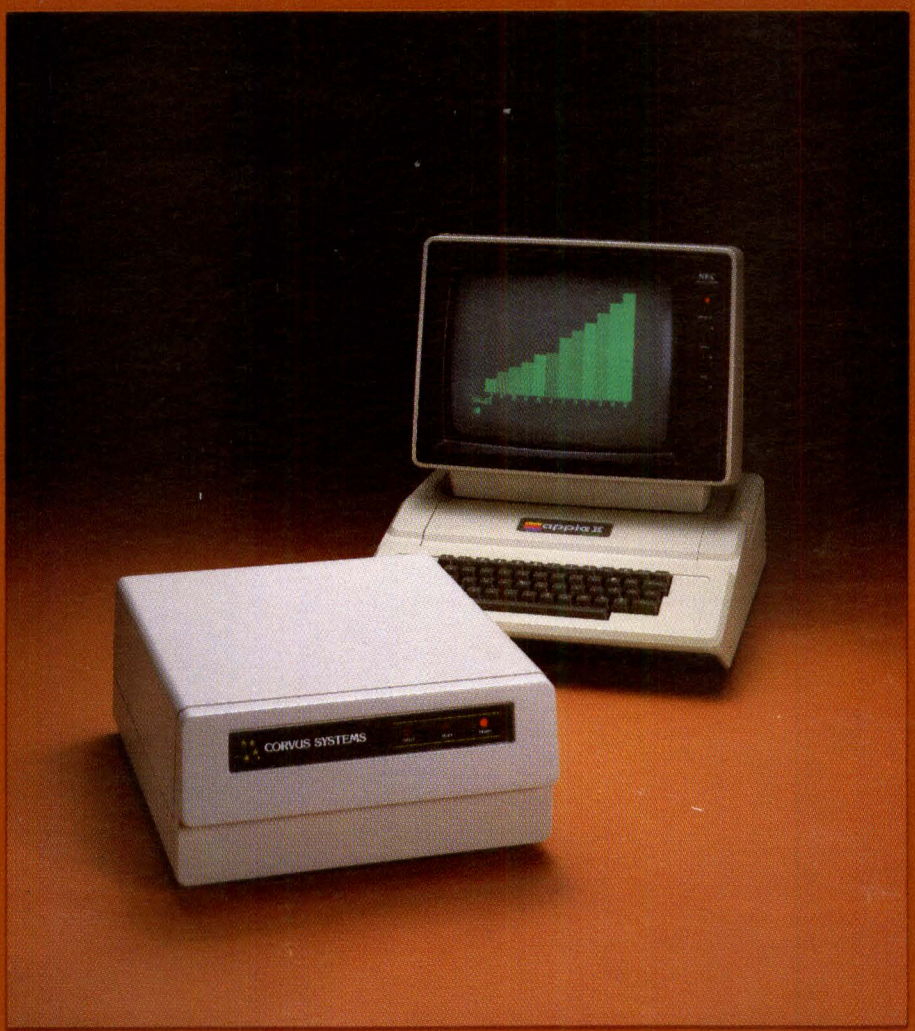
Disk System User Guide

Apple II



CORVUS SYSTEMS

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FCC 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. As temporarily permitted by regulation it has not been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. 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.

DISK SYSTEM USER GUIDE

APPLE II

PART NO.: 7100-03106
DOCUMENT NO.: AP2/10-22/1.1
RELEASE DATE: November, 1982

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SCOPE

The Corvus Disk System User Guide for Apple II® Computers provides detailed explanations and descriptions for using a Corvus disk system and related software. Before consulting this User Guide, you should already have installed and initialized your Corvus disk drive following the step by step procedures in one of the following guides:

CORVUS DISK SYSTEM INSTALLATION GUIDE FOR APPLE II COMPUTERS for a single-user, single-computer system.

CORVUS MULTIPLEXER INSTALLATION GUIDE FOR APPLE II COMPUTERS for one or more Apple II computers on a Multiplexer network.

CORVUS OMNINET DISK INSTALLATION GUIDE FOR APPLE II COMPUTERS for one or more Apple II computers on an Omninet network.

CONVENTIONS

The word **"Type"** is used throughout this guide to mean that two or more letters, numbers, or symbols are to be entered at the computer keyboard. The form of a **"Type"** statement is as follows:

Type: RUN BSYSGEN ◀RETURN▶

In this example, the spaces immediately following the word **"Type"** and immediately preceding the symbol ◀RETURN▶ may safely be ignored; but all spaces within the statement to be typed, such as the space between RUN and BSYSGEN, must be typed as shown.

Be careful to type all words, symbols, spaces and punctuation to the right of the word **"Type"** and left of the keytop symbol ◀RETURN▶ precisely as shown. If a statement to be typed does not end in punctuation, do not add punctuation at the end. Note that in a statement such as:

Type: RUN COPY3,S4 ◀RETURN▶

There is a space between RUN and COPY, but there is no space between COPY and 3, and there is no space between the comma and S4. Do not add a space at such points, when no space appears in this guide.

Keytop symbols within or at the end of a statement to be typed represent a single typewriter key to be pressed. Examples of these keytop symbols include ◀RETURN▶ and ◀SPACE▶. When a keytop symbol is used, press the key to which it refers; do not type out the word shown within the keytop symbol. For example, **"Press:** ◀SPACE▶" does not mean that you should type out the letters S-P-A-C-E.

The word **"Press"** is used throughout this guide to mean that a single letter, number, or symbol is to be entered at the computer keyboard. Examples:

Press: Y
Press: 3
Press: ◀RETURN▶

Note that while statements following the word **"Type"** generally end with the keytop symbol ◀RETURN▶, a statement following the word **"Press"** requires only a single keystroke, without using the ◀RETURN▶ key. If a statement following the word **"Press"** does not include ◀RETURN▶, do not press the ◀RETURN▶ key.

BACKING UP YOUR DATA BASICS (DOS 3.3)

ABOUT THE CORVUS MIRROR®

Corvus Systems has developed a unique system for providing effective, low-cost backup for its hard disk drives. Using a video cassette recorder and video cassettes, the Corvus Mirror creates an "image," or copy, of the entire Corvus drive, or a portion of the drive, on the video cassette.

The Mirror hardware can be ordered built into Corvus Disk Systems (called an internal Mirror), or it can be purchased as an add-on option (known as an external Mirror). Either way, Mirror software is included in the system utilities.

The B[ACKUP option of Mirror software copies information from the Corvus disk onto video tape. The tape may be used either as a duplicate of data on the drive, or for archival storage when you wish to free areas of the Corvus disk drive for processing of new data. Information on the backup video tape can easily be restored to the Corvus disk system when needed again.

A backup video tape may consist of the entire physical Corvus drive, or either half (logical drive) of a Model 20 drive, or one or more volumes. A volume is a floppy-like segment of a Corvus drive, consisting of a set of files with a file directory.

When backing up your Corvus drive, use the same VCR whenever possible. The VCR should be set at the standard play speed, and the highest quality tape should be used to prevent errors. It is recommended that VCRs without the color enhancement feature be used, or that this feature be disabled when using the VCR with a Mirror.

After backing up data onto a video tape, use the V[ERIFY option to confirm that all data from the disk has been successfully recorded on the video tape.

During B[ACKUP, you are asked to provide identifying information about the physical drive, logical drive, or set of volumes you are copying onto the video tape. You can later read this information from the video tape using the I[DENTIFY feature of the Mirror program.

R[ESTORE transfers data from the video cassette tape back onto a Corvus hard disk. If desired, data can be restored to a different Corvus drive than the one from which it originated.

HARDWARE INSTALLATION OF THE CORVUS MIRROR

Your drive must already be configured for Apple BASICS (DOS 3.3) according to the instructions in one of the following Corvus manuals:

CORVUS DISK SYSTEM INSTALLATION GUIDE FOR APPLE II COMPUTERS for a single-user, single-computer system.

CORVUS MULTIPLEXER INSTALLATION GUIDE FOR APPLE II COMPUTERS for one or more Apple II computers on a Multiplexer network.

CORVUS OMNINET DISK INSTALLATION GUIDE FOR APPLE II COMPUTERS for one or more Apple computers on an Omninet network.

If the drive size and serial number identification on the back panel of your Corvus drive both end with an "M," your drive has a Mirror already installed. Before the internal Corvus Mirror can be used, the video cable provided with your drive must be attached between the Corvus disk drive and the video cassette recorder (VCR).

Both ends of this video cable are split into two wires, with a phono connector attached to each wire. Insert one of the grey phono connectors into the VIDEO OUT jack on the VCR, and the other grey connector into the VIDEO IN jack on the back panel of the Corvus drive. Connect one of the white video cable connectors into the VIDEO IN jack on the VCR and the other white connector into the VIDEO OUT jack on the back panel of the Corvus drive.

If you have an add-on (external) Mirror, see the CORVUS SYSTEMS MIRROR INSTALLATION GUIDE, supplied with the add-on Mirror, for instructions on Hardware Setup.

ENTERING THE MIRROR PROGRAM

Read this section before selecting an option from the Mirror menu.

The Mirror program may be run either from the Corvus drive or directly from the Corvus Utilities diskette.

1. Power on the Corvus drive.
2. If you will be running the Mirror program from the Corvus drive, skip to Step 3.

   If you will be running the Mirror program from a diskette, place the CORVUS AP UTILITIES BASICS diskette in the diskette drive and power on the Apple II computer.

   The screen displays:

```
APPLE ] [
```

   While holding down the ◀CTRL▶ key, **press:** ◀RESET▶

   The screen displays:

```
]
```

   Type: PR#4 ◀RETURN▶

   Skip to Step 4.

3. To run the Mirror program from the Corvus drive, power on the Apple II computer.
4. If you have a single-user system, the screen displays:

```
]
```

   If your drive has Constellation software, the screen displays:

```
PLEASE ENTER YOUR NAME:
```

   Type the user name which has been assigned to you. For example:

   Type: SMGR ◀RETURN▶

The screen displays:

```
]
```

5. To enter the Mirror program:

   Type: RUN MIRROR ◀RETURN▶

   The screen displays:

```
                    VER 4.3 A
                 CORVUS MIRROR
                   24-OCT-82
I[DENT B[ACKUP R[ESTORE V[ERIFY Q ?:
```

6. To find out what each option of the Mirror program does:

   Press: ?

   The screen displays:

```
I[DENT B[ACKUP R[ESTORE V[ERIFY Q ?:
    I[DENT     = READ ID RECORD OF
                 AN IMAGE
    B[ACKUP    = RECORD DATA FROM DISK
                 TO TAPE
    R[ESTORE   = READ TAPE AND TRANSFER
                 DATA TO DISK
    V[ERIFY    = READ TAPE AND REPORT
                 ERROR STATUS
    Q[UIT      = EXIT PROGRAM
```

7. Proceed to the section which applies to the particular Mirror function you wish to use.

BACKING UP DATA ON VIDEO TAPE

A backup video tape may consist of the entire physical Corvus drive, or either half (logical drive) of a Model 20 drive, or one or more volumes. A volume is a floppy-like segment of a Corvus drive, consisting of a set of files with a file directory.

BACKING UP VOLUMES

An individual volume, or a set of consecutive volumes, of a Corvus drive can be backed up on video tape or restored to a Corvus drive. When a volume is restored from the video tape to a drive, it does not necessarily have to be restored to the same volume, nor even to the same drive, as the volume from which the backup image originated.

When you restore an image of a volume to a drive, the volume's file directory is copied, as well as all the files within that volume.

The Mirror program may be run either from the Corvus drive or directly from the Corvus Utilities diskette.

1. After you have completed the first section of this chapter, "Entering the Mirror Program," select the B[ACKUP option from the Mirror menu.

   Press: B ◀RETURN▶

   The screen displays:

```
BACKUP A :
  V[OLUME D[RIVE P[HYS-DRV :
```

2. **Press:** V

   The screen displays:

```
STARTING VOLUME # [1-XX] ?
```

The number of volumes displayed above varies according to what Model of drive you have, and whether your system is BASICS only, or both Pascal and BASICS. A Model 6 drive has 38 DOS volumes in a BASICS-only system or up to 37 DOS volumes in a Pascal/BASICS system. A Model 11 drive

has 82 DOS volumes in a BASICS-only system or up to 80 DOS volumes in a Pascal/BASICS system. Each of the two logical drives on a Model 20 drive has 62 DOS volumes in a BASICS-only system or up to 59 DOS volumes system in a Pascal/BASICS system.

3. Type the number of the first Corvus volume you wish to back up on video tape. For example:

   Press: 1 ◀RETURN▶

   The screen displays:

LAST VOLUME # (1-XX)

---

4. Type the number of the last volume in the set of volumes you are backing up on video tape.

   The last volume can be any number up to the number of BASICS volumes on your drive. For example:

   Type: 12 ◀RETURN▶

   To backup only one volume, make the last volume number the same as the starting volume number. For example, if you only want to backup volume 5, enter 5 for both the first and last volume number.

   The screen displays:

ENTER THE CORVUS DRIVE NUMBER: 1

---

5. Indicate the number of the Corvus drive containing the DOS 3.3 volumes you are backing up. If the volumes are on a Model 6 or Model 11 drive, or the first half of a Model 20 drive, they are on drive 1.

   To accept the displayed default value, which is drive 1:

   Press: ◀RETURN▶

   A Model 20 Corvus drive counts as two drives. If the volumes to be backed up are on the second half of a Model 20 drive, they are on drive 2. To indicate that drive 2 is the drive number:

   Press: 2 ◀RETURN▶

6. After you identify the volumes to be backed up, four screen prompts ask for identifying information, by which the volume or set of volumes will be recognized in the tape directory.

   In this example, a sample response follows each prompt, to show the form in which responses should be entered. Using these sample responses as a guide, enter your own appropriate response to each of the four prompts.

   Your answers to the DATE, TIME, and NAME prompts may be up to 16 characters long. Your response to the COMMENT prompt may be up to 80 characters long. DO NOT USE COMMAS OR SEMICOLONS IN YOUR RESPONSES.

   The screen displays:

```
ENTER DATE ?
```

   Type: 10-NOV-82 ◀RETURN▶

   The screen displays:

```
ENTER TIME ?
```

   Type: 3PM ◀RETURN▶

   The screen displays:

```
ENTER NAME ?
```

   Type: VOLUME-1 ◀RETURN▶

   The screen displays:

```
ENTER COMMENT ?
```

   Type: TEST ◀RETURN▶

7. After you have answered these four prompts, the screen displays:

```
POSITION RECORDER AND START RECORD
PRESS ◀RETURN▶ WHEN READY
```

8. Rewind or Fast Forward the video cassette recorder (VCR) to the tape position at which you want backup to begin.
9. Simultaneously press the PLAY and RECORD buttons on the VCR.
10. **Press:** ◀RETURN▶ on the Apple II keyboard.

    The screen displays:

```
BACKUP STARTED...
```

11. After an image of the specified volumes has been recorded on video tape, the screen displays:

```
BACKUP FINISHED.
ERROR STATUS:
                    DISK ERRORS: 0
                 —ALL DATA STORED—
```

    If any disk errors are reported, your drive may have bad sectors. See the Troubleshooting Guide, which is Chapter 5 of this manual, for possible remedies.

12. The Mirror menu redisplays on the screen:

```
I[DENT B[ACKUP R[ESTORE V[ERIFY Q ?:
```

13. After Backup has been completed, use the V[ERIFY option to check that all data was successfully duplicated on the video tape. Proceed to the section "Confirming Successful Backup."

BACKING UP ENTIRE DRIVE

An entire Model 6, Model 11, or Model 20 Corvus drive can be backed up on video tape or restored to a Corvus drive.

A Model 20 drive is viewed as two logical drives, each of which may be backed up independently of the other. If you wish to back up only one logical drive on a Model 20 drive, rather than the entire drive, see the next section, "Backing Up a Logical Drive."

When the image of an entire drive is restored from the video tape to a drive, it does not necessarily have to be

restored to the drive from which the backup image originated.

The Mirror program may be run either from the Corvus drive or directly from the Corvus Utilities diskette.

1. After you have completed the first section of this chapter, "Entering the Mirror Program," select the B[ACKUP option from the Mirror menu.

   Press: B ◀RETURN▶

   The screen displays:

```
BACKUP A :
  V[OLUME D[RIVE P[HYS-DRV :
```

2. To backup the entire contents of a Corvus drive:

   Press: P ◀RETURN▶

   The screen displays:

```
ENTER THE CORVUS DRIVE NUMBER: 1
```

3. Indicate the number of the Corvus drive you are backing up. To accept the displayed default value, which is drive 1:

   Press: ◀RETURN▶

   The screen displays:

```
SIZE OF BACKUP WILL BE XXXXX BLOCKS.
```

   The size of the backup, represented here as "XXXXX," varies according to which model of Corvus drive you have. A Model 6 drive is 11540 blocks long, a Model 11 drive is 23700 blocks long, and a Model 20 drive is 35860 blocks long.

4. After you identify the drive to be backed up, four screen prompts ask for identifying information, by which the drive image will be recognized in the tape directory.

   In this example, a sample response follows each prompt, to show the form in which responses should be entered. Using these sample responses as a guide, enter your own appropriate response to each of the four prompts.

Your answers to the DATE, TIME, and NAME prompts may be up to 16 characters long. Your response to the COMMENT prompt may be up to 80 characters long. DO NOT USE COMMAS OR SEMICOLONS IN YOUR RESPONSES.

The screen displays:

```
ENTER DATE
```

Type: 25-OCT-82 ◀RETURN▶

The screen displays:

```
ENTER TIME
```

Type: 3 PM ◀RETURN▶

The screen displays:

```
ENTER NAME
```

Type: DRIVE-1 ◀RETURN▶

The screen displays:

```
ENTER COMMENT
```

Type: TEST ◀RETURN▶

5. After you have answered these four prompts, the screen displays:

```
POSITION RECORDER AND START RECORD
PRESS ◀RETURN▶ WHEN READY
```

6. Rewind or Fast Forward the video cassette recorder (VCR) to the tape position at which you want backup to begin.
7. Simultaneously press the PLAY and RECORD buttons on the VCR.

8. **Press:** ◀RETURN▶ on the Apple II keyboard.

   The screen displays:

```
BACKUP STARTED . . .
```

9. After an image of the specified drive's contents has been recorded on video tape, the screen displays:

```
BACKUP FINISHED.
ERROR STATUS:
                DISK ERRORS: 0
            —ALL DATA STORED—
```

   If any disk errors are reported, your drive may have bad sectors. See the Troubleshooting Guide, which is Chapter 5 of this manual, for possible remedies.

10. The Mirror menu redisplays on the screen:

```
I[DENT B[ACKUP R[ESTORE V[ERIFY Q ?:
```

11. After B[ACKUP has been completed, use the V[ERIFY option to check that all data was successfully duplicated on the video tape. Proceed to the section "Confirming Successful Backup."

BACKING UP A LOGICAL DRIVE

Corvus software views a Model 20 drive as two logical drives. An entire Model 20 drive may be backed up (see "Backing Up Entire Drive") or either logical drive may be backed up independently of the other. To backup either of the two logical drives on a Model 20 drive, follow the instructions in this section.

1. After you have completed the first section of this chapter, "Entering the Mirror Program," select the B(ACKUP option from the Mirror menu.

   Press: B ◀RETURN▶

   The screen displays:

```
BACKUP A :
  V(OLUME D(RIVE P(HYS-DRV :
```

2. To backup a logical drive:

   Press: D

   The screen displays:

```
ENTER THE CORVUS DRIVE NUMBER: 1
```

3. Indicate the number of the logical drive you are backing up.

   The first half of a Model 20 Corvus drive is logical drive 1, and the second half is logical drive 2.

   To accept the displayed default value, which is logical drive 1:

   Press: ◀RETURN▶

   To backup the second half of a Model 20 drive (logical drive 2):

   Press: 2 ◀RETURN▶

   The screen displays:

```
SIZE OF BACKUP WILL BE XXXXX BLOCKS.
```

The size of the backup, represented here as "XXXXX," varies according to which logical drive you are backing up, and whether your Model 20 drive was initialized for BASICS only, or both Pascal and BASICS. In a BASICS only system, logical drive 1 is 18220 blocks long, and logical drive 2 is 17640 blocks long. In a Pascal/BASICS system, logical drive is 17920 blocks long, and logical drive 2 is 17940 blocks long.

4. After you identify the logical drive to be backed up, four screen prompts ask for identifying information, by which the drive image will be recognized in the tape directory.

   In this example, a sample response follows each prompt, to show the form in which responses should be entered. Using these sample responses as a guide, enter your own appropriate response to each of the four prompts.

   Your answers to the DATE, TIME, and NAME prompts may be up to 16 characters long. Your response to the COMMENT prompt may be up to 80 characters long. DO NOT USE COMMAS OR SEMICOLONS IN YOUR RESPONSES.

   The screen displays:

```
ENTER DATE
```

   Type: 25-OCT-82 ◀RETURN▶

   The screen displays:

```
ENTER TIME
```

   Type: 3 PM ◀RETURN▶

   The screen displays:

```
ENTER NAME
```

   Type: DRIVE-1 ◀RETURN▶

   The screen displays:

```
ENTER COMMENT
```

   Type: TEST ◀RETURN▶

5. After you have answered these four prompts, the screen displays:

```
POSITION RECORDER AND START RECORD
PRESS ◀RETURN▶ WHEN READY
```

6. Rewind or Fast Forward the video cassette recorder (VCR) to the tape position at which you want backup to begin.
7. Simultaneously press the PLAY and RECORD buttons on the VCR.
8. **Press:** ◀RETURN▶ on the Apple II keyboard.

   The screen displays:

```
BACKUP STARTED...
```

9. After an image of the specified logical drive's contents has been recorded on video tape, the screen displays:

```
BACKUP FINISHED.
ERROR STATUS:
                DISK ERRORS: 0
            —ALL DATA STORED—
```

   If any disk errors are reported, your drive may have bad sectors. See the Troubleshooting Guide, which is Chapter 5 of this manual, for possible remedies.

10. The Mirror menu redisplays on the screen:

```
I[DENT B[ACKUP R[ESTORE V[ERIFY Q ?:
```

11. After Backup has been completed, use the V[ERIFY option to check that all data was successfully duplicated on the video tape. Proceed to the section, "Confirming Successful Backup."

CONFIRMING SUCCESSFUL BACKUP

After Backing up data from a Corvus drive to a video tape, use the V[ERIFY option to confirm successful data duplication.

1. After Backup is completed, the screen displays:

```
I[DENT B[ACKUP R[ESTORE V[ERIFY Q ?:
```

2. **Press:** V

   The screen displays:

```
VER 4.3A
CORVUS MIRROR
24-OCT-82
—VERIFY—
POSITON RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

3. Rewind or Fast Forward the video tape to the beginning of the volume or drive image you want to verify.
4. Press the PLAY button on the front of the VCR recorder, then **press:** ◀RETURN▶ on the Apple II computer.

   The screen displays:

```
VERIFY IN PROGRESS...
```

5. When backup has been successfully verified, the screen displays:

```
VERIFY FINISHED.
ERROR STATUS:
        RECOVERED ERRORS : 24
        TAPE READ ERRORS : 0
          —ALL DATA STORED—
```

The Corvus Mirror backs up data from a Corvus drive onto video tape four times. If one block of the first image is garbled, the computer will automatically attempt to find a good block image in one of the other three backups. The number of recovered errors reported indicates the number of times the computer had to look at one of the other images to find a good block image. If only recovered errors were reported, the backup has been verified as restorable. If other errors, such as tape read errors, were reported, see the Troubleshooting Guide, which is Chapter 5 of this user guide, for the possible causes of the errors, and suggested solutions.

When V[ERIFY has been completed, the screen displays:

```
I[DENT B[ACKUP R[ESTORE V[ERIFY Q ? :
```

6. To exit the Mirror program:

Press: Q

The screen displays:

```
]
```

DETERMINING CONTENTS OF A VIDEO TAPE

The Mirror program may be run either from the Corvus drive or directly from the Corvus Utilities diskette.

The I[DENTIFY option of the Mirror program provides identifying information about the contents of a backup video tape. The procedure for using this option is as follows.

1. After you have completed the first section of this chapter, "Entering the Mirror Program," select the I[DENTIFY option from the Mirror menu.

   Press: I ◀RETURN▶

   The screen displays:

```
VER 4.3A
CORVUS MIRROR
24-OCT-82
—IDENTIFY—
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

2. Rewind or Fast Forward the video tape to the starting position of the drive or volume image you wish to identify.
3. Press the PLAY button on the front of the video recorder.
4. **Press:** ◀RETURN▶ on the Apple II keyboard. The screen displays:

```
SEARCHING FOR IMAGE HEADER . . .
```

5. If any errors are reported at this point, see the Troubleshooting Guide, which is Chapter 5 of this User Guide, for possible causes of the error and suggested solutions.

If no errors are reported, the image ID and length display after a few seconds:

```
                    VER 4.3A
                CORVUS MIRROR
                  24-OCT-82
                   —IDENTIFY—
IMAGE RECORDED FROM CORVUS XXAP{BASICS}
IMAGE ID: 1
IMAGE LENGTH 11220 BLOCKS
DATE      : 25-OCT-82
TIME      : 3 PM
NAME      : DRIVE-1
COMMENT   : TEST
TYPE ◀RETURN▶ TO CONTINUE
```

6. **Press:** ◀RETURN▶

   The screen displays:

```
                    VER 4.3A
                CORVUS MIRROR
                  24-OCT-82
I{DENT B{ACKUP R{ESTORE V{ERIFY Q ?:
```

7. To exit the Mirror program:

   Press: Q

   The screen displays:

```
]
```

RESTORING DATA TO A DISK

Data which has been stored on a backup video tape can be restored to a Corvus drive from the tape. The data from the tape may be restored to a floppy-sized volume on a Corvus drive, or half of a Model 20 drive, or an entire Model 6, Model 11, or Model 20 drive. The R[ESTORE option of the Mirror program may be used when you wish to temporarily return old data from an archival tape to the disk, or when you need to replace data which was accidentally erased from the disk.

RESTORING ENTIRE DRIVE

The Mirror program may be run either from the Corvus drive or directly from the Corvus Utilities diskette.

1. After you have completed the first section of this chapter, "Entering the Mirror Program," select the R[ESTORE option from the Mirror menu to restore an image from a video tape to a drive.

   Press: R ◀RETURN▶

   The screen displays:

```
RESTORE A :
  V[OLUME D[RIVE P[HYS-DRV M[AN:
```

2. To restore the image of an entire drive from a video tape to a drive:

   Press: P ◀RETURN▶

   The screen displays:

```
ENTER CORVUS DRIVE NUMBER: 1
```

3. Type the number of the Corvus drive to which data from the tape will be restored (it does not have to be the same drive as the one from which the data originated, but to use this option the source drive and the receiving drive must be the same size).

   To accept the displayed default value, which is drive 1:

   Press: ◀RETURN▶

4. The screen displays the size of the drive:

```
SIZE OF RESTORE WILL BE XXXXX BLOCKS
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

The size of the drive image on the video tape is expressed in terms of 512-byte units called "blocks." A Model 6 drive is 11540 blocks long, a Model 11 drive is 23700 blocks long, and a Model 20 drive is 35860 blocks long. To restore an image made from either half of a Model 20 drive, see the next section, "Restoring a Logical Drive."

The tape image does not have to be restored to the same drive as the source drive from which the data was recorded. However, the drive to which you restore the tape image must be the same Model as the source drive. If you attempt to restore a Model 6 drive image to a Model 11 or Model 20 drive, or vice versa, the error message "IMAGE SIZE MISMATCH" displays.

5. Rewind or Fast Forward the video recorder to the beginning of the drive image you wish to restore.
6. Press the PLAY button on the video cassette recorder.
7. **Press:** ◀RETURN▶ on the Apple II computer.

The screen displays:

```
RESTORE IN PROGRESS . . .
```

8. When all data has been restored to a drive, the screen displays:

```
RESTORE FINISHED.
ERROR STATUS:
        RECOVERED ERRORS  : 12
        TAPE READ ERRORS  :  0
        DISK WRITE ERRORS :  0
          —ALL DATA RESTORED—
```

The Corvus Mirror backs up data from a Corvus drive onto video tape four times. If one block of the first image is

garbled, the computer will automatically attempt to find a good block image in one of the other three backups. The number of recovered errors reported indicates the number of times the computer had to look at one of the other images to find a good block image. If only recovered errors were reported, the backup has been verified as restorable. If other errors, such as tape read errors, were reported, see the Troubleshooting Guide, which is Chapter 5 of this user guide, for the possible causes of the errors, and suggested solutions.

9. The Mirror menu redisplays:

```
I(DENT B(ACKUP R(ESTORE V(ERIFY Q ?:
```

10. To exit the Mirror program:

Press: Q

The screen displays:

```
]
```

RESTORING A LOGICAL DRIVE

Corvus software views a Model 20 drive as two logical drives. While an entire Model 20 drive may be backed up and restored, each logical drive may also be backed up on video tape and restored to the Corvus disk from a video tape independently of the other. The logical drive to which data is restored does not necessarily have to be the logical drive from which the data originated.

The Mirror program may be run either from a Corvus drive or directly from the Corvus Utilities diskette.

1. After you have completed the first section of this chapter, "Entering the Mirror Program," select the R(ESTORE option from the Mirror menu to restore the image of a logical drive from a video tape to a drive.

Press: R ◀RETURN▶

The screen displays:

```
RESTORE A :
  V(OLUME D(RIVE P(HYS-DRV M(AN:
```

2. **Press:** D ◀RETURN▶

   The screen displays:

ENTER THE CORVUS DRIVE NUMBER: 1

---

3. Indicate the number of the logical drive to which you are restoring data. Be sure that the logical drive receiving the data is the same length as the logical drive from which the backup video tape was recorded.

   To accept the displayed default value, which is logical drive 1:

   Press: ◀RETURN▶

   To restore a logical drive image from a backup video tape to the second half of a Model 20 drive (logical drive 2):

   Press: 2 ◀RETURN▶

4. The screen displays the size of the drive image on the tape:

SIZE OF RESTORE WILL BE XXXXX BLOCKS

The size is expressed in terms of 512-byte units called "blocks." The total drive capacity for a Model 20 drive is 35860 blocks.

If your Model 20 drive has been initialized for Apple BASICS (DOS 3.3) only, the first logical drive is 18220 blocks long, and the second logical drive is 17640 blocks long.

If your Model 20 drive has been initialized for both Apple Pascal and Apple BASICS (DOS 3.3), the first logical drive is 17920 blocks long, and the second logical drive is 17940 blocks long.

The tape image does not have to be restored to the same logical drive as the source drive from which the data was recorded. However, the logical drive to which you restore the tape image must have the same block length as the logical drive from which the tape image was recorded. If the tape image size and the logical drive size are not the same, the error message "IMAGE SIZE MISMATCH" displays.

If the tape image size and the block capacity of the receiving logical drive are the same size, the screen displays:

```
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

5. Rewind or Fast Forward the video recorder to the beginning of the drive image you wish to restore.
6. Press the PLAY button on the video cassette recorder.
7. **Press:** the ◀RETURN▶ key on the Apple II computer.

   The screen displays:

```
RESTORE IN PROGRESS...
```

8. When all data has been restored to a logical drive, the screen displays:

```
RESTORE FINISHED.
ERROR STATUS:
        RECOVERED ERRORS : 12
        TAPE READ ERRORS  :  0
        DISK WRITE ERRORS :  0
        —ALL DATA RESTORED—
```

The Corvus Mirror backs up data from a Corvus drive onto video tape four times. If one block of the first image is garbled, the computer will automatically attempt to find a good block image in one of the other three backups. The number of recovered errors reported indicates the number of times the computer had to look at one of the other images to find a good block image. If only recovered errors were reported, the backup has been verified as restorable. If other errors, such as tape read errors, were reported, see the Troubleshooting Guide, which is Chapter 5 of this user guide, for the possible causes of the errors, and suggested solutions.

9. The Mirror menu redisplays:

```
I(DENT B(ACKUP R(ESTORE V(ERIFY Q ?:
```

10. To exit the Mirror program:

Press: Q

The screen displays:

```
]
```

RESTORING VOLUMES TO A DRIVE

The Mirror program may be run either from the Corvus drive or directly from the Corvus Utilities diskette.

To restore a volume or a set of volumes from a video tape to a Corvus disk, use the V[OLUMES option of R[ESTORE in the Mirror program.

1. After you have completed the first section of this chapter, "Entering the Mirror Program," select the R[ESTORE option from the Mirror menu to restore an image from a video tape to a drive.

Press: R ◀RETURN▶

The screen displays:

```
RESTORE A :
    V[OLUME D[RIVE P[HYS-DRV M[AN:
```

2. To restore the image of a volume or a set of volumes from a video tape to a drive:

Press: V ◀RETURN▶

The screen displays:

```
STARTING VOLUME # [1-XX] ?
```

3. Type the number of the first volume in the set of drive volumes which will receive data from the video tape.

Your answer to this STARTING VOLUME NUMBER prompt can be any volume from 1 to the number of BASICS volumes on the drive.

The single volume or set of volumes to which you restore data from a backup video tape do not necessarily have to be the same volumes, nor even on the same drive,

as the source volumes from which the backup tape was made. For example:

Press: 1 ◀RETURN▶

The screen displays:

LAST VOLUME # (1-XX) ?

The last volume on the tape may be the same as the starting volume (which restores a single volume), or it may be any volume up to the number of DOS volumes which were on the source drive. All volumes between the one you typed as "first" and the "last" were also recorded as part of the backup image on the tape; the entire set of volumes forming one backup image on the video tape will be restored to the drive.

4. Type the number of the last volume on the backup tape.

   For example:

   Type: 20 ◀RETURN▶

   The screen displays:

ENTER THE CORVUS DRIVE NUMBER: 1

---

5. If the volume or volumes are being restored to a Model 6 or Model 11 drive, or to the first half of a Model 20 drive:

   Press: ◀RETURN▶

   If the volume or volumes are being restored to the second half of a Model 20 drive:

   Press: 2 ◀RETURN▶

   If the total length of the volume or set of volumes you are restoring from the backup video tape is not the same length as the receiving volume or volumes on the Corvus drive, the screen will display "IMAGE SIZE MISMATCH."

6. After you have identified the volumes to be restored to the drive, the screen displays:

POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY

---

7. Rewind or Fast Forward the video tape to the starting position of the volume or range of volumes you wish to restore from the tape to the drive.
8. Push the PLAY button on the video cassette recorder.
9. **Press:** ◀RETURN▶ on the Apple II keyboard.

   The screen displays:

```
RESTORE IN PROGRESS...
```

When the image of a volume or set of volumes on a video tape has been restored to a Corvus drive, the screen displays:

```
RESTORE FINISHED.
ERROR STATUS:
        RECOVERED ERRORS : 12
         TAPE READ ERRORS :  0
         DISK WRITE ERRORS :  0
        —ALL DATA RESTORED—
```

The Corvus Mirror backs up data from a Corvus drive onto video tape four times. If one block of the first image is garbled, the computer will automatically attempt to find a good block image in one of the other three backups. The number of recovered errors reported indicates the number of times the computer had to look at one of the other images to find a good block image. If only recovered errors were reported, the backup has been verified as restorable. If other errrors, such as tape read errors, were reported, see the Troubleshooting Guide, which is Chapter 5 of this user guide, for the possible causes of the errors, and suggested solutions.

10. The Mirror menu redisplays:

```
I(DENT B(ACKUP R(ESTORE V(ERIFY Q ?:
```

11. To exit the Mirror program:

Press: Q

The screen displays:

```
]
```

APPLICATIONS BASICS (DOS 3.3)

USING FID ON THE CORVUS DRIVE

The Apple II program FID (file developer) is a very versatile Apple BASICS (DOS 3.3) file manipulation program. It allows a user to easily catalog, delete, lock, unlock and verify all types of DOS 3.3 files. Additionally, it lets a user copy individual files from one diskette to another.

Any of the FID functions described on pages 183-189 of "The DOS Manual" for Apple II can be performed on any Corvus DOS volume. To enter the FID program, use the procedure below:

1. Load the FID program into Apple memory from a Corvus volume or a floppy diskette. For example, to load the FID program from volume 4 of the Corvus drive:

   Type: BLOAD FID,S6,D1,V4 ◀RETURN▶

2. CATALOG the Corvus volume to be manipulated with FID. For example, to catalog volume 8:

   Type: CATALOG,V8 ◀RETURN▶

3. To start the FID program:

   Type: CALL 2051 ◀RETURN▶

The screen displays:

```
**********************************************
          APPLE [ ] FILE DEVELOPER
                FID VERSION M
     ©COPYRIGHT 1979 APPLE COMPUTER INC.
**********************************************

CHOOSE ONE OF THE FOLLOWING OPTIONS

          ◀1▶ COPY FILES
          ◀2▶ CATALOG
          ◀3▶ SPACE ON DISK
          ◀4▶ UNLOCK FILES
          ◀5▶ LOCK FILES
          ◀6▶ DELETE FILES
          ◀7▶ RESET SLOT & DRIVE
          ◀8▶ VERIFY FILES
          ◀9▶ QUIT

WHICH WOULD YOU LIKE?
```

Once FID is running, it can be used to delete, lock, unlock, and verify the DOS 3.3 files in the selected Corvus volume. Additionally, the user can catalog the volume and list the amount of free space remaining on the selected volume using FID. FID can also be used to copy files.

COPYING FILES WITH FID

COPYING FROM DISKETTE TO CORVUS DRIVE

1. Select the copy option.

   Press: 1 ◀RETURN▶

   The screen displays:

   ```
   SOURCE SLOT?
   ```

2. The source slot is the slot connected to the floppy drive, which may be either slot 4 or slot 5. For example:

   Press: 4 ◀RETURN▶

   The screen displays:

   ```
   DRIVE?
   ```

3. The source drive number may be either 1 or 2. For example:

   Press: 1 ◀RETURN▶

   If there are two floppy drives, indicate that the source drive is 2 as follows:

   Press: 2 ◀RETURN▶

   The screen displays:

   ```
   DESTINATION SLOT?
   ```

4. **Press:** 6 ◀RETURN▶

   The screen displays:

   ```
   DRIVE?
   ```

   To copy files to a Model 6 or Model 11 drive, or the first half (logical drive) of a Model 20 drive:

   Press: 1 ◀RETURN▶

To copy files to the second half of a Model 20 drive:

Press: 2 ◀RETURN▶

The screen displays:

```
FILENAME?
```

5. Enter the name of the file to be copied. For example:

   Type: REPORTS.TEXT ◀RETURN▶

   FID will now copy the file from a diskette to the Corvus drive. When it has finished, the screen displays:

```
DONE
PRESS ANY KEY TO CONTINUE
```

6. Press any key on the Apple II keyboard. The FID menu redisplays.

COPYING FROM CORVUS DRIVE TO DISKETTE

1. Select the copy option.

   Press: 1 ◀RETURN▶

   The screen displays the Corvus controller slot:

```
SOURCE SLOT?
```

2. **Press:** 6 ◀RETURN▶

   The screen displays:

```
DRIVE?
```

3. To copy files from a Model 6 or Model 11 drive, or the first half (logical drive) of a Model 20 drive:

   Press: 1 ◀RETURN▶

   To copy files from the second half of a Model 20 drive:

   Press: 2 ◀RETURN▶

   The screen displays:

```
DESTINATION SLOT?
```

4. The destination slot is the slot connected to the floppy drive, which may be either slot 4 or slot 5. For example:

   Press: 4 ◀RETURN▶

   The screen displays:

```
DESTINATION DRIVE?
```

5. The destination drive number may be either 1 or 2. For example:

   Press: 1 ◀RETURN▶

   If there are two floppy drives, indicate that the destination drive is 2 as follows:

   Press: 2 ◀RETURN▶

   The screen displays:

```
FILENAME?
```

6. Enter the name of the file to be copied. For example:

   Type: REPORTS.TEXT ◀RETURN▶

   FID will now copy the file from the Corvus drive to a diskette. When it has finished, the screen displays:

```
DONE
PRESS ANY KEY TO CONTINUE
```

7. Press any key on the Apple II keyboard. The FID menu redisplays.

COPYING FILES BETWEEN TWO CORVUS VOLUMES

To transfer files between two Corvus volumes using FID, an intermediate copy to a floppy is required. First the files are transferred from the source Corvus volume to a floppy drive, then the files are transferred from the floppy to the destination Corvus volume. The two copy procedures described above can be used to perform these file transfers.

Sometimes it is easier to create a floppy containing all of the desired files using FID and then copy the complete floppy diskette to the Corvus volume using the Corvus-supplied COPY3 program.

As you can see, FID can easily be used to manipulate Apple BASICS (DOS 3.3) files on the Corvus drive.

CREATING THE USER AREA (PASCAL)

The Corvus disk system software interface to the Apple II under Pascal is designed to allow the user to divide the disk space into variable sized areas called volumes. This capability is extremely useful in a network environment and is also of value for the single user. A Pascal volume has a limitation of seventy-seven directory entries; multiple volumes permit greater than seventy-seven directories on a disk drive.

This section is designed to instruct you in the creating and activating of Pascal volumes on the Corvus hard disk.

CREATING PASCAL VOLUMES

1. Power on the Corvus drive. When the drive is ready, power on the Apple II and its monitor. The screen displays:

```
COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN
```

2. **Press:** X

   The screen displays:

```
EXECUTE WHAT FILE?
```

3. **Type:** SYS:VMGR ◀RETURN▶

   The screen displays:

```
VMGR:Q L(ST N(EW R(MVE W(PROT M(NT
U(NM
```

4. **Press:** N

   The screen displays:

```
NEW VOLUME: ENTER VOLUME NAME:
```

5. Determine an appropriate name of no more than seven characters. The first character must be a letter and the remaining characters can be any combination of numbers and letters. Type in the volume name determined and **press:** ◀RETURN▶. For example:

   Type: BOB ◀RETURN▶

   The screen displays:

```
ENTER LENGTH (BLOCKS) :
```

6. Determine the desired length for the volume being created. Type the desired length and **press:** ◀RETURN▶. For example:

   Type: 2048 ◀RETURN▶

   The screen displays:

```
ENTER CORVUS DRIVE # (1.1): 1
```

7. **Press:** ◀RETURN▶

   The screen displays:

```
ENTER ADDRESS (BLOCKS): 1032
```

8. **Press:** ◀RETURN▶

   The volume is added and the screen displays:

```
VMGR:Q L(ST N(EW R(MVE W(PROT
M(NT U(NM
```

9. If more volumes are desired, repeat steps 4 through 8. For the purpose of example, assume that a second Pascal volume was made called SUE that has a length of 512 blocks. By pressing L, the name of the volume, its length, its starting address on the Corvus drive, and the Corvus drive on which the volume resides is displayed.

   Press: L

Something similar to the following will display:

```
CORVUS VOLUME DIRECTORY
WP Name      Length     ADDR      DRV
SYS          1024          8      1
BOB          2048       1032      1
SUE           512       3080      1
◀unused▶     7628       3592      1
```

10. **Press:** Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

11. Pascal volumes have now been created. Proceed to the section "Activating Volumes."

ACTIVATING VOLUMES

1. Although volumes have been created, they cannot be used unless they are activated through a process known as mounting. To mount volumes, start by executing the volume management program.

Press: X

The screen displays:

```
EXECUTE WHAT FILE?
```

2. **Type:** VMGR ◀RETURN▶

The screen displays:

```
VMGR:Q L[ST N[EW R[MVE W[PROT
M[NT U[NM
```

3. **Press:** M

The screen displays:

```
MOUNT: ENTER VOLUME NAME:
```

4. Type the name of the volume to be mounted. For example:

   Type: BOB ◀RETURN▶

   The screen displays:

```
MOUNT BOB: ON UNIT #9
```

5. Four Pascal units are available for mounting volumes: 5, 10, 11 and 12; units 4 and 9 are reserved for the SYS volume and for the floppy drive respectively. Choose an available unit number on which to mount the volume. For example:

   Type: 10 ◀RETURN▶

   The screen displays:

```
BOB: MOUNTED
```

6. Repeat steps 3 through 5 to mount other volumes. After all desired volumes are mounted:

   Press: Q

   The screen displays:

```
CHANGE DEFAULT MOUNT TABLE (Y/N) ?
```

8. The default mount table determines the volumes which are mounted after the system is turned on. If you wish the volume just mounted to be mounted each time you turn on the Apple (until you specify otherwise):

   Press: Y

   The screen then displays the Pascal command line:

```
COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN
```

MIRROR BACKUP

Two options for backup are available to owners of Corvus disk systems. Information may be transferred either to diskettes using normal transfer commands or to video tape using the Corvus Mirror.

The Mirror is a device which takes information on the disk system and outputs the information to a standard video recorder. Video cassette recorder technology is fairly standard throughout the industry making one video recorder just about as good as another. However, a high quality of video tape is definitely suggested.

HARDWARE SETUP

1. Plug the video cable into the video in and out of both the video recorder jacks and the in/out jacks located on the back of the drive. Video in of the video recorder connects to video out of the drive; video out of the video recorder connects to video in of the drive.

USING THE MIRROR

This section describes the use of the Mirror program in the backup and restoration of information to and from a Corvus disk system with a Mirror.

BACKING UP A DRIVE

1. Power on the Corvus drive. When the Corvus drive is ready, power on the Apple II and its monitor. The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

2. **Press:** X

The screen displays:

```
EXECUTE WHAT FILE? __
```

3. **Type:** SYS:MIRROR ◀RETURN▶

   The screen displays:

```
MIRROR: I[DENT B[CKUP R[STORE V[RIFY Q ?
◀2.0b▶: _
```

4. **Press:** B. The screen displays:

```
BACKUP A: V[OLUME D[RIVE P[HYS-DRV: _
```

5. Corvus Systems' software addresses the Model 20 drive as two virtual drives. Occasionally, Model 20 users wish to backup only one of the two virtual drives. This may be done by selecting the D[rive option. The user is then asked which virtual drive is to be backed up. However, most users normally will wish to back up their entire disk drive. Therefore, unless only one half of a Model 20 is to be backed up:

   Press: P

   The screen displays:

```
WHICH PHYSICAL DRIVE? 1
```

6. If drives are daisy-chained together, the user may select which of the physical drives will be backed up. Only one drive may be backed up at a time. In a single drive system, the presence of only one physical drive eliminates the need for choice. Therefore, unless the second, third or fourth physical drive in a daisy-chain is to be backed up:

   Press: 1 ◀RETURN▶

   The screen displays:

```
Date: 1-Jan-0
```

7. The responses to the next four questions will be written on the beginning of the video tape. The response will assist the user in identifying the contents of the video tape. The first question asks for the date. Enter the date in a form similar

to the example on the screen. For example:

Type: 4-Nov-83 ◀RETURN▶

The screen displays:

```
Time: _
```

8. Enter the time followed by ◀RETURN▶. For example:

   Type: 5:00 p.m. ◀RETURN▶

   The screen displays:

```
Name: _
```

9. Enter a name of no more than sixteen characters which will be associated with the tape image created. For example:

   Type: DRIVE BACKUP ◀RETURN▶

   The screen displays:

```
Comment: _
```

10. Any comment of no more than 80 characters regarding the content of the drive backup may be entered. For example:

    Type: BACKUP RECORDS FOR OCTOBER 1983 ◀RETURN▶

    The screen displays:

```
POSITION RECORDER AND START RECORD
PRESS ◀RETURN▶ WHEN READY_
```

11. Place the speed setting on the video recorder on standard play speed. Insert a video tape into the video cassette recorder and rewind the tape. It is recommended that only one drive be backed up on any one tape. A 30 minute tape is required to back up a Model 6 or 11 drive while a 60 minute tape is required for a Model 20 drive. When the recorder has been loaded, press play and record on the video cassette recorder. **Press:** ◀RETURN▶ on the Apple II after the video cassette recorder has been running for about five seconds. The screen displays:

```
BACKUP IN PROGRESS...
```

12. The length of time required for backup varies with the size of the Corvus drive:

Drive Size	Approximate Backup Time
Model 6	12 minutes
Model 11	26 minutes
Model 20	38 minutes

13. After the appropriate time for the respective disk, the screen displays:

```
BACKUP FINISHED
ERROR STATUS:
                DISK ERRORS: 0
            —ALL DATA STORED—
```

14. This number should always be zero. If the number is not zero, go to the Troubleshooting section of this manual and rectify possible media defects.

The number of disk errors reported indicates the number of errors made by the disk unit during transfer to video tape. The number of errors on the tape itself has yet to be determined. Bad tape media may cause the tape to be incapable of restoration. To confirm that the information on the tape can be restored to a drive:

Press: V

The screen displays:

```
VERIFY SELECTED.
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

15. Rewind the video tape to its beginning and press PLAY, then **press:** ◀RETURN▶ on the Apple II. The screen displays:

```
VERIFY IN PROGRESS...
```

16. After the amount of time elapses equal to the time required for the backup of the drive, the screen displays:

```
ERROR STATUS:
    RECOVERED ERRORS : 16
    TAPE READ ERRORS  : 0
     —ALL DATA RECEIVED—
```

17. When the Mirror transfers information to video tape, the information is transferred four times. The number of recovered errors indicates the number of times the drive had to go to the second, third or fourth copy of the information in order to get a restorable block image. The number of recovered errors varies but should not exceed 250. When a large number of recovered errors are reported, the video tape is probably wearing and it should be replaced.

The number of tape read errors indicates the number of times that, despite going to the second, third and fourth copy of the information, a block could not be restored. Tape read errors usually indicate bad tape media. If tape read errors are reported, the backup should be done again with a new tape.

18. To exit the Mirror program:

Press: Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

RESTORING A DRIVE

This section describes the method by which an image of a drive is restored from a video cassette tape to a Corvus disk system using the Mirror, and describes only the normal situation where a tape image is to be restored to the same size drive as the drive from which it was created. The possibility that the image will be restored to a different size drive (or a different virtual drive in the case of a Model 20 drive) is described in the subsection "Restoration to Alternate Drives."

1. Power on the Corvus drive. When the Corvus drive becomes ready, power on the Apple II and its monitor. The screen displays:

```
COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN
```

2. **Press:** X

   The screen displays:

```
EXECUTE WHAT FILE? __
```

3. **Type:** SYS:MIRROR ◀RETURN▶

   The screen displays:

```
MIRROR: I(DENT B(CKUP R(STORE V(RIFY Q ?
```

4. To be sure that the tape contains the desired drive backup,

   Press: I

   The screen displays:

```
IDENTIFY SELECTED.
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

5. Rewind the video tape. When rewound, press play on the recorder followed by ◀RETURN▶ on the Apple II. After a few seconds, the screen displays something like the following:

```
MIRROR: I(DENT B(CKUP R(STORE V(RIFY Q?
    IMAGE ID        : 1
    SIZE            : 11220
    GENERATED ON    : XXAP (PASCAL)
    DATE            : 4-Nov-83
    TIME            : 5:00 P.M.
    NAME            : DRIVE BACKUP
    COMMENT         : BACKUP RECORDS FOR
                      OCTOBER 1983
```

6. If the tape contains the desired drive image:

   Press: R

   The screen displays:

```
RESTORE A: V(OLUME D(RIVE P(HYS-DRV M(AN
```

7. At the time of back up, Model 20 users had the option of backing up one of the two virtual drives by selecting the D(rive option. If this option had been selected at the time of back up, **press:** D. Most users, however, probably backed up the entire physical drive at the time of backup. If the entire physical drive had been backed up:

   Press: P

   The screen displays:

```
WHICH PHYSICAL DRIVE? 1
```

8. If drives are daisy-chained together, the user may select the drive to which the image will be restored. Remember that the size of the drive to which the image will be restored must match the size of the drive from which the image was taken (since the M(anual option has not been selected). Most users will probably restore to drive 1. Enter the drive number to which the image will be restored followed by ◀RETURN▶. For example:

   Type: 1 ◀RETURN▶

   The screen displays:

```
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

9. Rewind the video tape. When rewound, press PLAY on the recorder followed by ◀RETURN▶ on the Apple II. The screen displays:

```
RESTORE IN PROGRESS...
```

10. After the amount of time elapses that was required to originally back up the drive, the screen displays:

```
ERROR STATUS:
   RECOVERED ERRORS  : 30
   TAPE READ ERRORS  :  0
   DISK WRITE ERRORS :  0
     —ALL DATA RECEIVED—
```

11. The number of recovered errors varies, but should not be over 250. If the number exceeds 250, the tape is probably wearing and should be replaced. No tape read errors or disk write errors should be encountered. If tape read errors occur, the tape may have defective media; try to restore the image again. If disk write errors occur, go to the Troubleshooting section and rectify possible media defects.

12. To exit the Mirror program:

Press: Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

RESTORATION TO ALTERNATE DRIVES

Occasionally users wish to restore a drive image to a disk drive which differs in size from the drive from which the image was taken. This can be done as long as the drive to which the tape will be restored is larger than the drive from which the image was taken. This section describes the method by which this type of restoration is accomplished.

1. Power on the Corvus drive. When the drive becomes ready, power on the Apple II and its monitor. The screen displays:

```
COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN
```

2. **Press:** X

   The screen displays:

```
EXECUTE WHAT FILE? __
```

3. **Type:** SYS:MIRROR ◀RETURN▶

   The screen displays:

```
MIRROR: I(DENT B(CKUP R(STORE V(RIFY Q ?
◀2.0b▶:__
```

4. To be sure that the tape contains the desired drive backup:

   Press: I

   The screen displays:

```
IDENTIFY SELECTED.
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

5. Rewind the video tape. When rewound, press PLAY on the recorder followed by ◀RETURN▶ on the Apple II. The

screen displays something like the following:

```
MIRROR: I(DENT B(CKUP R(STORE V(RIFY Q
    IMAGE ID        : 1
    SIZE            : 11220
    GENERATED ON    : XXAP (PASCAL)
    DATE            : 4-Nov-83
    TIME            : 5:00 P.M.
    NAME            : DRIVE BACKUP
    COMMENT         : THIS BACKUP CONTAINS
                      ALL RECORDS FOR THE
                      MONTH OF OCTOBER
                      1983
```

6. If the tape contains the desired drive image:

   Press: R

   The screen displays:

```
RESTORE A: V(OLUME D(RIVE P(HYS-DRV
M(AN: _
```

7. **Press:** M

   The screen displays:

```
READ HOW MANY BLOCKS:
```

8. When the tape was I(dentified, the size of the image was reported. The size of the image must be smaller than the size of the virtual drive to which it will be restored.

MODEL	Size (in blocks)
6	11540
11	23700
20	
Virtual Drive #1	17920
Virtual Drive #2	17940

Since Model 20 is considered two virtual drives, and since each of the virtual drives of the Model 20 are smaller than a Model 11 drive, a Model 11 drive image should not be restored to a Model 20 drive.

9. If the image is not greater than the drive to which it will be restored, enter the size of the image followed by ◀RETURN▶. For example:

   Type: 23700 ◀RETURN▶

   The screen displays:

```
RESTORE TO DRIVE: 1
```

10. If drives are daisy-chained together, the user may select the drive to which the image will be restored. Enter the virtual drive number of the drive in the daisy chain to which the image will be restored followed by ◀RETURN▶. (Remember that a Model 20 drive counts as two virtual drives). If no drives are daisy chained:

    Press: 1 ◀RETURN▶

    The screen displays:

```
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

11. Rewind the video tape. When rewound, press PLAY on the recorder. After about 5 seconds, **press:** ◀RETURN▶ on the Apple II. The screen displays:

```
RESTORE IN PROGRESS...
```

12. After the amount of time elapses that was required to originally back up the drive, the screen displays:

```
ERROR STATUS:
   RECOVERED ERRORS : 30
   TAPE READ ERRORS  :  0
   DISK WRITE ERRORS :  0
    —ALL DATA RECEIVED—
```

13. The number of recovered errors varies, but should not be over 250. If the number exceeds 250, the tape is probably wearing and should be replaced. No tape read errors or disk write errors should be encountered. If tape read errors

occur, the tape may have defective media; try to restore the image again. If disk write errors occur, go to the Troubleshooting section and rectify possible media defects.

14. To exit the Mirror program:

    Press: Q

    The screen displays:

```
COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN
```

BACKING UP A VOLUME

1. Power on the Corvus drive. When the drive becomes ready, power on the Apple II and its monitor. The screen displays:

```
COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN
```

2. **Press:** X

   The screen displays:

```
EXECUTE WHAT FILE? _
```

3. **Type:** SYS:MIRROR ◀RETURN▶

   The screen displays:

```
MIRROR: I(DENT B(CKUP R(STORE V(RIFY Q ?
```

4. **Press:** B

   The screen displays:

```
BACKUP A: V(OLUME D(RIVE P(HYS-DRV: _
```

5. **Press:** V

   The screen displays:

```
WHICH VOLUME? _
```

6. Enter the name of a volume to be backed up followed by ◀RETURN▶. For example:

   Type: APPLE2 ◀RETURN▶

   The screen displays:

```
DATE: 1-JAN-0
```

7. The responses to the next four questions will be written on the beginning of the video tape. The response will assist the user to identify the contents of the video tape. The first question asks for the date. Enter the date in a form similar to the example on the screen. For example:

   Type: 4-Nov-83 ◀RETURN▶

   The screen displays:

```
TIME: _
```

8. Enter the time followed by ◀RETURN▶. For example:

   Type: 5:00 p.m. ◀RETURN▶

   The screen displays:

```
NAME: _
```

9. Enter a name of no more than sixteen characters which will be associated with the tape image created. Normally, the name of the volume is entered. For example:

   Type: APPLE2 VOLUME ◀RETURN▶

   The screen displays:

```
COMMENT: _
```

10. Any comment of no more than 80 characters regarding the content of the volume backup may be entered. For example:

    Type: BACKUP OF APPLE2 VOLUME ON CORVUS DRIVE ◀RETURN▶

    The screen displays:

```
POSITION RECORDER AND START RECORD
PRESS ◀RETURN▶ WHEN READY
```

11. Place the speed setting on the video recorder on standard play speed. Insert a video tape into the video cassette recorder and rewind the tape. It is recommended that only one volume be backed up on any one tape. When the recorder has been loaded, press play and record on the video cassette recorder. **Press:** ◀RETURN▶ on the Apple II after the video cassette recorder has been running for about five seconds. The screen displays:

```
BACKUP IN PROGRESS...
```

12. The length of time required for backup varies with the size of the volume being backed up. After a period of time which may be as long as 26 minutes, the screen displays:

```
BACKUP FINISHED
ERROR STATUS:
    DISK ERRORS: 0
    —ALL DATA STORED—
```

13. This number should always be zero. If the number is not zero, see the Troubleshooting chapter of this guide.

The number of disk errors reported indicates how many errors the disk unit made during transfer to video tape. The number of errors on the tape itself has yet to be determined. Bad tape media may make the tape incapable of restoration. To confirm that the information on the tape can be restored to a volume:

Press: V

The screen displays:

```
VERIFY SELECTED.
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

14. Rewind the video tape to its beginning and press PLAY, then **press:** ◀RETURN▶ on the Apple II. The screen displays:

```
VERIFY IN PROGRESS...
```

15. After the amount of time elapses equal to the time required for the backup of the volume, the screen displays:

```
ERROR STATUS:
    RECOVERED ERROS: 16
    TAPE READ ERRORS: 0
    — ALL DATA RECEIVED —
```

16. When the Mirror transfers information to video tape, the information is transferred four times. The number of recovered errors reported indicates the number of times the drive had to go to the second, third or fourth copy of the information in order to get a restorable block image. The number of recovered errors varies but should not exceed 250. When a large number of recovered errors are reported, the video tape is probably wearing and it should be replaced.

    The number of recovered errors reported indicates the number of times that, despite going to the second, third and fourth copy of the information, a block could not be restored. Tape read errors usually indicate bad tape media. If tape read errors are generated, the backup should be done again with a new tape.

17. To exit the Mirror program:

    Press: Q

    The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

RESTORING A VOLUME

This section describes the method by which an image of a volume is taken from a video cassette tape and restored to a

Corvus disk system using the Mirror. Note that the restoration of the volume must be to a volume that is the same size as the one backed up. Note also, that if a restore is done to a volume other than the one originally backed up, the contents of the volume are overwritten. For example, you can backup volume APPLE2, which is 1024 blocks long, and restore it to volume Denise, which is also 1024 blocks long. After the restore is completed, the name of the volume Denise will have been changed to APPLE2, and the drive would contain two identical copies of APPLE2.

1. Power on the Corvus drive. When the drive becomes ready, power on the APPLE II and its monitor.

   The screen displays:

```
COMMAND: E[DIT R[UN, F[ILE, C[OMP, L[IN
```

2. **Press:** X

   The screen displays:

```
EXECUTE WHAT FILE? _
```

3. **Type:** SYS:MIRROR ◀RETURN▶

   The screen displays:

```
MIRROR: I[DENT B[CKUP R[STORE V[RIFY Q ?
```

4. To be sure that the tape contains the desired volume backup:

   Press: I

   The screen displays:

```
IDENTIFY SELECTED.
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

5. Rewind the video tape. When rewound, press PLAY on the recorder followed by ◀RETURN▶ on the Apple II. The

screen displays something like the following:

```
IMAGE ID        : 1
SIZE            : 1024
GENERATED ON    : XXAP (PASCAL)
DATE            : 4-Nov-83
TIME            : 5:00 P.M.
NAME            : APPLE2 VOLUME
COMMENT         : BACKUP OR APPLE2
                  VOLUME ON CORVUS DRIVE
```

6. If the tape contains the desired volume:

   Press: R

   The screen displays:

```
RESTORE A: V(OLUME D(RIVE P(HYS-DRV
M(AN: __
```

7. **Press:** V

   The screen displays:

```
WHICH VOLUME? __
```

8. Enter the name of the volume to which the data is to be restored followed by ◀RETURN▶. For example:

   Type: APPLE2 ◀RETURN▶

   The screen displays:

```
POSITION RECORDER AND START PLAYBACK
PRESS ◀RETURN▶ WHEN READY
```

9. Rewind the video tape. When rewound, press PLAY on the recorder followed by ◀RETURN▶ on the Apple II. The screen displays:

```
RESTORE IN PROGRESS...
```

10. After the amount of time elapses that was required to originally back up the volume, the screen displays:

```
ERROR STATUS:
   RECOVERED ERRORS  : 2
   TAPE READ ERRORS  : 0
   DISK WRITE ERRORS : 0
     — ALL DATA RECEIVED —
```

11. The number of recovered errors varies, but should not exceed 250. If the number exceeds 250, the tape is probably wearing and should be replaced. No tape read errors or disk write errors should be encountered. If tape read errors occur, the tape may have defective media; try to restore the volume again. If disk write errors occur, go to the Troubleshooting chapter and rectify possible media defects.

12. To exit the Mirror program:

Press: Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

TROUBLESHOOTING GUIDE

ABOUT TROUBLESHOOTING

The Corvus disk system is designed to provide years of problem-free use. At times, however, even the most reliable computer equipment may experience a hardware or software problem.

A number of difficulties with the Corvus hard disk system can be rectified by the user in the office. The difficulties that can be corrected include improper hardware setup, drive firmware, and drive media defects.

The three major tools upon which the user will rely in rectifying problems are the drive indicator lights, the disk installation guide, and the Corvus diagnostic utilities.

The indicator lights on the drive are very useful in determining the status of the drive. When only the ready light is on and glowing strong (i.e. not flickering), the drive has "come ready." The drive must be in the ready state in order for computers to communicate with the drive.

When the drive is in the ready state, computers may communicate with it only if the hardware has been properly set up. The installation guide's hardware setup section is useful in confirming that the hardware has been properly configured for computer/drive communication.

When the computer can communicate with the drive, operation is usually smooth. However, intermittent problems may be experienced. Such problems can be a result of media defects, which can be remedied using the Corvus diagnostic utility. This utility assumes that the Corvus interface card is connected to slot 6 of the Apple II computer.

The table shows symptoms of problems that the user may experience, the possible cause of the difficulty, and the possible remedies to the difficulty. The Diagnostics chapter provides more detailed instructions for performing the suggested procedures to correct the problem.

TROUBLESHOOTING CORVUS DRIVE

Symptom	Possible Problem	Remedy
No indicator lights on disk	power cord not well connected	properly connected power cord
	power switch not on	turn on power switch
	fuse blown	replace fuse
	voltage setting incorrect	select proper voltage setting See Hardware Setup section of CORVUS DISK INSTALLATION GUIDE
Indicator lights function yet drive doesn't come ready	improper hardware setup	check hardware setup especially cable attachments
	drive error	toggle the RESET switch
	improper firmware	replace firmware (See Diagnostics chapter of this guide)
Drive comes ready but computer cannot communicate with drive	improper hardware setup	check hardware setup especially drive controller switches
	improper setup of Constellation table if master multiplexer is used	setup Constellation table for a network with a master multiplexer (See System Manager's Guide).
	VDO table or interleaving spec problems	setup VDO table and interleave spec properly (See Diagnostics chapter)

Symptom	Possible Problem	Remedy
Communication with the drive possible but intermittent problems	media defects	check for media defects (See Diagnostics chapter)
	VDO table or interleaving spec problems	setup VDO table and interleave spec properly (See Diagnostics chapter)

TROUBLESHOOTING A CORVUS MIRROR

Symptom	Possible Problem	Remedy
V[ERIFY shows tape error	VCR set at improper speed	reset tape speed control on VCR
	bad video tape	repeat backup using another video tape
"IMAGE SIZE MISMATCH" error during R[ESTORE	tape image larger than drive space	use I[DENTIFY option of Mirror program to determine correct image size
	image types don't match	check that image type (volume, drive, logical drive) on tape matches type of area on drive being restored.
"IMAGE NOT FOUND" error during R[ESTORE, V[ERIFY, or I[DENTIFY	improper video connections	properly connected video cable
	VCR power cord not well connected	properly connected power cord
	VCR power switch not on	turn on power switch on video cassette recorder

Symptom	Possible Problem	Remedy
	video tape not rewound	rewind tape to start of image being restored
R[ESTORE shows tape error	VCR set at improper speed	reset tape speed control on VCR
	bad video tape	repeat B[ACKUP using another video tape, then repeat R[ESTORE
R[ESTORE shows disk error	weak tracks on Corvus drive	repeat R[ESTORE; if error continues, spare out bad tracks (See Diagnostics chapter of this guide)
Tape dropout during playback on R[ESTORE or V[ERIFY	serious tape flaw	repeat B[ACKUP using another video tape, then repeat R[ESTORE or V[ERIFY
	image ran off end of tape	repeat B[ACKUP using a longer video tape, then repeat R[ESTORE or V[ERIFY
	image partially overwritten	repeat B[ACKUP

DIAGNOSTICS

ABOUT THE DIAGNOSTIC PROGRAM

This chapter provides detailed descriptions of how to use the Corvus disk diagnostics program. Diagnostics are used to check the Corvus disk for the causes of operating failures, as outlined in Chapter Two, "Troubleshooting Guide," and to remedy many of the problems which can occur on a drive.

Updating the Firmware may be required if the drive fails to become ready when powered on. Firmware updates are also used after reformatting a drive, or when adding new types of devices to an existing system. Before updating firmware, the Version Check option may be used to determine which version of firmware is on the drive, and whether a firmware update or replacement is required.

Setting the Virtual Drive Offset (VDO) and the Interleaving Spec are also remedies for a drive which fails to become ready. The VDO table tells the computer whether the drive is a Model 6, Model 11 or Model 20. The interleaving spec sets the timing for the heads to read data from the disk while the disk rotates at 3600 RPM.

A CRC (Cyclical Redundancy Check) test locates media defects on the Corvus drive.

Sparing Tracks allows you to skip over an area of the disk that the CRC check found to be defective. In recording data on the disk, spared tracks are skipped and only the areas of the drive which have no defects are used.

Formatting the drive erases all data on a drive, allowing you to start all over again. Formatting should be done only as a last resort, when no other Diagnostics option makes the drive operate properly. After a drive is reformatted, the firmware must be replaced using the firmware update procedure. Also, any tracks which had been found defective under the CRC check, and had been spared out, will have to be spared out again.

Exercising the Heads checks the operation of the Heads, which are the servo mechanisms that read data from the various disk platters inside a Corvus drive. Any failures in the operation of the heads are reported on the computer screen.

Parking the Heads locks all of the disk-reading heads over the innermost portion of the disk, which is not used for recording data. This prevents damage to the data portions of the disk while the drive is being transported from one office to another.

Two other options listed in the Diagnostic Menu, Setting the Diag Data Block File Name and using the Manual Mode, are not recommended procedures. These options are not covered in this chapter, as they should be performed only under the direction of the Corvus Service Department, which will provide the step-by-step instructions for these procedures when needed.

ENTERING THE DIAGNOSTIC PROGRAM

Follow the procedures on this page before selecting any of the Diagnostics options in this chapter.

1. Power off all equipment.

POWER OFF

2. Press the diskette controller card firmly into slot 6 of the Apple II computer.
3. Press the Corvus disk drive interface card firmly into slot 2 of the APPLE II computer.
4. Power on the Apple II monitor.
5. Place the CORVUS AP UTILITIES—DIAGNOSTICS diskette in the diskette drive.
6. Power on the Corvus drive. When the FAULT and BUSY lights turn off, and only the READY light stays lit, power on the Apple II computer.

The screen displays:

```
    DDIAG (2.1 A): CORVUS DISK DIAGNOSTIC
    ©COPYRIGHT 1982 CORVUS SYSTEMS, INC.
**************************************************
    V  — VERSION CHECK
    P  — DISPLAY/MODIFY DRIVE  PARAMETERS
    X  — PERFORM SERVO EXERCISE
    C  — PERFORM CRC SCAN FOR BAD TRACKS
    S  — SET DIAG DATA BLOCK FILE NAME
    A  — SET ALTERNATE SLOT
    U  — UPDATE FIRMWARE ON DISK
    F  — PERFORM PLATTER FORMAT
    O  — PARK HEADS OF DISK
    M  — MANUAL MODE
    H  — HELP
    E  — EXIT
**************************************************

    CURRENT SLOT IS 2
    SELECT DISK DIAGNOSTIC OPTION
```

7. Proceed to the section on the particular option of the Diagnostics program you wish to use.

UPDATING THE CORVUS FIRMWARE

Firmware is the programming which converts user requests to the disk into coordinates understood by a Corvus disk drive. There are two reasons for updating or replacing the firmware file on a Corvus hard disk.

The first reason for replacing the drive's firmware is that, as indicated in the Troubleshooting chapter, certain problems with the Corvus drive are related to damaged firmware. In those instances, it becomes necessary to replace the damaged firmware file with the original firmware from the CORVUS AP UTILITIES—DIAGNOSTICS diskette. Updating firmware is also required after reformatting a Corvus drive.

From time to time, Corvus issues a new version of the firmware programming, which enables the disk to communicate with more different brands of computers and computer-peripheral devices than was possible under previous firmware versions. The second reason for updating the firmware, then, is that you have purchased additional computers or peripheral equipment which were not Corvus-compatible under earlier firmware versions. To make the new equipment Corvus-compatible, replace the existing firmware file with a newer version that allows your Corvus disk system to understand user requests from both your earlier equipment and the new equipment you have just added.

Updating or replacing the firmware does not affect any other files on your drive, but we recommend that you backup your disk with the Corvus Mirror before selecting this option.

After you have completed the first section of this chapter, titled "Entering the Diagnostic Program," follow the procedures in this section to check which version of firmware is on the drive and to update or replace the Corvus firmware.

CHECKING THE FIRMWARE VERSION NUMBER

1. Check which version of firmware currently exists on the Corvus drive.

Press: V

The screen displays:

```
DRV  P/V  CAPACITY  SIZE/REV  SPT  TPC  CPD
 1    P     35860    20MB/H   20    6   306
 2    V     17940

DRV  ROM  FIRMWARE
 1    62   V18.3          — CONST II

PRESS ◀SPACE▶ TO CONTINUE
```

2. **Press:** ◀SPACE▶

The screen displays:

```
        DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
        ©COPYRIGHT 1982 CORVUS SYSTEMS, INC.
**************************************************

            V — VERSION CHECK
            P — DISPLAY/MODIFY DRIVE PARAMETERS
            X — PERFORM SERVO EXERCISE
            C — PERFORM CRC SCAN FOR BAD TRACKS
            S — SET DIAG DATA BLOCK FILE NAME
            A — SET ALTERNATE SLOT
            U — UPDATE FIRMWARE ON DISK
            F — PERFORM PLATTER FORMAT
            O — PARK HEADS OF DISK
            M — MANUAL MODE
            H — HELP
            E — EXIT
**************************************************

        CURRENT SLOT IS 2
        SELECT DISK DIAGNOSTIC OPTION
```

UPDATING THE FIRMWARE

1. To replace or update the firmware:

Press: U

The screen displays:

```
THE OPTION YOU HAVE SELECTED MAY
DESTROY DATA ON THE DRIVE. PLEASE MAKE
SURE THAT YOU ARE TALKING TO THE PROPER
DRIVE.
FORMAT AND UPDATE OPTIONS REQUIRE THE
DIAG BLOCK AND FIRMWARE FILES TO BE ON
A CONTROLLER OTHER THAN THE TARGET
DRIVE.
TARGET CONTROLLER IS: SLOT 2, SERVER 64
  CONTINUE? (Y/N)
```

2. **Press:** Y

   The screen displays:

```
UPDATE FIRMWARE ON WHICH DRIVE? 1
```

3. **Press:** ◀RETURN▶

   The screen displays:

```
CHANGE DRIVE TABLES (NOT
RECOMMENDED!)?
```

4. **Press:** N

   The screen displays:

```
ENTER FIRMWARE FILE NAME: CF18.3
```

5. Type the number of the new firmware file you wish to copy to the Corvus drive in place of the existing file. For example:

   Type: CF18.3 ◀RETURN▶

   To update the firmware with the default version number which displayed on the screen:

   Press: ◀RETURN▶

The screen displays:

```
READING FIRMWARE FROM CF18.3.DATA
. . . . . .
FIRMWARE WRITTEN.
PRESS ◀SPACE▶ TO CONTINUE
```

6. **Press:** ◀SPACE▶

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
©COPYRIGHT 1982 CORVUS SYSTEMS, INC.
**************************************************

        V — VERSON CHECK
        P — DISPLAY/MODIFY DRIVE PARAMETERS
        X — PERFORM SERVO EXERCISE
        C — PERFORM CRC SCAN FOR BAD TRACKS
        S — SET DIAG DATA BLOCK FILE NAME
        A — SET ALTERNATE SLOT
        U — UPDATE FIRMWARE ON DISK
        F — PERFORM PLATTER FORMAT
        O — PARK HEADS OF DISK
        M — MANUAL MODE
        H — HELP
        E — EXIT
**************************************************
CURRENT SLOT IS 2
SELECT DISK DIAGNOSTIC OPTION
```

7. To exit the Diagnostic program, power off your computer and place the diskette drive controller card in slot 4 and the Corvus interface card in slot 6 of the Apple II.

VDO TABLE AND INTERLEAVING SPEC SETUP

In order for the Apple II computer to know whether a Model 6, Model 11, or Model 20 drive is available, the virtual drive offset (VDO) table must be properly setup. The VDO table normally does not need to be setup; however, if communication with the drive is not possible, the VDO table may be the problem.

The incorrect setting of the interleaving spec parameter may also cause communication to be impossible. Sectors of the disk are numbered in a manner considering rotational speed and the timing of read/write operations. This is not a sequential order due to physical proximity. The wrong interleave number will cause excessive delays in disk operations.

Setting the VDO table and interleaving spec destroys data on the disk. We recommend that you backup your disk with the Corvus Mirror before selecting this option, and restore the data to the disk when you have finished.

After you have completed the first section of this chapter, "Entering the Diagnostic Program," the following procedure will cause both the VDO table and the interleave values to be set.

1. From the Diagnostic menu:

   Press: P

   The screen displays:

```
PARAMETERS OF WHICH DRIVE? 1
```

2. **Press:** ◀RETURN▶

   The screen displays:

```
DISK MAP FOR DRIVE 1
NO TRACKS ARE SPARED
INTERLEAVE SPEC: 9
VIRTUAL DRIVE / TRACK OFFSET
                1       0
                2     896
PRESS ◀SPACE▶ TO CONTINUE
```

3. **Press:** ◀SPACE▶

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
©COPYRIGHT 1982 CORVUS SYSTEMS, INC.
**************************************************
        L — DISPLAY PARAMETERS
        S — SAVE CHANGES
        T — SET SPARE TRACKS
        I — SET INTERLEAVING
        V — SET VIRTUAL DRIVE OFFSET TABLE
        H — HELP
        E — EXIT
**************************************************
CURRENT SLOT IS 2
SELECT PARAMETER OPTION:
```

4. To set the interleaving specification:

Press: I

The screen displays:

```
ENTER INTERLEAVING: 9
```

5. Enter the appropriate interleaving spec for the particular Model of Corvus drive you have.

The proper values of the interleave spec are:

Model 6. 12
Model 11 9
Model 20 9

The default value which displays on the screen should be correct for the particular drive Model. If it is:

Press: ◀RETURN▶

If the Corvus service department instructs you to change the interleaving, or the displayed interleaving is incorrect, enter the correct number. For example:

Type: 12 ◀RETURN▶

The screen displays:

```
DISK MAP FOR DRIVE 1
NO TRACKS ARE SPARED
INTERLEAVE SPEC: 12
VIRTUAL DRIVE / TRACK OFFSET
                1        0
                2      896
PRESS: ◀SPACE▶ TO CONTINUE
```

6. **Press:** ◀SPACE▶

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
(C) COPYRIGHT 1982 CORVUS SYSTEMS, INC.
**************************************************
        L  — DISPLAY PARAMETERS
        S  — SAVE CHANGES
        T  — SET SPARE TRACKS
        I  — SET INTERLEAVING
        V  — SET VIRTUAL DRIVE OFFSET TABLE
        H  — HELP
        E  — EXIT
**************************************************
CURRENT SLOT IS 2
SELECT PARAMETER OPTION:
```

7. To set the virtual drive offset:

Press: V

The screen displays:

```
ENTER -1 TO TERMINATE ENTRY
TRACK OFFSET FOR VIRTUAL DRIVE 1: 0
```

8. **Press:** ◀RETURN▶

   If you have a Model 6 or Model 11 drive, the screen displays:

```
TRACK OFFSET FOR VIRTUAL DRIVE 2: -1
```

   For a Model 6 or Model 11 drive, skip to Step 10.

   If you have a Model 20 drive, the screen displays:

```
TRACK OFFSET FOR VIRTUAL DRIVE 2: XXX
```

   The virtual drive offset for drive 2 of a Model 20 drive, represented here by "XXX," is 911 for a drive which has been initialized for BASICS only, and 896 for a drive which has been initialized for both Pascal and BASICS.

   If the displayed virtual drive offset for drive 2 is correct:

   Press: ◀RETURN▶

   If the displayed virtual drive offset for drive 2 is not correct, enter the correct value. For example:

   Type: 896 ◀RETURN▶

9. The screen displays:

```
TRACK OFFSET FOR VIRTUAL DRIVE 3: -1
```

10. **Press:** ◀RETURN▶

    The screen displays:

```
DISK MAP FOR DRIVE 1
NO TRACKS ARE SPARED
INTERLEAVE SPEC: 9
VIRTUAL DRIVE / TRACK OFFSET
              1        0
              2      896
PRESS: ◀SPACE▶ TO CONTINUE
```

11. **Press:** ◀SPACE▶

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
©COPYRIGHT 1982 CORVUS SYSTEMS, INC.
**********************************************

    L — DISPLAY PARAMETERS
    S — SAVE CHANGES
    T — SET SPARE TRACKS
    I — SET INTERLEAVING
    V — SET VIRTUAL DRIVE OFFSET TABLE
    H — HELP
    E — EXIT

**********************************************

CURRENT SLOT IS 2
SELECT PARAMETER OPTION:
```

12. To save the changes to the interleaving and the virtual drive offset:

Press: S

The screen displays:

```
DISK MAP FOR DRIVE 1
NO TRACKS ARE SPARED
INTERLEAVE SPEC: 9
VIRTUAL DRIVE / TRACK OFFSET
                1        0
                2      896
YOU ARE ABOUT TO DESTROY DATA
ON THE DISK. CONTINUE? (Y/N)
```

13. **Press:** Y

The screen displays:

```
PARAMETERS UPDATED.
PRESS ◀SPACE▶ TO CONTINUE
```

14. **Press:** ◀SPACE▶

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
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**************************************************

        V  — VERSION CHECK
        P  — DISPLAY/MODIFY DRIVE PARAMETERS
        X  — PERFORM SERVO EXERCISE
        C  — PERFORM CRC SCAN FOR BAD TRACKS
        S  — SET DIAG DATA BLOCK FILE NAME
        A  — SET ALTERNATE SLOT
        U  — UPDATE FIRMWARE ON DISK
        F  — PERFORM PLATTER FORMAT
        O  — PARK HEADS OF DISK
        M  — MANUAL MODE
        H  — HELP
        E  — EXIT
**************************************************
CURRENT SLOT IS 2
SELECT DISK DIAGNOSTIC OPTION
```

15. To exit the Diagnostic program, power off your computer and place the diskette drive controller card in slot 4 and the Corvus interface card in slot 6 of the Apple II.

You have now updated the interleaving spec and the VDO table. If these values have changed the disk should now function properly.

RECTIFYING MEDIA DEFECTS

LOCATING MEDIA DEFECTS

If you are experiencing intermittent problems with the Corvus disk drive, media defects may be the source of the problem. The defects can be of two types, hard defects and soft defects. Hard defects are caused by production blemishes or aging of the Winchester drive. 31 spare tracks are provided to replace defective tracks. Soft defects are caused by format information being destroyed; this information can be corrected. This section describes the method by which both types of media defects may be eliminated from the user area of the disk.

Sparing tracks destorys data on the disk. We recommend that you backup your disk with the Corvus Mirror before selecting this option, and restore the data to the disk when you have finished.

1. The Diagnostic program must be run from floppy disk as the hard drive is inoperative. After you have completed the first section of this chapter, "Entering the Diagnostic Program," select the C—PERFORM CRC SCAN FOR BAD TRACKS option from the Diagnostic menu.

2. **Press:** C ◀RETURN▶

   The screen displays:

```
PERFORM CRC CHECK OF WHICH DRIVE? 1
```

3. **Press:** ◀RETURN▶

   This will execute a Cyclical redundancy check on the disk drive to determine the quality of the media.

   The screen displays:

```
CRC SCAN IN PROGRESS
(TAKES FROM 1 TO 3 MINUTES)
```

The BUSY light on the Corvus drive blinks rapidly.

4. After one to three minutes, the CRC test is finished and the screen displays:

```
NO BLOCKS WITH CRC ERRORS FOUND
PRESS ◀SPACE▶ TO CONTINUE
```

If media defects are encountered, copy the information on paper. Note the head, cylinder, sector and track of any errors.

5. **Press:** ◀SPACE▶

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
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**********************************************

    V — VERSION CHECK
    P — DISPLAY/MODIFY DRIVE PARAMETERS
    X — PERFORM SERVO EXERCISE
    C — PERFORM CRC SCAN FOR BAD TRACKS
    S — SET DIAG DATA BLOCK FILE NAME
    A — SET ALTERNATE SLOT
    U — UPDATE FIRMWARE ON DISK
    F — PERFORM PLATTER FORMAT
    O — PARK HEADS OF DISK
    M — MANUAL MODE
    H — HELP
    E — EXIT
**********************************************

CURRENT SLOT IS 2
SELECT DISK DIAGNOSTIC OPTION
```

6. Repeat Steps 1 to 5 a total of five times.

If a track appears bad three or more times, the track needs to be eliminated and one of the 31 spare tracks used instead. See the next section of this chapter, called "Sparing Tracks."

SPARING TRACKS

Before any tracks are spared, a Mirror backup must be made of the entire drive. If a track is spared, all drive information after that track will not function. After a track is spared, restore from the tape.

1. From the Diagnostic menu:

   Press: P

   The screen displays:

```
PARAMETERS OF WHICH DRIVE? 1
```

2. **Press:** ◀RETURN▶

   The screen displays:

```
DISK MAP FOR DRIVE 1
NO TRACKS ARE SPARED
INTERLEAVE SPEC: 9
VIRTUAL DRIVE / TRACK OFFSET
                1       0
                2     896
PRESS ◀SPACE▶ TO CONTINUE
```

3. **Press:** ◀SPACE▶

   The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
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**********************************************
    L — DISPLAY PARAMETERS
    S — SAVE CHANGES
    T — SET SPARE TRACKS
    I — SET INTERLEAVING
    V — SET VIRTUAL DRIVE OFFSET TABLE
    H — HELP
    E — EXIT
**********************************************
CURRENT SLOT IS 2
SELECT PARAMETER OPTION:
```

4. To spare out damaged tracks on the Corvus disk drive:

   Press: T

   The screen displays:

```
NO TRACKS ARE SPARED
**********************************************
     A — ADD A TRACK TO THE LIST
     R — REMOVE A TRACK FROM THE LIST
     C — REMOVE ALL TRACKS FROM THE
         LIST
     H — HELP
     E — EXIT
**********************************************
CURRENT SLOT IS 2
SELECT TRACK SPARING OPTION
```

5. **Press:** A

   The screen displays:

```
ENTER TRACK NUMBER TO BE ADDED: 0
```

   Type the number of a track which was listed as bad when you did a CRC check of the drive. For example:

   Type: 306 ◀RETURN▶

   The screen displays:

```
SPARED TRACKS:
  306
          1 TRACKS ARE CURRENTLY SPARED.
         31 TOTAL TRACKS MAY BE SPARED.
**********************************************
     A — ADD A TRACK TO THE LIST
     R — REMOVE A TRACK FROM THE LIST
     C — REMOVE ALL TRACKS FROM THE
         LIST
     H — HELP
     E — EXIT
**********************************************
CURRENT SLOT IS 2
SELECT TRACK SPARING OPTION
```

6. Repeat Steps 4 and 5 until all tracks that were listed as bad during the CRC check have been spared out.

7. To exit the Spared Tracks menu:

   Press: E

   The screen displays:

```
DISK MAP FOR DRIVE 1
SPARED TRACKS:
  306
            1 TRACKS ARE CURRENTLY SPARED.
           31 TOTAL TRACKS MAY BE SPARED.
INTERLEAVE SPEC: 9
VIRTUAL DRIVE / TRACK OFFSET
                1       0
                2     896
PRESS ◀SPACE▶ TO CONTINUE
```

8. **Press:** ◀SPACE▶

   The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
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**************************************************
     L — DISPLAY PARAMETERS
     S — SAVE CHANGES
     T — SET SPARE TRACKS
     I — SET INTERLEAVING
     V — SET VIRTUAL DRIVE OFFSET TABLE
     H — HELP
     E — EXIT
**************************************************
CURRENT SLOT IS 2
SELECT PARAMETER OPTION:
```

9. To exit the Parameters menu:

   Press: E

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
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**********************************************
     V — VERSION CHECK
     P — DISPLAY/MODIFY DRIVE PARAMETERS
     X — PERFORM SERVO EXERCISE
     C — PERFORM CRC SCAN FOR BAD TRACKS
     S — SET DIAG DATA BLOCK FILE NAME
     A — SET ALTERNATE SLOT
     U — UPDATE FIRMWARE ON DISK
     F — PERFORM PLATTER FORMAT
     O — PARK HEADS OF DISK
     M — MANUAL MODE
     H — HELP
     E — EXIT
**********************************************
CURRENT SLOT IS 2
SELECT DISK DIAGNOSTIC OPTION
```

To exit the Diagnostic program, power off your computer and place the diskette drive controller card in slot 4 and the Corvus interface card in slot 6 of the Apple II.

FORMATTING THE CORVUS DRIVE

The following procedures will destroy all data on the disk. Before you do these steps, backup all data on the drive. Use the Corvus Mirror or floppy diskettes to protect your work.

Formatting the drive should be done only as a last resort, when no other Diagnostics procedure succeeds in making your Corvus drive operational. After a drive has been formatted, the firmware must be replaced, and any bad tracks which were spared out will have to be spared again.

1. After you have completed the first section of this chapter, "Entering the Diagnostic Program," select the F — PERFORM PLATTER FORMAT option from the Diagnostic menu.

   Press: F

   The screen displays:

```
THE OPTION YOU HAVE SELECTED MAY
DESTROY DATA ON THE DRIVE. PLEASE MAKE
SURE THAT YOU ARE TALKING TO THE PROPER
DRIVE.

FORMAT AND UPDATE OPTIONS REQUIRE THE
DIAG BLOCK AND FIRMWARE FILES TO BE ON
A CONTROLLER OTHER THAN THE TARGET
DRIVE.

TARGET CONTROLLER IS: SLOT 2, SERVER 64
     CONTINUE? (Y/NO
```

2. **Press:** Y

   The screen displays:

```
FORMAT OF DRIVE 1.
REMINDER: YOU WILL HAVE TO REWRITE
  THE FIRMWARE AFTER THE DRIVE FORMAT.
DO YOU WANT TO CONTINUE (Y/N)? N
```

3. **Press:** Y

   The screen displays:

```
TURN ON FORMAT SWTICH
AND PRESS ◀RETURN▶
```

4. Under the three red lights on the front of the Corvus disk drive, there are four drive controller switches. Flip the FORMAT switch, which is the third switch from the left when facing the front of the Corvus drive, to the right. Leave the other three switches as they are.

5. **Press:** ◀RETURN▶

   The screen displays:

```
FORMAT IN PROGRESS
(TAKES FROM ONE TO TWO MINUTES)
```

6. The BUSY light on the drive will blink during the format operation. When the drive is formatted, the screen displays:

```
FORMAT COMPLETE...
ENTER FIRMWARE FILE NAME: CF18.3
```

7. **Press:** ◀RETURN▶

   The screen displays:

```
READING FIRMWARE FROM CF18.3.DATA
. . . . . .
FIRMWARE WRITTEN.
TURN OFF THE FORMAT SWITCH
AND PRESS ◀RETURN▶
```

8. Flip the FORMAT switch (the third switch from the left on the front of the drive) back to the left.

9. **Press:** ◀RETURN▶ on the Apple II keyboard.

10. Toggle the RESET switch (the rightmost switch on the front of the drive).

11. **Press:** ◀RETURN▶ on the Apple II keyboard.

The screen displays:

```
PRESS ◀SPACE▶ TO CONTINUE
```

12. **Press:** ◀SPACE▶

The screen displays:

```
DDIAG [2.1A]: CORVUS DISK DIAGNOSTIC
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**********************************************
     V — VERSION CHECK
     P — DISPLAY/MODIFY DRIVE PARAMETERS
     X — PERFORM SERVO EXERCISE
     C — PERFORM CRC SCAN FOR BAD TRACKS
     S — SET DIAG DATA BLOCK FILE NAME
     A — SET ALTERNATE SLOT
     U — UPDATE FIRMWARE ON DISK
     F — PERFORM PLATTER FORMAT
     O — PARK HEADS OF DISK
     M — MANUAL MODE
     H — HELP
     E — EXIT
**********************************************
CURRENT SLOT IS 2
SELECT DISK DIAGNOSTIC OPTION
```

To exit the Diagnostic program, power off your computer and place the diskette drive controller card in slot 4 and the Corvus interface card in slot 6 of the Apple II.

EXERCISING THE HEADS

The Heads are the servo devices which read data from, and write data to, the recording surfaces of the disk platters inside a Corvus drive. Use the procedures in this section to test whether these heads are functioning properly.

1. After you have completed the first section of this chapter, "Entering the Diagnostic Program," select the X — PERFORM SERVO EXERCISE option from the Diagnostic menu.

   Press: X

   The screen displays:

```
DISK EXERCISER OPTION.
PRESS ◀SPACE▶ TO STOP TEST.
/.....
.....
.....
.....
```

2. To stop the servo mechanism test:

   Press: ◀SPACE▶

   The screen displays:

```
ERROR SUMMARY:
    NUMBER OF PASSES        : 140
    NUMBER OF SOFT ERRORS   : 1
    NUMBER OF HARD ERRORS   : 0
PRESS ◀SPACE▶ TO CONTINUE
```

If any hard errors are reported, you will need to use the CRC test to determine the track location of the error, then spare out the weak tracks.

3. Press: ◀SPACE▶

The screen displays:

```
DDIAG (2.1A): CORVUS DISK DIAGNOSTIC
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**********************************************
     V  — VERSION CHECK
     P  — DISPLAY/MODIFY DRIVE PARAMETERS
     X  — PERFORM SERVO EXERCISE
     C  — PERFORM CRC SCAN FOR BAD TRACKS
     S  — SET DIAG DATA BLOCK FILE NAME
     A  — SET ALTERNATE SLOT
     U  — UPDATE FIRMWARE ON DISK
     F  — PERFORM PLATTER FORMAT
     O  — PARK HEADS OF DISK
     M  — MANUAL MODE
     H  — HELP
     E  — EXIT
**********************************************
CURRENT SLOT IS 2
SELECT DISK DIAGNOSTIC OPTION
```

PARKING THE HEADS

Parking the Heads shuts down the disk drive, preventing any damage to the disk in transit—for example, when a disk drive will be transported from one office or building to another.

1. After you have completed the first section of this chapter, "Entering the Diagnostic Program," select the 0—PARK HEADS OF DISK option from the Diagnostic menu.

   Press: 0

   The screen displays:

```
PLEASE SELECT THE DRIVE TO SHUT DOWN...
    SLOT 1 CONTAINS NO INTERFACE
    SLOT 2 CONTAINS NO INTERFACE
    SLOT 3 CONTAINS A CORVUS DISK
      INTERFACE
    SLOT 4 CONTAINS NO INTERFACE
    SLOT 5 CONTAINS NO INTERFACE
    SLOT 6 CONTAINS AN APPLE 5"
      FLOPPY DISK
    SLOT 7 CONTAINS NO INTERFACE
SELECT ALTERNATE SLOT NUMBER (3): 3
```

2. The alternate slot number displayed will be whatever slot has the Corvus drive connected. To accept the slot number which displays on your screen (in this example, slot 3):

   Press: ◀RETURN▶

   The screen displays:

```
PARK HEADS OF WHICH DRIVE? 1
```

3. **Press** ◀RETURN▶

   All three of the drive's red indicator lights turn off and the screen displays:

```
HEADS PARKED...DRIVE MUST BE RESET OR
POWERED-ON TO BE USED.
```

Now the heads of the disk (the device which writes data onto the disk and reads the data from the disk) are parked over the innermost portion of their respective disk platters. After you power-off and unplug the drive, you may safely transport the disk drive from one place to another without fear of a disk-damaging head crash, because even if the heads touched the disk, they would touch an area that is not used for the recording of data.

When you power on the drive again, the heads will no longer be parked, and you may freely use the drive just as you had before parking the heads.

If you parked the heads and did not power off the drive, flipping the reset switch (the rightmost switch on the front of the drive) will unpark the heads.

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