CORVUS SYSTEMS

USER
GUIDE

CP/M®

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Chapter 1
Introduction

The CORVUS SYSTEMS CP/M USER GUIDE provides you with a general introduction to the Corvus hard disk system, the Mirror option for backup of data, the pipes and spooling features for moving files between computers and peripherals, trouble-shooting procedures, and diagnostic programs. Your Corvus hard disk system should already be installed and configured for a single user. Please retain your installation guide for future reference.

The CORVUS SYSTEMS CP/M USER GUIDE is used with the following computers:
—TRS-80™ Model II (under CP/M)
—XEROX 820™
—Zenith Z-89 or Z-90
—Intertec SuperBrain™
—NEC PC-8001, PC-8001A or PC-8800
—S-100 Bus Systems, for example:
  • Cromemco™ (under CP/M)
  • CCS (California Computer Systems)
  • Dynabyte
  • North Star™
  • Vector Graphics

as well as other systems. Consult with your dealer if you wish information about a specific computer system or a particular model.

This guide and other Corvus manuals do not take the place of the operating system and language manuals provided by the manufacturer of your computer. It is presumed that you have a working knowledge of your computer system hardware and software.

For more detailed information on Corvus software, refer to the CORVUS SYSTEMS CP/M PROGRAMMER'S REFERENCE GUIDE. For information on multi-user configurations, refer to the CORVUS SYSTEMS MULTIPLEXER INSTALLATION GUIDE for your computer.

Chapter 2
Reviewing Some Basic Points
About Your System

Your Corvus hard disk system should be installed and configure at this point, following the directions provided in the installatio guide for your computer. The standard configuration makes th Corvus 6 MB and 10 MB drives appear as two extra-large flopp drives to your computer system (Drives C and D) and a Corvus 20 MI drive appear as three extra-large floppies (C, D and E). These pseud floppies are called virtual drives. The entire Corvus disk is called physical drive. If your system only has a single floppy diskette drive you should have this single physical drive appear as two virtual drive (for example, the TRS-80 Model II has a program called ONEDRIVI to do this).

Start-Up of Your Computer System

Insert the CP/M boot diskette into Drive A:. The screen display the initial boot instructions and information on the CP/M versio (you should have version 2.2 or later), and then a prompt, similar to

```
CP/M VER. 2.2   COPYRIGHT DIGITAL RESEARCH
CORP.

A> __
```

Insert a CORVUS UTILITIES VOL. 1 diskette into Drive B:.

Type **B:** and press < **RETURN** >. The screen displays:

```
B> __
```

Type the appropriate CLINK program, for example: **CLINK2TN** and press < **RETURN** >. The screen displays:

```
--- CORVUS LINK INSTALLED ---

B> _
```

Remember, you must run the correct CLINK program before you can use your Corvus drive.

How to List a Directory

To list a directory for the one of the virtual drives on the Corvus, follow the same procedure you use for a floppy drive. For example, type D:DIR and press <RETURN>. The screen displays the directory in a manner similar to:

```
D : INDEX    DOC : CERROR  DOC : PUTGET   COM : CLINK2FV COM
D : CLINK2TN COM : CLINK2TW COM : CLINK7FV COM : CLINK7TN COM
D : CLINK7TW COM : CDIAGNOS COM : CDIAGNOS DOC : CORVB173 CLR
D : MIRROR   COM : SEMA4    COM :

    B> _
```

How to Run a Program

Files that have a "DOC" extension are text files, rather than programs. To examine the contents of a DOC file named INDEX.DOC on Drive C: of the Corvus disk, type **D:TYPE INDEX.DOC** and press <**RETURN**>. The contents of the file will scroll up the screen. To stop at any point, hold the control key down and press S (<**CNTL**>**S**). To restart, hold the control key down and press Q (<**CNTL**>**Q**). If you wish to return to the main CP/M program, hold down the control key and press C (<**CNTL**>**C**).

CP/M finds files by filename. Each file also has a three-letter extension. For example, "COM" indicates that the file is a command program (also known as a "system program") that you can run. See Appendix A of this guide for a list of the different types of extensions. It is not necessary to type the extension for COM files.

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Your Corvus drive should already be configured and linked. To run the program TANGENT (as an example) on Drive D of the Corvus disk drive, type **D:TANGENT** and press <**RETURN**>. The computer goes to Drive D:, finds TANGENT, and runs the program.

How to Save a File

Once a Corvus drive has been linked to your computer system with one of the CLINK programs, it works just like a giant floppy disk drive, and CP/M programs work in the usual manner. Save files on a Corvus drive just as you would on a floppy, specifying the drive and file name, plus the extension (optional).

How to Copy a File

Files are copied from one drive (either physical or virtual) to another drive, using the PIP program in CP/M. Since one physical Corvus drive is made to look like either two or three floppy drives (virtual drives), you can have duplicate files on the Corvus, or transfer material from the floppy drives to the Corvus and vice-versa. To move the TEXT.TXT file (as an example) from Drive C: on the Corvus disk to Drive B: on the floppy drive, first make sure the CP/M boot diskette is in Drive A:. Type **A:PIP** and press <**RETURN**>. This loads the PIP program. The screen displays:

Type **B:=C:TEST.TXT** and press <**RETURN**>. The screen displays:

Type <**CNTL**>**C** to exit the PIP program and return to the main CP/M program. You have now copied the TEST.TXT file from the Corvus hard disk to a floppy diskette.

Chapter 3
Backing Up Your Drive
with the Mirror

This chapter is for those users who have a Corvus Mirror (eithe built-in or add-on) with their Corvus Disk System.

Description of the Corvus Mirror

Corvus Systems has developed a unique system for providin effective, low-cost backup for its hard disk drive, known as the Corvu Mirror, using a video cassette recorder (VCR) and video cassettes The Mirror creates an "image", or copy, of either virtual drives or th entire physical drive on the video cassette. The Corvus drive i configured to appear as several (either two or three, depending o size) virtual drives to your computer.

The Mirror hardware can be ordered built into Corvus Dis Systems, or it can be purchased as an add-on option. Mirror softwar is included on the CORVUS UTILITIES diskettes which accompan the Corvus disk drive.

General Tips

Use the same VCR whenever possible for backing up your Corvu drive. The VCR should be set at the standard play speed, and th highest quality tape should be used to prevent errors. It i recommended that VCRs without the color enhancement feature b used, or that this feature be disabled when using the VCR with Mirror.

See Appendix E for the capacity of different-sized cassettes and th time required to backup 6, 10 and 20 MB drives. You should be familia with the operation of your VCR before using it with the Mirror.

Hardware Installation of the Corvus Mirror

Your drive must already be configured for the number of virtua drives before using the Mirror. Turn off all power before making an connections.

If you have a drive with a Mirror already installed, the serial numbe and the drive size should both end with an "M". Insert one end of th phono connector cable into the VIDEO out jack on the VCR, and th

other end into the VIDEO IN jack on the back panel of the Corvus drive. Connect one end of the other phono connector cable into the VIDEO IN jack on the VCR and the other end into the VIDEO OUT jack of the Corvus drive.

If you have an add-on Mirror, see the CORVUS SYSTEMS MIRROR INSTALLATION GUIDE supplied with the add-on Mirror for instructions on hardware set-up.

The Mirror Menu

```
L  : LIST THIS MENU
H  : LIST HELP DATA
B  : BACKUP
V  : VERIFY
I  : IDENTIFY
R  : RESTORE

TASK (L TO LIST) : __
```

This is the Mirror menu, which allows you to pick which subprogram of the Mirror program you wish. Simply press the letter for the option you wish.

L: LIST THIS MENU—Pressing L for this option allows you to see a display of the Mirror menu, as shown above.

H: LIST HELP DATA—If you press H for this option, HELP DATA will display a brief description of the BACKUP, IDENTIFY and RESTORE options, in addition to a brief overall description of the Mirror utility program running under CP/M.

B: BACKUP—Pressing **B** for the BACKUP option starts the Mirror option for recording an image (a copy of all or part of the Corvus hard disk) on the VCR. See below in this chapter.

V: VERIFY—Pressing **V** for the VERIFY option makes the Mirror read a video tape image to check if the image has been properly recorded. A search is made for hard and soft recording errors and a status report is displayed on the screen. If a different VCR machine will be used for the RESTORE option than for the original BACKUP recording, you can perform a verify pass to check the head alignment on the VCR.

I: IDENTIFY—Pressing **I** for the IDENTIFY option tells the Mirror to read the initial header block which is created at the beginning of each image. This header block has the date, time, a name, a comment, and format information, which helps you locate images on the video tape if you have several images on the same tape. The Mirror program displays an error message on your CRT if the initial header block cannot be found in about 1 minute on the video cassette.

R: RESTORE—Pressing **R** for the RESTORE option copies a video cassette image back onto the Corvus disk. This image may be stored in a different disk location than the original data copied by the Mirror.

The RETRY Function

The RETRY function is part of the VERIFY and RESTORE options of the Mirror. If you need to use this function after performing either a VERIFY or a RESTORE, a screen message is displayed that alerts you to the number of blocks that need to be retried. With the RETRY function, the Mirror program attempts to reconstruct data from blocks with errors to create a block without errors.

Exiting the Mirror Program

You can exit from the Mirror program back to the CP/M prompt by pressing <**CNTL**>**C**, except in the middle of actual Mirror operations.

Using the Mirror to Backup Your Entire Corvus Disk

1. First, make sure the Corvus Mirror and the VCR are properly connected. Boot your computer system with the CP/M boot diskette. Run the correct CLINK program.

2. Load the Mirror program from the CORVUS UTILITIES VOL. 1 diskette in Drive B: by typing **MIRROR** and pressing <**RETURN**>. The screen displays the Mirror menu:

```
 L  : LIST THIS MENU
 H  : LIST HELP DATA
 B  : BACKUP
 V  : VERIFY
 I  : IDENTIFY
 R  : RESTORE

TASK (L TO LIST) : __
```

3. Press **B** for Backup. The screen displays:

```
BACKUP ENTIRE CORVUS DISK (Y/N) ? __
```

4. Press **Y** for Yes. The screen displays:

```
CORVUS DRIVE # (1-4) ? __
```

5. Press **1** (unless you have added on another Corvus physical drive). The screen displays:

```
--- ENTER TAPE FILE HEADER INFORMATION ---
DATE __
```

6. It is strongly recommended that you complete the tape header information. The tape header is information that is written at the beginning of the backup image to help you identify the image. Here is a sample tape file header. Type **MAY 9, 1982** and press **<RETURN>**. The screen displays:

TIME __

7. Type **12:00 A.M.** and press **<RETURN>**. The screen displays:

NAME __

8. Enter the name you wish to use on your tape header. Type **TEST ONE** and press **<RETURN>**. The screen displays:

COMMENT __

9. Type **COMMENT COMPLETED** and press **<RETURN>**. The comment is optional. If you do not want a comment, just press **<RETURN>**. The screen displays:

NORMAL OR FAST FORMAT (N/F) ? __

10. Press **N** for Normal. The screen then displays:

START UP RECORDER AND PRESS RETURN

11. Make sure the VCR is on, and the video cassette is loaded properly. Write down the VCR counter number on a piece of paper and save it. Start the VCR recording (on most recorders you will have to press both the play and record buttons). Press <**RETURN**>. The screen displays:

```
WAITING FOR RECORDER TO SPEED UP... _
```

After about half a minute, the screen displays:

```
>>BACKUP HAS STARTED<<
```

12. When the backup is finished (about 11 minutes for the 6 MB drive, 17 minutes for the 10 MB drive and 35 minutes for the 20 MB drive), the screen displays:

```
BACKUP DONE --- NO DISK ERRORS
TASK (L TO LIST) ? __
```

13. Stop the VCR. It is strongly recommended that you copy down the VCR counter number, so you will know the approximate starting and ending locations of the image on the video cassette.

It is a good idea to record just one entire drive on each cassette, and to use a double back-up system—keeping the current backup and one copy of the next previous backup on another cassette.

How to Backup Single Virtual Drives on the Corvus Disk

1. Boot your computer system with the CP/M diskette, and then run the correct CLINK program.

2. Load the Mirror program on the **CORVUS UTILITIES VOL. 1** diskette in Drive B: by typing **MIRROR** and pressing <**RETURN**>. The screen displays the Mirror menu:

```
L : LIST THIS MENU
H : LIST HELP DATA
B : BACKUP
V : VERIFY
I : IDENTIFY
R : RESTORE

TASK (L TO LIST) : __
```

3. Press **B** for Backup. The screen displays:

```
BACKUP ENTIRE CORVUS DISK (Y/N) ? __
```

4. Press **N** for No. The screen now displays:

```
STARTING DISK BLOCK # ? __
```

5. This starting disk block number is for an internal address of the Corvus drive, which is calculated in terms of 512-byte sectors (four 128-byte sectors). See Table 1 below for the correct starting disk block number. For example, on a 6 MB drive, the starting disk block number for Drive D is 5908.

TABLE 1—REFERENCE TABLE FOR BLOCK NUMBER/ LENGTH

6 MB Drive with CLINK2 Program

Drive	Starting Disk Block #	Number of Blocks in Drive
C:	580	5312
D:	5908	5312

10 MB Drive with CLINK2 Program

Drive	Starting Disk Block #	Number of Blocks in Drive
C:	579	10304
D:	10907	10304

20 MB Drive with CLINK2 Program

Drive	Starting Disk Block #	Number of Blocks in Drive
C:	580	12608
D:	13212	12608
E:	25844	12608

Type **5908** and press <**RETURN**>. The screen displays:

```
 NUMBER OF BLOCKS ?
```

6. Table 1 shows that for a 6 MB drive (CLINK2) the number of blocks in a virtual drive is 5312.
   Type **5312** and press <**RETURN**>.

7. The Mirror now requests the information for the header block
The screen displays:

```
--- ENTER TAPE FILE HEADER INFORMATION ---
DATE: _
```

8. Type **4/18/82** and press <**RETURN**>. The screen displays:

```
TIME:
```

9. Type **2:30 p.m.** and press <**RETURN**>. The screen displays:

```
NAME:
```

10. The name cannot be more than 16 characters long. Type **TES'**
FILE and press <**RETURN**>. The screen displays:

```
COMMENT:
```

11. Type **COMMENT FINISHED** and press <**RETURN**>, or just pres
<**RETURN**> if you have no comment. The screen displays:

```
NORMAL OR FAST FORMAT (N/F) ? _
```

12. Press **N** for Normal. The screen displays:

```
START UP RECORDER AND PRESS RETURN
```

13. Make sure the VCR is on, and the video cassette is loaded properly. Write down the VCR counter number on a piece of paper and save it. Start the VCR recording (on most recorders you will have to press both the play and record buttons). Press <**RETURN**>. The screen displays:

```
WAITING FOR RECORDER TO SPEED UP...
```

After about a half a minute, the screen displays:

```
BACKUP HAS STARTED
```

14. When Backup is finished, the screen displays:

```
BACKUP DONE—NO DISK ERRORS
TASK (L TO LIST) : _
```

15. Now stop the VCR and copy down the VCR counter number. If you do record more than one image on a cassette, it is recommended that a gap be left between different virtual drives, so that the initial header blocks can be located easier.

How to Use the Verify Option on the Mirror

1. Rewind the video cassette to the start of the tape, or to the location on the cassette you copied down earlier.

2. Your computer should be operating under CP/M. The Corvus drive should be on and the Corvus link established. The Mirror and VCR hardware should be connected.

3. Load the Mirror program from the CORVUS UTILITIES VOL. 1 diskette in Drive B by typing **MIRROR** and pressing <**RETURN**>. The screen displays:

```
L  : LIST THIS MENU
H  : LIST HELP DATA
B  : BACKUP
V  : VERIFY
I  : IDENTIFY
R  : RESTORE

TASK (L TO LIST) : __
```

4. Press **V** for Verify option. The screen displays:

```
START RECORDER AT BEGINNING IF IMAGE
VERIFY IN PROGRESS
```

5. Start the VCR playing (not recording). When the Verify procedure is finished, the screen displays (for example):

```
--- ERROR STATISTICS ---

# SOFT ERRORS : 3
# DISK ERRORS : 0
# OF BLOCKS NEEDING RETRYS : 0

ALL DATA RECEIVED
```

Sometimes soft errors will appear. However, this is no problem since all data is recorded four times.

How to Use the Identify Option on the Mirror

1. Rewind the video cassette to the start of the tape, or to the location on the cassette you copied down earlier. Since the Identify option searches for the very first characters of the header block, it is important to rewind the video cassette completely to avoid missing the header.

2. Your computer should be operating under CP/M. The Corvus drive should be on the Corvus link established. The Mirror and VCR hardware should be connected.

3. Load the Mirror program from the CORVUS UTILITIES VOL. 1 diskette in Drive B: by typing **MIRROR** and pressing <**RETURN**>. The screen displays:

```
L  :  LIST THIS MENU
H  :  LIST HELP DATA
B  :  BACKUP
V  :  VERIFY
I  :  IDENTIFY
R  :  RESTORE

TASK (L TO LIST) : __
```

4. Press **I** for the Identify option. The screen displays:

```
POSITION TAPE AND START PLAYBACK
SEARCHING FOR IMAGE HEADER...
```

5. Start the VCR playing (not recording). When the image is found, the screen displays (for example):

```
--- IMAGE RECORDED FROM CORVUS DRIVE ---
        IMAGE ID :
    IMAGE LENGTH : 11220 BLOCKS
          SYSTEM : CP/M
            DATE : 4/12/82
            TIME : 2:18 p.m.
            NAME : TEST ONE
         COMMENT : COMMENT FINISHED

TASK (L TO LIST) : __
```

You can use the Identify option to locate different images on the same cassette, or to examine the header blocks of different cassettes, f you are searching for a particular backup.

How to Use the Restore Option on the Mirror

1. Connect the Corvus Mirror and VCR hardware. Boot you computer system with the CP/M diskette, and then run th correct CLINK program.

2. Load in the Mirror program from the CORVUS UTILITIES VOL. diskette in Drive B: by typing **MIRROR** and pressing <**RETURN**> The screen displays:

```
L  : LIST THIS MENU
H  : LIST HELP DATA
B  : BACKUP
V  : VERIFY
I  : IDENTIFY
R  : RESTORE
TASK (L TO LIST) : __
```

3. Press **R** for Restore. The screen displays:

```
RESTORE ENTIRE DISC (Y/N) ? __
```

4. If you have backed up the entire disk, press **Y** for Yes. If you hav backed up only part of the entire physical drive, press **N** for N(

5. If you press **N**, the screen displays:

```
STARTING DISK BLOCK # ? __
```

6. Enter the same starting disk block number that you used i Backup (from Table 1). The screen displays:

```
NUMBER OF BLOCKS ? __
```

7. Enter the same number of blocks that you used for Backup (from Table 1). The screen displays:

```
CORVUS DRIVE # (1-4) ? __
```

8. Press **1**. The screen now displays:

```
POSITION TAPE AND START PLAYBACK
RESTORE IN PROGRESS...
```

9. Find the beginning of the image on the video cassette. You may have to use the Identify feature if you have several images on the same cassette. If you use the VCR counter to find the starting position, make sure you get the complete image. When you are finished the Restore procedure, the screen displays (for example):

```
--- ERROR STATISTICS ---

# SOFT ERRORS: 0
# DISC ERRORS: 0
# OF BLOCKS NEEDING RETRYS: 0

ALL DATA RECEIVED

TASK (L TO LIST) : __
```

You have now backed up and then restored a Corvus drive. We recommend that you back up data on your Corvus hard disc at least weekly, or more often, depending on computer use. Although hard disk drives offer superior reliability compared to floppy diskette drives, you should take proper care to protect valuable data from unforeseen accidents.
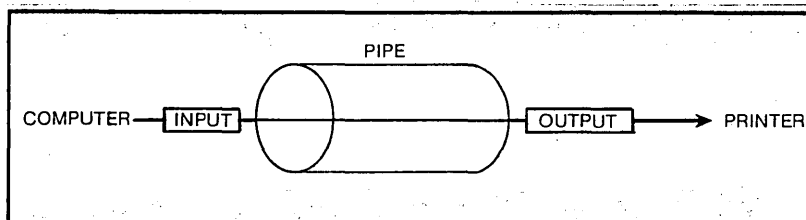
Chapter 4
Printing Multiple Files

It is desirable, in some applications, to print more than one file at a time.

Corvus has implemented this by providing a special area on the disk that you can write files to (spooling) and retrieve files from (despooling). This temporary file area is called the "pipes" area. The reason for this name is that like a pipe, the first thing put into it is the first thing out.

In this section you will find instructions for creating a pipes area putting files into the pipes area (spooling) and sending files to the printer (despooling).

Although there are many more uses for these techniques, they are reserved for multi-user systems. For a complete explanation, see the Corvus Systems CP/M Multiplexer User Guide.

How to Create a Pipes Area

Although the CLINK program automatically reserves an area of 256K bytes for pipes, it is possible to reserve a larger or smaller area.

NOTE: Do not attempt to recreate a pipes area if you already have data on your Corvus disk. To do so will destroy some of the data.

1. Insert the CORVUS UTILITIES VOL. 1 diskette into floppy drive
   B. Type **PMGR** and press <**RETURN**>. The screen displays:

    Pmgr [1.1] L)ist P)urge C)lear I)nit Q)uit __

2. Press **I** to initialize the pipes area. The screen displays:

```
DEFAULT PARAMETERS
STARTING BLOCK:   64
BLOCK LENGTH:     500
USE DEFAULT PARAMETERS ? (Y/N) __
```

3. Press **N** for NO. The screen displays:

```
STARTING BLOCK:
```

4. Type **64** and press <**RETURN**>. The screen displays:

```
BLOCK LENGTH:
```

5. Type **600** and press <**RETURN**>. The screen displays:

```
INITIALIZE ? (Y/N)
```

6. Press **Y** for YES. The screen displays:

```
INITIALIZING PIPES AREA
Pipes Area Initialized
Pmgr [1.1] L)ist P)urge C)lear I)nit Q)uit __
```

7. You have now set up the pipes area. Press **Q** to quit the PMGR program. The screen displays:

```
B > __
```

How to Send a File to a Pipe

To send a file to a pipe, the file must already exist on your Corvus disk drive, or on the floppy diskettes.

1. Insert the CORVUS UTILITIES VOL. 1 diskette into floppy drive

   B. Type **SPOOL** and press <**RETURN**>. The screen displays:

```
SPOOLER [2.0]: S(pool  D(espool  L(ist  Q(uit __
```

2. Press **S** for S(pool. The screen displays:

```
SPOOL PARAMETERS

P(ipe name: PRINTER
F(ile name:
M(essage:
T(ype of File: F(ormatted Text
L(inefeeds: TRUE
N(ew pages: FALSE
I(nclude Files: FALSE
   S( P( F( M( T( L( N( I( Q( : __
```

3. Press **F** for F(ile name. The screen displays:

```
F(ile name:
```

4. Type **B:INDEX.DOC** and press <**RETURN**>. The screen displays:

```
SPOOL PARAMETERS

P(ipe name: PRINTER
F(ile name: B:INDEX.DOC
M(essage:
T(ype of File: F(ormatted Text
L(inefeeds: TRUE
N(ew pages: FALSE
I(nclude Files: FALSE
   S( P( F( M( T( L( N( I( Q( : __
```

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INDEX.DOC is the name of the file you want to send. B: is the drive it resides on.

5. Press **M** for message. The screen displays:

```
M(essage:
```

6. Type **This is a test file.** and press <**RETURN**>. The screen displays:

```
SPOOL PARAMETERS

P(ipe name: PRINTER
F(ile name: B:INDEX.Doc
M(essage:This is a test file.
T(ype of File: F(ormatted Text
L(inefeeds: TRUE
N(ew pages: FALSE
I(nclude Files: FALSE
  S( P( F( M( T( L( N( I( Q( : __
```

The message option allows you to make comments about a file without having them included in it. When printed, this message will appear on a separate page from the text.

7. Press **S** to send the file. The screen displays:

```
Spooling file to pipe. PRINTER [1] ..........
   10 blocks written to pipe PRINTER [1]
```

The number in brackets is the pipe's number. There can be up to 62 pipes named PRINTER.

8. Press **Q** to quit. The screen displays:

```
SPOOL PARAMETERS

P(ipe name: PRINTER
F(ile name: B:INDEX.DOC
M(essage: This is a test file.
T(ype of File: F(ormatted Text
L(inefeeds: TRUE
N(ew pages: FALSE
I(nclude Files: FALSE
   S( P( F( M( T( L( N( I( Q( : __
```

The other SPOOL options are:

P(ipe name—   Allows you to assign another name to the pipe. For single user applications, leave it set as PRINTER.

T(ype of File—   may be changed to U for unformatted text or N for non-text. Non-text may result in an end of file error.

L(inefeed—   will allow linefeeds when TRUE and will strip them out if FALSE. If your printed copy seems to double-space, select F for FALSE.

N(ew Pages—   if your printed copy does not leave blank lines between the bottom of one page and the top of the next, you should select T for TRUE.

I(nclude Files—   is used with word processing packages that allow file linking. If you wish to use this feature, select T for TRUE.

Sending a File From a Pipe to a Printer

If you have not sent a file to the pipes area, go to the previous instructions labelled "How to Send a File to a Pipe."

1. Insert the CORVUS UTILITIES VOL. 1 diskette into floppy drive B:.

Type **SPOOL** and press <**RETURN**>. The screen displays:

```
Spooler [2.0]: S(pool D(espool L(ist Q(uit :
```

2. Press **D** for **D(espool**. The screen displays:

```
DESPOOL PARAMETERS

P)ipe name: PRINTER
W)here: PRINTER
M)ax lines/Page: 0
E)xpand Tabs: 8
L)inefeeds: TRUE

   D) P) W) M) E) L) Q) : __
```

3. Say we wish to despool the file INDEX.DOC which was loaded in pipe PRINTER [1].
   Press **P** for P)ipe name:. The screen displays:

```
P)ipe name: __
```

4. Type **PRINTER** and press <**RETURN**>. The screen displays:

```
DESPOOL PARAMETERS

P)ipe name: PRINTER
W)here: PRINTER
M)ax Lines/Page: 8
E)xpand Tabs: 8
L)inefeeds: TRUE

   D) P) W) M) E) L) Q) __
```

5. If you wish to change other defaults, follow a similar procedure. When you are finished, press **D** for despool. The file is despooled to the printer, and the computer waits to despool the

next pipe. The screen displays:

```
Pipe Contained 10 Blocks


Waiting to Despool Pipe "PRINTER"


Depress any key to escape...
```

This procedure will print all pipes named PRINTER.

6. When you press any key, the computer returns to the start of the Spool program and the screen displays:

```
Spooler [2.0]: S(pool D(espool L(ist Q(uit : __
```

7. Continue despooling files until you are finished. Press **Q** for Q(uit. The screen displays:

```
B> __
```

How to Clear the Pipes Area

1. Insert the CORVUS UTILITIES VOL. 1 diskette into floppy drive B. Type **PMGR** and press **[RETURN].** The screen displays:

```
Pmgr [1.1] L(ist P(urge C(lear I(nit Q(uit : __
```

2. Press **C** for Clear. The screen displays:

```
Clearing Pipes area:
Starting Block: 0
Block Length: 500
Continue? (Y/N) __
```

3. Press **Y.** The screen displays:

```
Pipes Area Cleared
```

You have just cleared the entire pipes area of files.

How to Clear a Single Pipe

1. Insert the CORVUS UTILITIES VOL. 1 diskette into floppy drive B.
   Type **PMGR** and press **[RETURN]**. The screen displays:

```
Pmgr [1.1] L(ist P(urge C(lear I(nit Q(uit : __
```

2. Press **P** for purge. The screen displays:

```
Purge which pipe (enter pipe number)?
```

3. Type **1** and press **[RETURN]**. The screen displays:

```
PIPE ERROR -12
Pipe does not exist.
```

Pipe number 1 did not have any data in it because the pipes area was already cleared.

What Is In the Pipes?

It is possible to find out what pipes you have spooled to in the following way:

1. Insert the CORVUS UTILITIES VOL. 1 diskette into floppy drive B.

   Type **PMGR** and press **[RETURN]**. The screen displays:

   Pmgr [1.1] L(ist P(urge C(lear I(nit Q(uit : __

2. Press **L** for list. The screen displays something like:

Active Pipes are:			
1. PENPLOT	Closed	----	Contains Data
2. PRINTER	Closed	----	Contains Data

   A pipe is open only while spooling or despooling. If a pipe does not contain data, it will not be listed.

3. **To quit, press Q.** The screen displays:

   B __

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Chapter 5
Troubleshooting Your Corvus Drive

The Corvus disk system is designed to provide years of problem-free use. At times, however, it may experience a hardware or software problem. If your drive is not performing properly, consult the following table for recommended actions.

Corvus Systems suggests that you take two simple steps when you first set up your system:
- Make copies of the Corvus Utilities Program diskettes.

- Copy down on paper the spared track and virtual drive offset tables. See page 00 of this manual.

PROBLEM	OPERATION TO FIX PROBLEM
A. NO FRONT PANEL INDICATOR LIGHTS ON.	1. Make sure power switch is or
	2. Check power cord connections to drive and wall socket
	3. Inspect fuse—replace with proper fuse if blown (see the Installation Guide for you computer).
	4. Check the Voltage Circui Board for correct voltage and installation (see the Installation Guide for your computer)
	5. Listen to the drive and hea if fan is spinning. If fan is no operating, repeat Steps 1–4 then call your Corvus Service Center for further instructions If fan operating, go Step 7.
	6. Toggle Reset Switch (right-most switch on front panel) If front panel lights remain of (and fan is operating), cal your Corvus Service Center for further instructions.

B. FAULT AND BUSY
LIGHTS COME ON AFTER
POWER UP SEQUENCE.
BUSY LIGHT FLASHES
FOR A WHILE, THEN
BOTH LIGHTS STAY ON.

7. Toggle Reset Switch on front panel.

8. Check all front panel switches for proper position.

9. Check flat interface cable connections.

10. Unplug processor flat cable and video connections (if you are using the Mirror). Toggle Reset Switch. If drive becomes ready, reconnect interface cable (and video connections if using Mirror), and repeat the installation sequence, making sure correct software programs are used. (See the Installation Guide for your computer for instructions).

11. If drive does not become ready after Step 10, turn format switch on and reset drive. If the drive becomes ready, refer to Section 6 of this User Guide. Go to Step 12.

If your drive still does not become ready, call your Corvus Service Center.

12. You will now update the controller code on the drive (refer to Section 6 of this User Guide). Power drive down. Turn format switch to the right before proceeding. Power drive up. Run the CDIAGNOS program from the floppy drive. Select option #6. Update with controller

code program from director)
(see Step 13 above). Afte
updating controller code, turr
format switch off (to the left)
See Section 6 of this manua
for examples of this operation

Toggle Reset Switch. If drive
does not become ready afte
1 to 2 minutes, the final step
is to reformat the drive (Step
#15).

REFORMAT

13. First, read the section or
reformatting the Corvus drive
(refer to Section 6 of this
User Guide).

WARNING

REFORMATTING THE
DRIVE WILL DESTROY ALL
DATA ON DRIVE. BACK
UP DATA IF AT ALL POS-
SIBLE. COPY DOWN SPARE
TRACK TABLE AND
VIRTUAL DRIVE OFFSET
TABLE AS WELL.

Power the Corvus drive down
Flip the Format Switch (sec
ond switch from right) to the
right. Power drive up.

Run CDIAGNOS program
from floppy drive. Select op
tion #6. Type the controlle
code (CORVXX. XXX) witl
an .FMT extension, example
CORVB173.FMT
Answer the questions as the\
appear on the screen. The
busy light will flicker rapidl\
for about one minute and

then the screen displays a long message indicating formatting is finished, and the new controller code has been written out. You should then restore the old values to the Virtual Drive Offset Table (VDO Table) and spare track table. Turn format switch off and toggle Reset Switch.

Repeat Step 13 to check controller code. If the system does not become ready after toggling reset, call the Service Center for further information.

C. BACKUP OR RESTORE FUNCTION SHOWS DISK ERROR.

14. This is usually caused by bad sectors on the drive. Run CDIAGNOS program and do the Format Check (Option 2). You should back drive up (ignoring disk errors), spare out bad tracks, and then restore data.

D. VERIFY FUNCTION INDICATES BLOCK(S) NEEDING RETRY.

15. Possible causes are bad tape, faulty connections, VCR tracking out of adjustment, VCR play speed out of adjustment. If none of the above, you may have hardware problems in the VCR or Mirror.

E. RESTORE FUNCTION INDICATES BLOCK(S) NEEDING RETRY.

16. Probable causes same as #15 above. Do a retry pass. If problem persists, check hardware.

F. WHEN TRYING A RESTORE, ERROR MESSAGE "IMAGE SIZE MISMATCH" OR "MIRROR ERROR 4" DISPLAYS.

17. Probable cause is wrong block size or starting address was used. Use IDENTIFY option of Mirror program to determine correct image size and repeat RESTORE.

G. WHEN TRYING A RESTORE, VERIFY OR IDENTIFY OPTION ON THE MIRROR PROGRAM, THE ERROR MESSAGE "IMAGE NOT FOUND" OR "MIRROR ERROR 7" DISPLAYS.

18. Video cassette not rewound to beginning or VCR conections faulty. First, check video connections and VCR line input/output switches (these switches should be set to either line or VCR, depending on your machine—not TV).

Rewind video cassette to correct starting position and repeat function.

If problem persists, call your Corvus Service Center.

H. CORVUS I/O DRIVER OR CORVUS UTILITY PROGRAM ISSUES ERROR MESSAGE IN THE FORM:

**DISC R/W ERROR #XXH*

22. Look up error code in Appendix B of this guide for an indication of the error type. If it is a bad sector (indicated by error codes AAH, ABH, EBH, or ECH), try to fix it by using Option 2 of the CDIAG-NOS Program.

Chapter 6
Diagnostic Utilities for
Your Corvus Drive

Corvus Systems has produced a special diagnostics program— CDIAGNOS—to allow you to perform certain hardware and software system checks, and to replace the firmware if necessary. You should read this entire section before using CDIAGNOS, and follow the instructions very carefully.

CDIAGNOS is usually on VOL. 1 of the CORVUS UTILITIES diskettes. It must be run from your floppy drive, rather than the Corvus disk drive.

How to Load the CDIAGNOS Program

1. You should have your hardware (the computer system and the Corvus drive) already connected. The Corvus hard disk should be configured for your system.

2. Boot your computer system with the CP/M boot diskette.

3. Insert the CORVUS UTILITIES VOL. 1 diskette into floppy drive B:.

   Type **CDIAGNOS** and press <**RETURN**>. The screen displays something like this:

```
          --- CORVUS DISC DIAGNOSTIC ---
                 (VERSION 2.2 XE)

              --- TEST MENU ---
    0. LIST THIS MENU
    1. LIST INSTRUCTIONS
    2. DISC FORMAT CHECK
    3. READ CONTROLLER CODE VERSION #
    4. HEAD SERVO CHECK
    5. MANUAL CONTROLLER DIAGNOSTIC
    6. UPDATE CONTROLLER CODE
    7. LIST/MODIFY DRIVE PARAMETERS
    8. LIST/MODIFY CONSTLLATION PARAMETERS
    9. EXIT BACK TO CP/M

    TASK (0 TO LIST) : _
```

4. To use CDIAGNOS, press the number for the task and follow the directions. If you wish to exit CDIAGNOS and return to CP/M, press Q when prompted for a task, or hold the control key and press **C** (<**CNTL**> **C**).

A Brief Description of the CDIAGNOS Menu

Ø. LIST THIS MENU

Press **Ø** and the menu displays.

1. LIST INSTRUCTIONS

Press **1** and the screen displays:

> **TO CONSERVE SPACE, THE INSTRUCTIONS HAVE BEEN REMOVED AND PLACED IN A SEPARATE FILE: CDIAGNOS.DOC. TO READ THEM JUST TYPE THE FILE.**

To see this file, press **9** to exit, and then type **TYPE CDIAGNOS.DOC** and press <**RETURN**>. A summarization of these instructions is also found in Appendix C of this guide.

2. DISK FORMAT CHECK

Press **2** and the screen displays:

> **CORVUS DRIVE # (1-4) ? __**

Press **1** (unless you have multiple Corvus physical drives). The screen displays:

> **DISK FORMAT CHECK IN PROGRESS...**

A check of the Corvus disk is performed. After several minutes, the screen displays:

```
NO BAD SECTORS FOUND!!
TASK (0 TO LIST) : __
```

If the Disk Format Check test found any bad sectors, it would display them in this fashion:

```
            -- BAD SECTORS RE-WRITTEN --
   SURFACE  CYLINDER   SECTOR   TRACK
     #          #         #        #
   -----      -----     -----    -----
    XX         XX        XX       XX
   LIST DATA AGAIN (Y/N) ? __
```

Copy this table down on a piece of paper. The fourth column, TRACK #, contains the information you will need to spare tracks out, which we will discuss later in this section.

3. READ CONTROLLER CODE VERSION NUMBER

Press **3.** The screen displays:

```
CORVUS DRIVE # (1-4) ? __
```

Press **1** (or the number of the Corvus drive if you have added on more physical Corvus drives). The screen displays:

```
V17.3 CORVUS SYSTEMS 20-NOV-81  REVISION #35
CONTROLLER ROM VERSION #57

TASK (0 TO LIST) : __
```

NOTE: You may have different numbers, but the controller code version should be 17.3 or later.

4. HEAD SERVO CHECK

Press **4** and the screen displays:

```
CORVUS DRIVE # (1-4) ? __
```

Press **1** (or the drive number, in case of add-on physical Corvus drives). The read/write heads of the Corvus disk will rapidly move from the outer edge to the center of the disk, producing a whirring sound. This test verifies that the disk reads data and that the disk heads move properly.

NOTE: This test continues indefinitely until stopped by holding down the control key and pressing **C** (<**CNTL**>**C**). Approximately one minute of this test should be enough to check the disk.

5. MANUAL CONTROLLER DIAGNOSTIC

Press **5** and the screen displays:

```
                    WARNING
        THIS TEST CAN CAUSE LOSS OF USER DATA
                (IF USED IMPROPERLY)
      THE COMMAND FORMAT IS:
          R - READ A BYTE FROM THE CONTROLLER
      WXX - WRITE HEX BYTE TO CONTROLLER
          S - READ CONTROLLER STATUS
          E - EXIT TEST
```

NOTE: This test should be performed ONLY under the direction of qualified Corvus Systems Customer Service representatives.

6. UPDATE CONTROLLER CODE

Press **6** and the screen displays:

```
CONTROLLER CODE FILE NAME (COVBXX.CLR) :
```

Type the controller code file name listed in the Directory of the CORVUS UTILITIES diskettes; for example, type **CORVB173.CLF** and press <**RETURN**>. This starts the procedure for updating the controller code on the Corvus drive, which is contained ir protected tracks of the hard disk. Normally, this code cannot be written to or read by the user (even accidentally). However, i can be made accessible, for writing, by turning on the forma switch. To use this option, follow this procedure:

1. Power the drive up. Turn on the format switch (the second switch from the right under the front bezel of the drive), and depress the reset switch (the first switch from the right).

2. Run the proper CLINK program to establish the Corvus link.

3. Run the CDIAGNOS program from the floppy diskette drive. Select the update option, number 6.

4. Type the controller code file name. For example, type **CORVB173.CLR and press** <**RETURN**>.

5. Turn off the format switch and reset the drive by either using the reset switch (the rightmost switch under the front beze of the drive), or by powering the drive down and back up again, and re-running the CLINK program.

7. LIST/MODIFY DRIVE PARAMETERS

Press **7** and the screen displays:

```
CORVUS DRIVE # (1-4) ? __
```

Press **1**. The screen displays (as an example):

```
--- SPARED TRACK TABLE ---
TRACK 16
TRACK 38
PRESS RETURN TO CONTINUE
```

Press <**RETURN**>. The screen displays:

```
SECTOR INTERLEAVING SPEC. = 12
PRESS RETURN TO CONTINUE
```

NOTE: The Sector Interleaving Spec(ification) is 12 for 6 MB drives, and 9 for the 10 and 20 MB drives. **CORVUS SYSTEMS STRONGLY RECOMMENDS THAT YOU DO NOT CHANGE IT.**

Press <**RETURN**>. The screen displays:

```
           --- VIRTUAL DRIVE TRACK ---
                  OFFSET TABLE
   DRIVE              TRACK
     1                   0
                   WARNING
CHANGING ANY OF THE FOLLOWING PARAMETERS
CAN MAKE ANY USER DATA STORED ON THE DISC
UNUSABLE

DO YOU WISH TO CONTINUE (Y/N) ?
```

NOTE: Changing these specifications can make your data totally inaccessible, because the directory pointers are changed from the actual disk locations. Before altering drive parameters, you should back up the entire Corvus disk.

Press **Y** for Yes (if you wish to continue). The screen displays:

```
                DRIVE PARAM MENU
   S : CHANGE SPARED TRACK TABLE
   I : CHANGE SECTOR INTERLEAVING
   V : CHANGE VIRTUAL DRIVE OFFSETS
   E : EXIT BACK TO MAIN MENU

   TASK ? _
```

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Press **S** if you wish to change the spared track table. Spared tracks are tracks automatically skipped by the drive—any data on them is lost if not backed up first; and other data may be disturbed. Add or delete tracks by typing the track numbers, and then press <**RETURN**>.

It is not recommended that you change the sector interleaving spec or the virtual drive offsets.

8. LIST/MODIFY CONSTELLATION PARAMETERS

This is discussed in the CORVUS SYSTEMS CP/M MULTI-PLEXER GUIDE.

9. EXIT BACK TO CP/M

If you wish to return to the main menu, press option 9.

Appendix A. List of Common CP/M Extensions

Extension	Explanation
.ASM	**As**sembly language source file
.BAK	**Back**up file
.BAS	**BASIC** program source file
.DAT	**Dat**a file
.DOC	Text (**Doc**ument) file
.FOR	Microsoft **FOR**TRAN source file
.HEX	Intel **HEX** format object code file
.LIB	Extension for a **Lib**rary file
MAC	Source code for some Microsoft **MAC**RO assemblers.
.OBJ	Machine code (**Obj**ect code)
.PAS	**Pas**cal source file
.PCO	Sorcin Pascal run-tim module
.REL	**Rel**ocatable machine code program
.SRC	**Sourc**e file for CP/M User's Group
.SUB	Command file for a **sub**mit run
.TXT	**Text** file
.$$$	Temporary file or an improperly saved, un-usable file

Appendix B. Corvus Disk Error Codes (text of CERROR.DOC file from CORVUS UTILITIES DISKETTE VOL. 1)

Corvus Disk Error Codes

The Corvus controller has a number of error codes that may be issued if either an illegal command is given, or the controller is out of synchronization, or there is a hardware malfunction. A number of the utilities and disk interface programs can list these error codes (in hex) if such an error occurs. For example, PUTGET.COM may list the code as:

** DISK R/W ERROR # XXH **

where XX is the error code. You can demonstrate this by trying to read a sector (with PUTGET) from drive 4 (unless you have four drivers). This will give error code A7H. The upper 3 bits of the error code have the following significance:

BIT 5 Set if there was a recoverable error (as in a re-try or read or write).

BIT 6 Set if an error occurred on a re-read (verification) following a disk write.

BIT 7 Set if any fatal error has occurred.
NOTE: Most of the programs will not list the error unless bit 7 is set.

The lower 5 bits have the following significance:

BITS 0–4	MEANING
0	Disk Header Fault
1	Seek Timeout
2	Seek Fault
3	Seek Error
4	Header CRC Error
5	Re-zero (Head) Fault
6	Re-zero Timeout
7	Drive Not On Line
8	Write Fault

9	------
A	Read Data Fault
B	Data CRC Error
C	Sector Locate Error
D	Write Protected
E	Illegal Sector Address
F	Illegal Command
10	Drive Not Acknowledged
11	Acknowledge Stuck Active
12	Timeout
13	Fault
14	CRC
15	Seek
16	Verification
17	Drive Speed Error
18	Drive Illegal Address Error
19	Drive R/W Fault Error
1A	Drive Servo Error
1B	Drive Guard Band
1C	Drive PLO (Phase Lockout) Error
1D	Drive R/W Unsafe

Appendix C
Description of CDIAGNOS Program

CDIAGNOS.DOC

The CP/M version of the Corvus Disk Diagnostic (CDIAGNOS. COM) provides some relatively "safe" disk tests along with the ability to list and/or change some parameters within the controller code. The functions available in this version are:

1. DISK FORMAT CHECK

    The controller tries to read each 512 byte sector to verify that it is "good" (has a correct CRC). If it gets a bad CRC after twenty read attempts, it will re-write the sector to reset the CRC. This usually takes 1–2 minutes. NOTE: on Rev A controllers, this function is not available with Version O controller code.

2. READ THE CONTROLLER CODE VERSION #

    This option will return some information about the controller code on your drive. Rev B drives can return more detailed information than Rev A drives.

3. HEAD SERVO TEST

    This test alternately reads 128 byte sectors at disk address O and 1000 sectors in from the maximum. This test is mainly useful to verify that the drive will actually read data and move its head.

4. MANUAL CONTROLLER DIAGNOSTIC

    This option allows one to read or write directly to the Corvus controller I/O ports as well as read the status lines. It is mainly useful for Corvus service personnel when attempting to diagnose a drive problem over the phone.

WARNING
THIS TEST CAN CAUSE THE USER DATA ON THE DISK TO BE OVERWRITTEN. IF USED ON A REV A DRIVE WITH THE FORMAT JUMPER IN PLACE, IT CAN EVEN CAUSE THE DISK TO BE REFORMATTED.

5. UPDATE CONTROLLER CODE

This option allows one to update or initially install controller code on the Corvus drive. This code resides on protected tracks of the hard disk. Normally this code cannot be written to or read by the user (even accidentally). However, it can be made accessible (to writing) by turning on the format switch (or by adding a jumper to the drive backplane). This option replaces the separate program: CCODE.COM that had similar capabilities.

WARNING

ON REV A DRIVES, DO NOT ATTEMPT TO WRITE THE CODE OUT TO THE DRIVE WITHOUT TURNING ON THE FORMAT SWITCH (OR INSTALLING THE FORMAT JUMPER. IF YOU DO, IT WILL BE WRITTEN OUT TO THE USER AREA OF THE DISK—OVERLAYING POSSIBLY VALUABLE USER PROGRAMS OR DATA!

To use this option:

A. Power the drive down. If your drive has a format switch (under the front bezel or on the back of the drive), turn it on and proceed to step D.

B. On drives without a format switch, remove the plastic cover over the backplane pins (on the back of the drive where the computer cable is attached).

C. Connect a jumper between pins:
   D37 and D38 (for Rev A drives)
   C2 and C12 (for Rev B drives)

D. Power the drive back up.

E. Run the CDIAGNOS program from your floppy disk based CP/M and select the update option.

F. After the code is written out, turn off the format switch (or remove the jumper) and reset the drive by either using the reset switch or by powering the drive down and up again.

6. LIST/MODIFY DRIVE PARAMETERS

This option allows you to examine and/or change the:

A. The Spared Track Table
This table specifies physical track numbers which are to be skipped over when the controller accesses data on the drive. This allows one to hide the existence of media defects from the external user (the data service will look perfect to him).

B. The Sector Interleaving Spec
The defaults used here have been optimized for small computers like Apple II's. Typically, we have selected a value of:
9 for 10 and 20 MB drives
12 for 6 MB drives

C. The Virtual Drive Offset Table
This table allows one drive to behave as if it were several smaller drives daisy-chained together. The table entries specify the track number at which these virtual drives start.

Normally, one would not have occasion to disturb these parameters unless the drive has been re-formatted or a bad track develops.

7. LIST/MODIFY CONSTELLATION PARAMETERS

This option allows one to examine and/or modify the:

A. Master Multiplexer Connection Table
(i.e.—specify what is connected to it) This table is usually set to assume all the slots have a mux on them.

B. Constellation Polling Constants
These numbers determine certain aspects of the Constellation polling environment.

Appendix D
Description of Corvus Utilities Programs

1. INDEX.DOC   This is the disk index document file.

2. CERROR.DOC   This is a short document file listing the controller error codes.

3. PUTGET.COM   This is a disk utility that can be used under CP/M to read and write from memory to the Corvus drive as well as fill various sections of the disk with data. The routine has its own disk drivers and is mainly useful as a SYSGEN routine to write a configured CP/M 2.X system out to the drive, and to initialize a drive directory.

4. CLINK2FV.COM   These are several versions of the Corvus
   CLINK2TN.COM   link program. You should choose the one
   CLINK2TW.COM   that best meets your needs, and ignore
   CLINK7FV.COM   the others. Consult the CORVUS SYSTEMS
   CLINK7TN.COM   CP/M USERS GUIDE for descriptions of
   CLINK7TW.COM   each program. This program contains the Corvus disk drivers that are linked into CP/M. These programs will only work with CP/M version 2.0 or later.

5. CDIAGNOS.COM   A disk diagnostic that can be used to verify
   CDIAGNOS.DOC   correct drive operation as well as to update the controller code and change other drive parameters.

6. CORVB173.CLR   This is a controller code file for use with CDIAGNOS.COM. This is a copy of version 17.3 of the controller code for the REV B controller.

7. MIRROR.COM   This program is the control program for the Corvus Mirror disk backup system. It will not work under Version 0 of the controller code (REV A drives).

8. SEMA4.COM   This is an example program designed to illustrate how to access the semaphores supported on the Corvus drive.

9. PMGR.COM

This is a program that allows the user to manage the pipes area of the drive. It allows the user to initialize the pipes and clear the pipes area, purge as pipe, and list the current pipes and their status.

10. SPOOL.COM

This is a program that use the pipes facilities on the Corvus drive. It transfers files to and from an area of the drive that is accessible by any user and/or system through pipe commands. Examples of its usage are: (1) Send text files to a shared printer; and (2) Transfer files between different systems (CPM <--> APPLE).

11. DRIVEL.COM

This is a program that helps you configure your Corvus drive, if you choose not to use one of the default CLINK.COM's provided. Based on your input, it creates a file containing the equates that need to be changed in the CLINK2.ASM program to set up your drive. Also in this file is the start and directory addresses for the pseudo drives being set up. These addresses are used with the PUTGET and MIRROR programs.

12. LINKASM.COM
    LINKASM.DOC

This is an assembler that uses the standard Intel mnemonics and is upward compatible with the assembler supplied by Digital Research (but unfortunately not also provided by XEROX with their version of CP/M). This program was written by Ward Christensen and was extracted from CP/M Users Group disk #36. If necessary, you can use this assembler to assemble any of the .ASM files on these disks. NOTE: This assembler is only supplied for the XEROX 820 or Vector Graphics computers.

The following source programs are provided for those of you who wish to modify the Corvus interface or utility programs:

13. CLINK2.ASM

Source for the Corvus link program which may be modified if the default versions do

	not meet your needs. Consult the CORVUS SYSTEMS CP/M PROGRAMMER'S GUIDE for instructions on how to modify CLINK2.ASM.
14. SEMA4.ASM SPOOLGEN.SUB SPOOL.SRC SPOOL.DEF SPOOL.PAS SPOOLM.PAS PIPEGEN.SUB PIPES.SRC PIPED.PAS PIPEC.PAS PIPES.PAS CPMIO.MAC	Sources for the SEMA4 and SPOOL programs. These sources are provided as examples of how to use the Semaphore and pipe features of the Corvus drive. NOTE: The spool program is written in Pascal, and requires you to have PASCAL/MT and the M80 Assembler in order to modify it.
15. CLOADR.ASM	This is a short boot loader program to be used with CP/M 2.X. It can be used under a floppy-based CP/M to boot in CP/M from the hard-disk once it is put there, or it can be used to make a ROM-based loader.
16. CBOOT.ASM	This is a cold boot loader for CP/M 2.X. It is brought in by CLOADER. CBOOT then brings in the CP/M system.
17. BIOSC.ASM BIOSCT.ASM	One of these two files should be on your set of diskettes. Both of these files contain the source for the Corvus Basic I/O System (BIOS) to configure the Corvus drive into one to seven pseudo drives, as well as allow for the control of two floppy drives. The BIOSC.ASM file contains dummy floppy and console I/O drivers. These dummy drivers should be replaced with the floppy and console should be replaced with the floppy and console I/O drivers for your computer. The BIOSCT.ASM file contains floppy and console I/O drivers for a typical S-100 system using a single density floppy diskette drive controller.

NOTE 1: Source for the programs PUTGET, CDIAGNOS, and MIRROR is available by special order.

NOTE 2: All of the disk utilities contain their own Corvus disk drivers. They can be run from floppy-based CP/M systems that are not yet linked to the Corvus drive.

NOTE 3: Support for pre-2.0 versions of CP/M has been discontinued. The last release of pre-2.0 software, dated 7-May-81, is available by special order.

Appendix E
Supplemental VCR Information

Corvus Systems recommends that you purchase a VHS-type video cassette recorder (VCR). The following VCR models have been used with the Corvus Mirror:

Grundig VCR 4000 (PAL Format)

Hitachi VT 5000 (PAL Format)

National NV 7000

Panasonic VHS 1000
Panasonic VHS 1500
Panasonic NV 3810
Panasonic NV 8200
Panasonic NV 1200

RCA VDP 150
RCA VET 180
RCA VCT 201
RCA VET 250
RCA VDT 350
RCA VDT 501

Sony Betamax SL 5600 (Beta Format)

Technicolor 212 (limited to 30 minute cassette)

Zenith VL 9700 (Beta Format)

When used in the normal quad recording format of the Corvus Mirror, video cassettes have the storage capacities listed below:

30 minute cassette—18 MB maximum storage capacity
60 minute cassette—36 MB maximum storage capacity
90 minute cassette—55 MB maximum storage capacity
120 minute cassette—73 MB maximum storage capacity