System Manager's Guide

DEC Rainbow 100

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FCC WARNING

This equipment has been tested with a Class A computing device and has been found to comply with Part 15 of FCC Rules. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

NOTICE

Table of Contents

Getting Started

Our engineers have designed the Constellation II software to manage mass storage for a single computer or network system. This guide shows the system manager how to maintain and supervise the Constellation II software.

How This Guide is Organized

Chapter 1 is an overview of the Constellation II mass storage management programs. The chapter shows how to log onto Constellation II and how its programs work.

Chapter 2 includes a practice session to familiarize users with Constellation II. Those using the software for the first time should go through the sample session to learn the basic functions.

Chapter 3 describes drive management, the utility that creates user accounts, volumes and access to volumes. It also explains the drive management error message.

Chapter 4 explains the first of the system manager's three main tasks, creating user accounts for the people who will use the mass storage system.

Chapter 5 describes the second of the system manager's main tasks. It tells how to create volumes, which are storage spaces on the system, for users.

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Chapter 6 describes the last of the system manager's main tasks, how to give users access to volumes. Access allows users either to read data from the volume or read information and write it to the volume.

Chapter 7 describes how to create and initialize the PIPES volume, the message center for the network.

Chapter 8 explains how to use the PIPES volume for printing and exchanging information between users. It also explains how to maintain the PIPES volume.

Chapter 9 tells how to protect your system by regularly copying information on disks to inexpensive video cassette tape using the Corvus MIRROR.

Chapter 10 explains how to diagnose and correct some common disk system problems.

Usage

Throughout this guide, **type** means to enter two or more characters or keyboard symbols on the computer keyboard. Type all words, symbols, spaces and punctuation to the right of **type** exactly as shown. Do not add or leave out punctuation marks at the end of the statement.

Examples:

Type ERA B:*.DOC RETURN

Type DIR C: RETURN

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Don't type the spaces between **type** and the first character to its right. When a keytop symbol appears, press the key it refers to. Don't type out each letter of the word in the keytop symbol.

Throughout this guide, **press** means to enter a single character or symbol on the computer keyboard.

Examples:

Press Y

Press [RETURN]

When the command **type** or **press** appears in a sentence or paragraph, enter the information indicated.

Examples:

Type your user name and password and **press** [RETURN] .

The variables **x.xx** in the screen display stand for software revision numbers.

Throughout this guide, Constellation II main menu and Corvus management utility main menu mean the menu that appears once the system manager signs on.

Chapter 1: Overview of Constellation II

Welcome to system management. The system manager's job is to keep the system running smoothly and make sure the system resources are not wasted or misused.

Constellation II software is integral to the system manager's job. Constellation II manages a mass storage system, either for a single computer or a network. What follows is an overview of how the software works.

The system manager plans and maintains the system and manages the system's resources by creating user accounts, volumes and access.

User Accounts

Users are the people who use the computer or computer network. Users who want to work with the Corvus mass storage system need user accounts, which identify the user to the system. Once a user has an account name and password, he can have access to the system and use it without interfering with the work of others. Passwords help make the system secure.

Volumes

A Corvus mass storage system is divided into volumes. Volumes are like floppy diskettes: Both store data or text. But the storage area of a diskette is fixed in size while Corvus volumes vary in size.

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Different operating systems require different types of Corvus volumes. Different computer types using the same operating system can share a Corvus volume. Computers that use more than one operating system may need different volumes for each operating system.

PIPES

If a network consists of more than one computer, consider creating a volume called PIPES. PIPES is a special volume on the system that allows users to send information to other users or to shared printers.

Access

The system manager creates user accounts as needed and gives users access to volumes. The manager decides what volumes are accessible to a user. Volumes that are accessible to many users are public volumes. Volumes accessible to a single user are private volumes.

The system manager can let a user write to a volume (read-write access) or restrict the user to reading only the contents of a volume (read-only access). Usually, public volumes are read-only volumes while private volumes are read-write.

Active and Inactive Volumes

Accessible volumes are either active or inactive. A volume is active once it's mounted, that is, assigned to a unit. An inactive volume is unmounted, that is, no longer assigned to a unit. Users can only use mounted volumes, but have the option of mounting inactive volumes with the Corvus mount manager program.

Different computers allow different numbers of volumes to be active at one time. The CP/M-86 operating system on the DEC Rainbow 100 computer allows up to 16 units to be active at once.

Logging On

To use the Constellation II program, sign on with the system manager's name, DRBMGR, and password, HAI (Japanese for "yes").

Don't let anyone learn the password. Use the password above to create your system, but consider changing this password later.

Once the system manager signs on, the screen
will display the Constellation II main menu:

```
CORVUS MANAGEMENT UTILITY DS
Version [x.xx]                              Drive
(c) Copyright 1982, 1983 Corvus Systems, Inc.
-----------------------------------------------------------------
D  —  Drive Management
B  —  Backup Utilities
M  —  Maintenance Utilities


U  —  Utility Server Manager


I   —  Initialize Drive
L  —  List Drives
H  —  Help
E  —  Exit to CP/M-86
-----------------------------------------------------------------
Please select an option: __
```

Menu Overviews

The main menu leads to all of the Constellation
II utility programs. After choosing a menu
option, press the letter corresponding to that
option. The diagram below shows the hierarchy
of Constellation II menus and programs.

```
                                        ┌──────────── User Manager
                                        │
                        ┌────────────┐  ├──────────── Volume Manager
                        │ Drive      │──┤
                        │ Management │  └──────────── Access Manager
                        └────────────┘
                                        ┌──────────── MIRROR
                        ┌────────────┐  │
                        │ Backup     │──┼──────────── Remote Backup
                        │ Utilities  │  │
                        └────────────┘  └──────────── Achival Storage
     ┌────────────┐
     │ Const II   │     ┌────────────┐  ┌──────────── Parameter Manager
     │ Main Menu  │─────│ Maintenance│──┤
     └────────────┘     │ Utilities  │  ├──────────── Disk Diagnostic
                        └────────────┘  │
                                        └──────────── OMNINET Test

                        ┌────────────┐  ┌──────────── Printer Service
                        │ Utility    │  │
                        │ Server     │──┤
                        │ Manager    │  └──────────── Time Service
                        └────────────┘

                                        ───────────── Initialize Drive
```
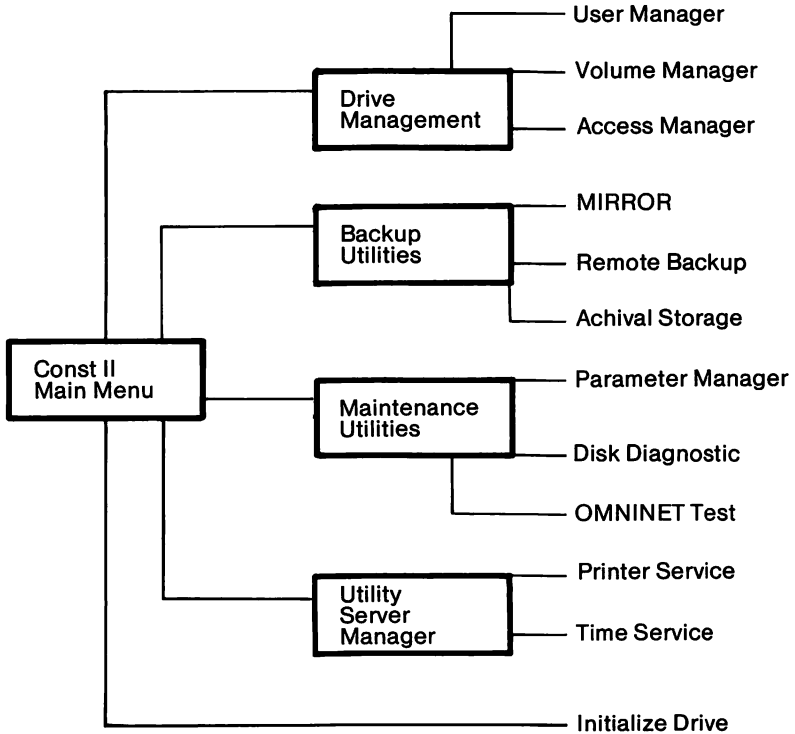
The programs surrounded by boxes lead to programs that perform system functions.

Chapter 2: A Sample Session

This chapter shows in a sample session how to add a
user to a system. First create a user account name,
ARTHUR, and a password, DENT. Then create a volume,
GALAXY, and give the user access to certain volumes.
Once finished, boot your system using the Corvus boot
diskette created in the *System Generation Guide—DEC
Rainbow 100* and sign on.

Logging On

1. **Turn on
your computer.**

The screen displays the Rainbow 100 main
system menu.

2. **Put the system manager's diskette
into drive A of your computer.**

If there is no system manager's diskette, make
one. Go to Chapter 4, "Making a Boot Diskette,"
of the System Generation Guide for the
Rainbow 100.

3. **Press A to start
from drive A.**

4. Link your operating system with the Corvus mass storage system.

When using a flat cable system, type CLINK86F [RETURN] .

When using an OMNINET system, type CLINK86T [RETURN] .

After a moment the screen displays:

```
--- Corvus Link Installed ---
```

5. Enter the system manager utilities.

Type SMGR [RETURN]

After a moment the Constellation II sign-on display appears:

```
                    CORVUS SYSTEMS

                    CONSTELLATION II

                        V x.xx



Please enter your name: __
```
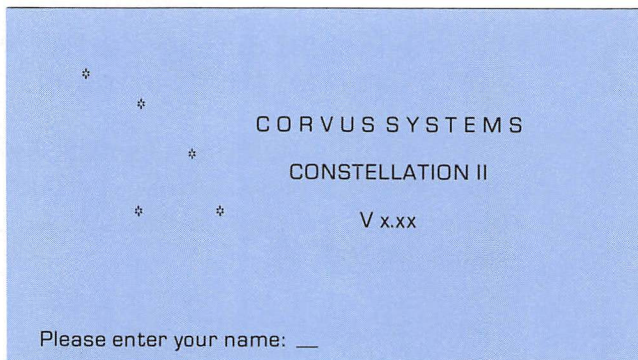
6.

Sign on as DRBMGR and use the password HAI.

After a few moments, the screen displays the Constellation II main menu:

```
CORVUS MANAGEMENT UTILITY DS
Version [x.xx]                              Drive
(c) Copyright 1982, 1983 Corvus Systems, Inc.
-----------------------------------------------------------------
D — Drive Management
B — Backup Utilities
M — Maintenance Utilities


U — Utility Server Manager


I  — Initialize Drive
L — List Drives
H — Help
E — Exit to CP/M-86

Please select an option __
```

The drive management option contains the programs for creating users, accounts and volumes.

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7. Select the drive management option.

Press D

The screen displays:

```
CORVUS UTILITY [x.xx]                              DS
Drive Management                                Drive
(c) Copyright 1982, 1983 Corvus Systems, Inc.
------------------------------------------------------------
U — User/Device Manager
V — Volume Manager
A — Access Manager


S — Select Drive
L — List Drives
E — Exit to CP/M-86
------------------------------------------------------------
Please select an option: __
```

Creating Volume GALAXY

First create the volume GALAXY.

1. Select the volume manager.

Press V

2. Enter your drive and server names and passwords.

Type the names written in the back of your Disk System Initialization Guide or System Generation Guide when the system was generated.

If the names can't be found, **press** the `ESC` key and return to the drive management menu. Contact a Corvus Service representative for assistance.

After the correct names and passwords are
typed in, the screen displays the volume
management menu:

```
Volume Manager [x.xx]              DS SERVER
Main Menu                          Drive DRIVE1
(C) Copyright 1982, 1983 Corvus Systems, Inc.
--------------------------------------------------------------
A — Add a volume
R — Remove a volume
C — Change volume attributes
L — List volumes
X — Extended list
F — Free space list


H — Help
E — Exit
--------------------------------------------------------------
Enter VOLMGR function: __
```

3. Select add a volume.

Press A

The screen displays:

```
Enter attributes of new volume:

   Name:
```

4. Enter the volume name.

Type GALAXY [RETURN]

5. Choose the volume size.

The program asks for the size of the volume
and automatically suggests 1024.

Press [RETURN]

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6.
Choose the volume's starting location.

The program automatically suggests a location.

Press [RETURN]

7.
Choose the volume type.

Type CP/M [RETURN]

The screen display is similar to:

```
Enter attributes of new volume:


        Name:   GALAXY
Size (blocks):  1024
    Location:   7376
Volume type:    CP/M


Do you want to initialize the volume [Y/N]? [Y]
```

8.
Initialize the volume.

Press [RETURN]

The screen displays:

```
Enter CPM attributes:
Allocation size in 1k blocks [1, 2, 4, 8, 16]: [2]
```

Press [RETURN]

The screen displays:

```
Directory entries [512 Max]: [256]
```

Press [RETURN]

The screen displays:

Sectors per track: [64]

Press [RETURN]

The screen displays:

Reserved Sectors: [0]

Press [RETURN]

The screen displays:

OK to add volume [Y/N]? [Y]

Press [RETURN]

The screen displays:

Header written.
Directory zeroed.
Volume added.
Access added for user 1.

Press <space> to continue, or
press A to add another volume.

Press [SPACE]

The screen displays the volume management menu.

Volume GALAXY now is part of your system. Follow the same steps to create all of your volumes. See Chapter 5, "Volume Manager," for details.

9. Return to the drive management menu.

Press E

The screen displays the drive management menu.

Creating User ARTHUR

Now create a user, Arthur.

1. From the drive management menu, select user/device manager.

Press U

The screen displays the user manager menu:

```
User Manager [x.xx]                    DS SERVER
Main menu                          Drive DRIVE1
(C) Copyright 1982, 1983 Corvus Systems, Inc.
--------------------------------------------------------------
A — Add a user/device
R — Remove a user/device
C — Change user attributes
I — List users/devices


H — Help
E — Exit
--------------------------------------------------------------
Enter USEMGR function: _
```

2. Select add a user/device.

Press A

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The screen displays:

```
User Manager [x.xx]                          DS SERVER
Add a user/device                            Drive DRIVE1
------------------------------------------------------------------
U — User addition
D — Device addition


E — Exit
------------------------------------------------------------------
Enter USEMGR function: __
```

3. Select user addition.

Press U

The screen displays:

```
Please enter attributes of new user:


                    Name:
```

4. Enter the user name.

Type ARTHUR RETURN

5. Enter ARTHUR'S password.

Type DENT RETURN

6. Enter ARTHUR's home disk server.

Press RETURN

7. Enter ARTHUR's boot operating system.

Type CP/M-86 [RETURN]

The screen displays:

```
Please enter attributes of new user:


                    Name:    ARTHUR
                Password:    DENT
Name of home disk server:    SERVER
    Boot operating system:   CP/M-86


OK to add user (Y/N)?  Y
```

8. Add user ARTHUR.

Press [RETURN]

The screen displays:

```
User added.
--------------------------------------------------------------
Press <space> to continue, or
press A to add another user or device.
```

Press [SPACE]

The screen displays the user manager menu.

ARTHUR is now a system user. Follow the same steps to create all your system users. See Chapter 4, "User Manager," for details.

9. Return to the drive management menu.

Press E

Granting ARTHUR Access

All the users on the system will share the volume DRBCPM. The system manager had the option to put the Corvus utilities in DRBCPM during system generation. Programs for sharing the printer and mounting and unmounting volumes run more quickly from volume DRBCPM than from a floppy. GALAXY is Arthur's private volume.

1. **From the drive management menu, select access manager.**

Press A

Type ARTHUR ⌈RETURN⌉

The screen displays the access manager menu:
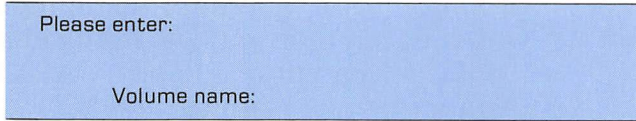
```
Access Manager [x.xx]              User ARTHUR
Main Menu                           DS SERVER
                                   Drive DRIVE1
(C) Copyright 1982, 1983 Corvus Systems, Inc.
-----------------------------------------------------------
G  — Grant volume access
R  — Remove volume access
C  — Change volume access


L  — List volumes accessible


N  — Next user
H  — Help
E  — Exit
-----------------------------------------------------------
Please select an option: _
```

2. Select grant volume access.

Press G

The screen displays:

> Please enter:
>
>   Volume name:

3. Enter the volume name.

Type DRBCPM [RETURN]

4. Select the type of access.

The computer asks whether ARTHUR should have read-write (RW) or read-only (RO) access to DRBCPM

Press [RETURN]

5. Mount DRBCPM to make it active.

Press [RETURN]

The computer asks on which unit to mount DRBCPM

Type E ⌐RETURN⌐

The screen displays:

> Please enter:
>
>   Volume name: DRBCPM
>   Access (RO/RW):   RO
>   Mount status (M/U):   MOUNTED
>   Mount unit: E
>
> OK to grant volume access (Y/N)? Y

6. Grant ARTHUR access to DRBCPM

Press ⌐RETURN⌐

ARTHUR now has access. The screen displays:

> Press <space> to continue, or
> press G to grant another volume . . .

7. Continue granting access.

Press G

The screen displays:

> Please enter:
>
>   Volume name:

8. Enter the volume name.

Type GALAXY ⌷RETURN⌷

Follow "Granting Access" steps 2 through 6 above to give ARTHUR RW access to GALAXY. In step 4, select read-write access by **typing** RW ⌷RETURN⌷ . Mount GALAXY on unit F.

When you finish step 6, the screen displays:

```
Press <space> to continue, or
press G to grant another volume . . .
```

Press ⌷SPACE⌷

Arthur now has access to volumes **DRBCPM** and **GALAXY**. Follow the steps above to grant other users volume access. See Chapter 6, "Access Manager," for details.

9. Return to the drive management menu.
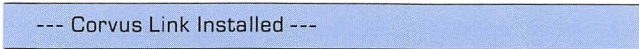
Press E

Sign On

1. Put the Corvus boot diskette into drive A of your computer.

If there is no Corvus boot diskette, make one. Go to Chapter 4, "Making a Boot Diskette," of the System Generation Guide for the Rainbow 100.

2. Press A to start from drive A.

After a moment the screen displays:

```
--- Corvus Link Installed ---
```

Then the Constellation II sign-on display appears:

```
                    ✧
             ✧                    C O R V U S   S Y S T E M S
                ✧                    CONSTELLATION II
        ✧         ✧                        V x.xx




  Please enter your name: __
```
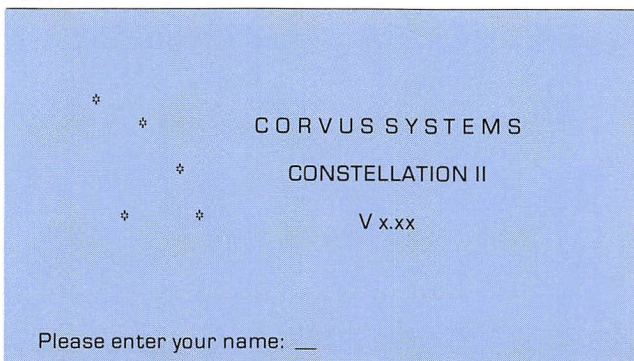
3. Sign on as ARTHUR with password DENT.

As ARTHUR, you now have RO access to DRBCPM and RW access to GALAXY.

Repeat the steps in this chapter to create all of your volumes and users. Chapters 3 through 6 explain how to manage a system and detail the functions of the user manager, volume manager and access manager.

Chapter 3: Drive Management

The user manager, volume manager and access manager programs detailed in Chapters 4 through 6 are all part of the drive management program. First select drive management to create or change a user account, volume or access.

If an error message appears after selecting the drive management program, see this chapter's section, "Drive Management Error."

Entering the Drive Management Program

Follow the steps below whenever entering the drive management program for the first time and selecting user/device manager, volume manager or access manager.

1. Enter your server name, drive name and drive password.

On entering the drive management program, type in your server name, drive name and drive password.

Type the names written down in your Disk System Initialization Guide or System Generation Guide. Only re-enter the names and password after exiting the drive management menu.

2. If the drive name or password can't be found, press $\boxed{\text{ESC}}$ to return to the drive management menu.

Contact a Corvus Service representative for assistance.

Once the drive and server names and passwords are typed in, the screen will display the drive management menu. Then select either the user manager, volume manager or access manager menu.

Drive Management Error

If two computers write to the drive management tables at the same time, they could destroy everything on the disk system. So Corvus provides a locking method, called semaphores, to prevent two people from writing simultaneously to the drive management tables.

Semaphores are a signal to prevent more than one person from using the drive management program at one time. The semaphore that's set is listed in the semaphore table. The program clears the semaphore once the user exits the drive management program.

A power failure or rebooting causes the user to exit the drive management program with the semaphore still set. The semaphore will lock out the user if he tries to re-enter the program after a power failure or rebooting.

The screen displays this error message:

```
Constellation ERROR −107
Corvus Utility already in use on selected drive
Type <space> to continue . . .
```

Be sure no one else is using the drive
management program. To return to the drive
management program, clear the semaphore
following the steps below.

1. Return to the Constellation II menu.

Either exit the drive management program or
reboot and sign on as the system manager.

2. Enter the maintenance option.

Press M

3. Select the parameter option.

Press P

4. Select the set/display semaphore parameters option.

Press S

5. Select unlock semaphore.

Press U

6.

Type CRVSEMA4
[RETURN]

Type the name exactly as it appears in the semaphore table.

7.

Confirm the semaphore is unlocked.

Press S to display the semaphore table to confirm it is no longer listed and thus is unlocked.

The drive management program now is ready for use.

8.

Return to the drive management main menu.

Press E twice.

Chapter 4: User Manager

The user manager program adds or removes users, changes a user's attributes and lists users.

Type in your drive name, server name and passwords whenever entering the drive management program for the first time and selecting the user/device manager. See Chapter 3, "Drive Management."

From the drive management main menu, **press** U for user/device manager. The screen displays:

```
User Manager [x.xx]                 DS SERVER
Main menu                           Drive DRIVE1
[C] Copyright 1982, 1983 Corvus Systems, Inc.
-------------------------------------------------------
A  — Add a user/device
R  — Remove a user/device
C  — Change user attributes
L  — List users/devices


H — Help
E  — Exit
-------------------------------------------------------
Enter USEMGR function: _
```

Adding Users

Add users only from the user manager main menu. **Press** A for add a user/device option.

The screen displays:

```
User Manager [x.xx]                 DS SERVER
Add a user/device                   Drive DRIVE1
-------------------------------------------------------
U  — User addition
D  — Device addition


E  — Exit
-------------------------------------------------------
Enter USEMGR function: _
```

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The device option is used to add system devices dedicated to a single task, such as a utility server.

Press U for user addition.

Type the user name and password, home disk server and operating system.

The user name can be up to 10 characters and must begin with a letter. The rest of the name may be letters, numbers or any of the characters: __ − . # $ ′ ( ) ∧ . The system will capitalize letters in the name.

The user password can be up to eight characters. Follow the rules above to make a password.

The name of the home disk server is the disk server now in use.

Your system may show other operating systems besides CP/M-86. Use this guide to create CP/M-86 users.

Removing Users

To remove a user, from the user manager main menu, press R for the remove a user/device option. Type the name of the user to be removed. Confirm the removal.

Changing User Attributes

The change user attributes option is mostly for changing passwords if a user suspects others know it.

The boot operating system can be changed, but there is no reason to do so. Do not change the operating system assigned to any user whose name ends in MGR. Otherwise, the system will lose all management capabilities and will require regeneration.

The user name cannot be changed. To change a user's name, create a new user with all attributes, except the name, identical to the present user.

Listing Users

The list users/devices option is a handy reference of user names and passwords. From the user manager menu, press L to list users alphabetically.

The screen display is similar to:

```
User Manager [x.xx]                      DS SERVER
List users/devices                       Drive DRIVE1
------------------------------------------------------------
    User
    Name          Password      Home DS       Boot type


1. ARTHUR         DENT          SERVER        CP/M-86
2. DRBMGR         HAI           SERVER        UCSD IV.0
3. JOE            MANN          SERVER        CP/M-86


3 users listed.
------------------------------------------------------------
Press <space> to continue, or
press F to list a file.
```

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The device list is similar to:

```
User Manager [x.xx]                    DS SERVER
List Users/Devices                     Drive DRIVE1
--------------------------------------------------------------
    DEV name       Type       Addr Home DS   Boot Type


 1. SERVER      DiskServer        0            Invalid


   1 device listed.
--------------------------------------------------------------
Press <space> to continue, or
press F to list a file.
```

After adding all users, consider listing them on your printer to keep a record of all user names and passwords.

Chapter 5: Volume Manager

The volume manager adds or removes a volume, changes its attributes and lists the volume directory.

To use the volume manager, enter the Constellation II main menu and select the drive management option. Type in your drive name, server name and passwords whenever entering the drive management program for the first time and selecting the volume manager. See Chapter 3, "Drive Management."

From the drive management option, **press** V for volume manager. The screen displays:

```
Volume Manager [x.xx]                    DS SERVER
-----------------------------------------------------------
A — Add a volume
R — Remove a volume
C — Change volume attributes
L — List volumes
X — Extended list
F — Free space list


H — Help
E — Exit
-----------------------------------------------------------
Enter VOLMGR function: __
```

Adding Volumes

To add a volume, **press** A for the add volume option. Each option suggests a value; accept the suggested value or change it.

The computer asks for the volume name, size, location and type. Then format, or initialize, the new volume.

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Volume Name

The volume name may be up to 10 characters and must begin with a letter. The rest of the name may be letters, digits or the characters __ − . # $ ' ( ) ∧ . No spaces are allowed between any of the characters. The system will capitalize letters in the volume name.

Volume Size

Specify the size of the volume in blocks. A block holds 512 bytes of information. The program automatically suggests 1024 blocks, about half a megabyte. That size is large enough for most tasks. Accept it by **pressing** RETURN . The maximum size of a CP/M-86 volume is 16384 blocks, almost 8 megabytes.

Volume Location

The volume's address, or location, on the mass storage system is specified by block number. The program automatically suggests the address of a free area for your volume. The suggested volume location is the starting block address of the system's largest free space. Accept it by **pressing** RETURN . To locate the volume at a different address, **type** that address instead.

See the section "Listing Volumes" in this chapter to get a list of all the volumes and free areas on the mass storage system.

Volume Type

The volume type is a format designation to make the volume compatible with an operating system. Different operating systems need different volume types. The screen suggests several operating system formats for a volume. Choose which operating system to use with your volumes.

Volume Initialization

New volumes must be formatted, that is, initialized or prepared for use. However, it's not necessary to format a volume when upgrading Corvus mass storage systems that aren't running Constellation II software.

In most cases, format the new volume.

Formatting sets up a directory that's compatible with the operating system. During the format, the directory within the volume is erased.

When initializing CP/M-86 volumes, determine their allocation size, number of directory entries, sectors per track and reserved sectors.

TYPICAL VOLUME CONFIGURATIONS

	Size (blocks)	Alloc Size	Dir Entries	Sectors/ Track	Reserved Tracks	Capacity (bytes)
single-sided diskette	804	2	128	40	2	395,264
suggested Corvus volume	1,024	2	256	64	0	514,048
	4,000	4	256	64	0	2,037,760
	8,000	8	256	64	0	4,085,760
	16,000	8	256	64	0	8,181,760

Allocation Size. This is the number of kilobytes in a file allocation unit: 1, 2, 4 or 8. For most efficient storage, allocation size should be slightly larger than the average file size within the volume. If the volume will contain mostly small files, choose a small allocation size. A volume with many large files should have a larger allocation size.

Directory Entries. Every file in the volume requires a directory entry. The maximum number of entries is 512. The more space set aside for directory entries, the less space remains for storage. For maximum efficiency, the number of directory entries should be a multiple of 16.

Sectors per Track. A diskette uses sectors per track to divide the tracks into manageable units. Unless a Corvus volume is supposed to be identical to a floppy diskette, don't be concerned with the number of sectors per track. Accept the suggested value when creating volumes.

Reserved Tracks. A diskette uses reserved tracks to store boot information. Unless a Corvus volume is supposed to be identical to a floppy diskette, make the reserved tracks equal to 0. The mass storage system does not require reserved tracks.

Removing Volumes

Remove a volume when a user is deleted from
the system or to change certain volume attributes.

Removing a volume loses all files within it.
Do not remove the volume CORVUS. This
volume must remain on your system because
it contains the tables used to manage all users
and volumes.

From the volume manager, select the remove
a volume option. Type the name of the volume
to be removed and confirm the volume's
removal. The volume manager removes the
volume and all user
volume and all user's access to that volume.

Changing Volume Attributes

Only a volume's name and access can be
changed. Changing a volume's size, location
or type requires removing the volume, then
recreating it with the desired attributes.
Remember that removing a volume loses all
the files within it. Therefore, to save the
current contents of the volume in the new
volume as well, copy the contents onto diskettes.
When recreating the volume, transfer the old
files back into it. Go to Chapter 5, "Backup to
Floppy," of the Network Station User's Guide
for the Rainbow 100 for a complete discussion
of this transfer process.

To change a volume's name or access, **press** C for the change volume option. The screen will display the volume's size and location, which can't be changed. The current access—read-only, read-write or not accessible—will appear automatically on the screen. Accept the current access by **pressing** `RETURN` or change it by **typing** in a new access.

The volume manager designates volumes as read-write when creating them. Use the change volume option to reset the access to read-only or not accessible.

Volumes designated read-only cannot be written to by any user, even if access has been granted to that user.

Volumes designated not accessible cannot be mounted by any user. Label a volume NA to determine an unknown volume's user without checking every user's access list. The user will reveal himself when he tries unsuccessfully to mount a volume, then goes to the system manager for help.

Listing Volumes and Free Space

The list volumes option shows each volume's name, starting address and length in blocks, access and type. X in the RW column denotes read-write access; a blank denotes read-only access. The example below shows only CP/M-86 and UCSD volumes, but all volumes on the mass storage system will be displayed. The screen also will show the system's total number of free blocks, the total free areas with their sizes and locations and the largest single area of free space.

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The extended list option shows the volume name, size in blocks, allocation size, directory entries, sectors per track and reserved tracks as well as the free space on the system.

The free space list option shows only the free space on the system and its location.

Press L to list the volumes on the mass storage system.

The screen display is similar to:

```
Volume Manager [x.xx]                    DS SERVER
List Volumes                             Drive DRIVE1
----------------------------------------------------------------
    Volume        Address     Length     RW     Type


1. CORVUS          1032        200               UCSD
2. DRBCPM          1232        1024       x       CP/M
3. DRBSYS          2256        1024              UCSD
4. DRBBOOT         3280        128               UCSD
5. DRBBACK         3308        1024       x      UCSD
6. GALAXY          4332        1024       x       CP/M
   <unused>        5356        6788


          Total free blocks on drive:     7811
           Total free areas on drive:        2
          Largest free space (blocks):    6788


          Total volumes on drive:            5
   Total blocks allocated on drive:       3400
       Largest volume size (blocks):      1024
----------------------------------------------------------------
Press <space> to continue, or
press F to list to a file.
```

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Press X for the extended volume list.

The screen displays:

```
Volume Manager [x.xx]                    DS SERVER
Extended Volume List                     Drive DRIVE1
--------------------------------------------------------------
List Volumes of which type?


Select from:
   UCSD
   CP/M
   MSDOS
   CCOS
--------------------------------------------------------------
```

Type the desired operating system and **press**
RETURN .

The screen display is similar to:

```
Volume Manager [x.xx]                         DS SERVER
Extended Volume List                          Drive DRIVE1
--------------------------------------------------------------------------
Volume     Vol Size  Aloc Size  Dir Entries  Sectors/track  Reserved  tracks


DRBCPM     1024      2k         256          64             0
GALAXY     1024      2k         256          64             0



          Total free blocks on drive:      7811
            Total free areas on drive:        2
          Largest free space (blocks):     6788



             Total volumes on drive:         5
   Total blocks allocated on drive:        3400
      Largest volume size (blocks):        1024
--------------------------------------------------------------------------
Press <space> to continue, or
press F to list to a file.
```

Press **F** to list the free space on the mass storage system.

The screen display is similar to:

```
Volume Manager [x.xx]                    DS SERVER
Free Space                               Drive DRIVE1
-----------------------------------------------------------------
    Volume            Address        Length       RW Type


1. <unused>            10348          1796


      Total free blocks on drive:      1796
       Total free areas on drive:         1
   Largest free space (blocks):       1796
```

When finished with the volume manager, consider printing the new listing on your printer for future reference.

Chapter 6: Access Manager

The access manager program grants a user access to
volumes. The program also removes access from a
volume, changes access or lists volume access. Use the
program to prevent unauthorized users from entering
a particular volume and to mount volumes automatically
for a user.

Access is read-only, meaning the user can only read
data from a volume, or read-write, meaning the user
can both read data from and write it to a volume.

To use the access manager, enter the Constellation II
main menu and select the drive management option.
Whenever entering the drive management program for
the first time and selecting access manager, type your
drive name, server name and passwords. See Chapter 3,
"Drive Management."

To use the program, from the drive management menu,
press A for the access menu. **Type** in your drive name,
server name and passwords. Then **type** the name of the
user to be managed and **press** RETURN .

The screen display is similar to:

```
Access Manager [x.xx]          User ARTHUR
Main Menu                         DS SERVER
                                Drive DRIVE1
(C) Copyright 1982, 1983 Corvus Systems, Inc.
---------------------------------------------------
G — Grant volume access
R — Remove volume access
C — Change volume access


L — List volumes accessible


N — Next user
H — Help
E — Exit
Please select an option: __
```

Granting Volume Access

Press G to select the grant volume access option.

The screen will ask for the volume name, the type of access the user will have and the volume's mount status. If the volume will be mounted, the screen also will ask for the volume's mount unit.

Volume Name

Decide which volume to grant the user. Although impractical, the system manager could grant a user access to all the volumes in the system.

Type the volume name that the user will have access to and press RETURN .

Access

Type what access the user will have, either RO for read-only or RW for read-write.

It's possible to restrict volume access to a single user by giving only that user read-write access to the volume. That makes a volume private and protects the information from changes by other system users. If using a local area network, consider letting only one network user write to any one volume. Otherwise, two users could write to a file at the same time.

If the access manager and volume manager do not agree on a volume's access, the most restrictive access takes precedence. For example, if the access manager grants read-write access to a volume but the volume manager makes the volume read-only, the user will have read-only access.

Mounted or Unmounted

The system manager determines when setting up the system which of the user's accessible volumes will be mounted when a user boots. CP/M-86 permits each user to have up to 16 units active at once.

If a user has access to a volume that is inactive when he boots, the user can mount the volume temporarily with the Corvus mount manager program.

Press M to mount the volume or **press U** to leave it unmounted. Selecting unmounted finishes the process of granting volume access.

Unit

Mounting a volume for a user requires assigning it a unit letter. After mounting each volume, the program asks what unit letter to assign it. Mount the volume on the lowest unit letter available between A and P. **Type** the letter and **press** RETURN .

Mount only one volume on a unit. Attempts to mount more than one volume per unit will mount only the first volume that the program finds with that unit assignment.

The unit assignments set the order of the volumes when a user boots his computer.

Removing Volume Access

Press R to select the remove volume access option that denies a user access to a volume. **Type** in the name of the volume with the denied access and confirm the choice. To remove the access, **press** Y and RETURN . To cancel, **press** N and RETURN .

Changing Volume Access

Press C for the change volume access option that changes the type of access a user has to a volume. It's possible to change the access, mount status and mount unit.

Type the volume name and **press** RETURN .

The screen automatically suggests the volume's current access. To keep it, **press** RETURN . Otherwise, **type** RO for read-only or RW for read-write and **press** RETURN .

Next the screen automatically suggests the volume's current mount status. To keep the current status, **press** RETURN . Otherwise, **press** M for mounted or U for unmounted and **press** RETURN .

If the volume is unmounted, the process is finished.

If the volume is mounted, the screen automatically suggests the current mount unit. To keep the current unit, **press** RETURN . Otherwise, **type** a letter A through P, then **press** RETURN .

Changes made while the user is on the system take effect only after the user reboots or uses the mount manager program to access the changed volume.

Listing Volume Access

Press L to see a list of the volumes a user has access to, their mount units, access type and operating system.

Help

Press H for help to get a list of all volumes on the drive or all users on the network.

Chapter 7: Creating a Message Center—PIPES

The Corvus local area network lets users share data and equipment. They do this with the help of a special area on the mass storage system called the pipes area or PIPES volume.

Think of the pipes area as an electronic message center. Network users can send, or spool, their files via a pipe that stores the information in a common space, the pipes area. Other users then can receive, or despool, these files or the printer can print them. Files sent to the pipes area must have names that the receiving user or device, such as the printer, can recognize.

This chapter explains how to create the pipes area, then initialize it to set up its structure.

Chapter 8 explains how to use the PIPES volume to have files printed and to send messages to other users. Chapter 8 also shows how to maintain the message center.

Creating the PIPES Volume

Begin at the Constellation II main menu.

1. Select the drive management menu.

Press D

2. Select the volume manager option.

Press V

3.

Identify the mass storage device that will create the volume.

Type in the names written at the back of the Disk System Initialization or System Generation Guide.

If the names can't be found, press the ESC key to return to the drive management menu. Contact a Corvus Service representative for assistance.

Once the correct names and passwords are typed in, the screen displays the volume manager main menu:

```
Volume Manager [x.xx]              DS SERVER
Main menu                        Drive DRIVE1
(c) Copyright 1982, 1983 Corvus Systems, Inc.
-----------------------------------------------------
A  — Add a volume
R  — Remove a volume
C  — Change volume attributes
L  — List volumes
X  — Extended list
F  — Free space list


H  — Help
E  — Exit
-----------------------------------------------------
Enter VOLMGR function: __
```

4.

Select the option to add a volume.

Press A

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5. Enter the volume's name, size, location and type.

Type volume name PIPES and **press** [RETURN] .

Type the volume's desired size and **press** [RETURN] .

The size will depend on how many files the pipes area will hold at one time. A PIPES volume of 1024 blocks will hold many files, while one of 512 blocks might be enough for a small network. Expand or contract the pipes area later by removing the current volume and creating and initializing a new volume.

Type the volume's location.

The screen will suggest a location. To that number, add the length of the pipes area. If the sum of the two values is less than 32000 blocks, **press** [RETURN] .

If the suggested location plus the pipes area is more than 32000, **press** [ESC] to return to the volume manager main menu. **Press** L for a listing of volumes and free space. The pipes area must reside within the first 32000 blocks. Find a free space there for the PIPES volume.

The volume should be a UCSD type volume.

Type UCSD [RETURN] .

6. Confirm the volume should be initialized.

Press Y [RETURN]

The screen displays:

```
Directory zeroed
Volume added.
Access added for user 1.
-----------------------------------------------------------
Press <space> to continue, or
press A to add another volume. __
```

Press [SPACE]

The screen displays the volume manager main menu.

The PIPES volume has been created.

7. Return to the Constellation II main menu.

Press E

twice.

Initializing the PIPES Volume

To use the new PIPES volume as the pipes area, the volume must be initialized. Begin at the Constellation II main menu.

1. Select the maintenance utilities menu.

Press M

The screen displays the maintenance utilities menu:

```
CORVUS UTILITY [x.xx]                    DS SERVER
Maintenance Utilities                 Drive DRIVE1
(c) Copyright 1982, 1983 Corvus Systems, Inc.
-------------------------------------------------------
P  — Parameter Manager


D  — Disk Diagnostic
O  — Omninet Test


U  — Update Utilities


S  — Select Drive
L  — List Drive
E  — Exit
-------------------------------------------------------
Please select an option: __
```

2. Select the parameter manager menu.

Press P

The screen displays the parameter manager menu:

```
PARMGR [x.xx]:   Corvus Parameter Manager Program
(c) Copyright 1982, 1983 Corvus Systems, Inc.
--------------------------------------------------------------
M — Master Multiplexer
P  — Pipes
S  — Set/display semaphore parameters


H — Help
E — Exit
--------------------------------------------------------------
Slot is 1; server is SERVER
```

3. Select the pipes option.

Press P

The screen displays an error message stating the pipes area hasn't been initialized.

Press [SPACE]

The screen displays the pipes menu:

```
PARMGR [x.xx]:   Corvus Parameter Manager Program
(c) Copyright 1982, 1983 Corvus Systems, Inc.
--------------------------------------------------------------
L — List active pipes
R — Reinitialize (delete all pipes)
I  — Initialize pipes area
C — Close a pipe
P — Purge a pipe


E — Exit
--------------------------------------------------------------
Select Pipes option: __
```

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4. Select the option to initialize the pipes area.

Press I

The screen is similar to:

Initializing pipes with block = 2391, length = 1018

OK to continue? [N]

5. Initialize the PIPES volume.

Press Y

PIPES is initialized. The screen displays the pipes menu.

6. Return to the Constellation II main menu.

Press E

three times.

The PIPES volume is ready for use. Go to Chapter 8 to learn how to use the pipes area for printing and sending information, and how to maintain the message center.

Chapter 8: Using PIPES to Print and Send Messages

Once the PIPES volume has been created and initialized, it is ready to hold files. Then the PIPES volume can be used for printing files or sending messages and files to other users.

Printing files and sending messages via the pipes area follow the same two-step process. First send, or spool, the file to the pipes area. Then print a file on a printer or receive the file by despooling.

Files sent to the pipes area must have names that the receiving user or device, such as the printer, can recognize. The easiest way to keep track of names is to use the user names of users as their pipe names.

A pipe name is a temporary name for a file in the pipes area. The name can be up to eight characters and must begin with a letter. The system manager can make a directory such as the one below. All network users should have the directory.

```
*******************************************************
*                                                     *
*              ELECTRONIC MESSAGE                      *
*              CENTER DIRECTORY                        *
*                                                     *
*                                                     *
*                              User and               *
*    User                      pipe name              *
*    ---------                 ----------------------  *
*    John Anderson             JOHNNY                  *
*    Steve Harris              STEVE                   *
*    Steve Smith               SMITH                   *
*                                                     *
*                                                     *
*    Device                    Pipe name              *
*    -----------               ----------------------  *
*    Daisy-wheel printer       LETTER                 *
*    Dot-matrix printer        PRINTER                *
*                                                     *
*******************************************************
```

In the example above, user John Anderson knows from looking at the directory that his pipe name and user name are the same, JOHNNY. He also knows he can send a message to Steve Smith if he spools it to Steve with the pipe name SMITH.

John also can see from the directory that his network has two printers, a letter-quality daisy-wheel printer with the name LETTER and a fast dot-matrix printer with the name PRINTER. Each printer should be attached to a computer or utility server that will search the pipes area for its pipe name. John can choose which printer to use by spooling his file to LETTER or PRINTER.

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Sending Files to a Printer or User

Follow the steps below to send files to a printer or user.

First spool the files to the pipes area. When spooling files to a printer, set the format for the printout by setting spool parameters.

Begin after signing on with your user name and password. The spool program won't run with the system manager's name and password.

1. Enter the spool program.

Type n:SPOOL $\boxed{\text{RETURN}}$

where n is the unit letter for the volume containing the spool program.

The screen displays:

```
Copyright 1982, 1983 Corvus Systems, Inc.
            All Rights Reserved


Corvus Spool Utility [x.xx]
Main Menu
----------------------------------------------------------------
S  — Spool a file


C  — Change Spool Parameters


D  — Display Pipes


H  — Help


E  — Exit
----------------------------------------------------------------
Please select an option: __
```

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2. Select the desired pipe name.

To print the file on the printer named PRINTER, go to step 5.

To send information to a different destination, **press** C. The screen displays the change parameters menu:

```
Corvus Spool Utility [x.xx]
Change Spool Parameters
-----------------------------------------------------------
P  — Pipe Name          :   PRINTER
L  — Lines per Page      :   55
C  — Chaining Symbol     :   [*I
N  — New Page Symbol     :   [*P
T  — Tab Length          :    8
F  — File Type           :  TEXT
E  — Exit to Main Menu
-----------------------------------------------------------
Please select an option: __
```

3. Select the pipe name option.

Press P

The screen displays:

```
Pipe name (up to 8 characters): __
```

4. Name the pipe.

Consult the user directory to determine what spool name to use when sending a file to a different printer or another user. When sending a file to another user, use the recipient's name.

Type the desired pipe name and **press** [RETURN] .

To send a file to another user, skip to step 8.

5. Check other spool parameters.

Several parameters affect how a file is spooled. Change any or all of the suggested values before spooling a file.

Press C

The screen displays:

```
Corvus Spool Utility [x.xx]
Change Spool Parameters
----------------------------------------------------------
P — Pipe Name          :  PRINTER
L — Lines per Page      :  55
C — Chaining Symbol     :  [*I
N — New Page Symbol    :  [*P
T — Tab Length          :  8
F — File Type           : TEXT
E — Exit to Main Menu
----------------------------------------------------------
Please select an option: __
```

6. Select the parameter to change.

Press the letter which corresponds to the parameter to change. For example, to change the chaining symbol, **press** C.

7. Choose the new value.

Once a parameter is chosen, the program shows a possible value for the parameter. Choose the desired value. **Type** the value and **press** RETURN . The parameters and their values are described below.

Pipe Name   —This is any alphanumeric name up to eight characters that begins with a letter. It's possible to direct a file to any active printer on a network by choosing the appropriate pipe name. The system manager can supply a list of network printers and their pipe names.

Lines per Page   —This is the total number of lines that a printer will print on a page before beginning a new page. To print continuously without skipping over page boundaries, set lines per page to 0. This only applies to text files.

Chaining Symbol —Once this symbol and a file name immediately after it are typed in the text file, the spool program inserts the text from the specified file where the symbol appeared. Neither the chaining symbol nor the file name will appear in the spooled text. If the spool program finds no file name after the chaining symbol, it prints an error message and continues spooling. The chaining symbol can be any string of up to 133 characters.

New Page Symbol—This symbol typed in the text file causes the printer to skip to the top of the next page. The symbol can be any string of up to 133 characters.

Tab Length —This sets the tab column positions and causes the spool program to insert spaces until it reaches the next tab column. Starting at the left margin, tabs are set according to the tab length specified. For example, a tab length of 8 would insert tabs every eight spaces. Valid tab lengths are 1 to 133.

File Type   —This specifies whether the file being spooled is text or data. If text, the spool program will format the file with the parameters of lines per page, chaining symbol, new page symbol and tab lengths. If data, the spool program will spool the file without formatting it.

8. Return to the spool program main menu.

After making all desired changes to the parameters,

Press E

The screen displays the spool utility main menu.

9. Send the file.

Press S

The screen displays:

```
Corvus Spool Utility [x.xx]
Spool a file
-------------------------------------------------------------
File name: __
```

10. Enter the file name.

Type the name of the file to send and **press** RETURN .

The screen displays:

> Message: __

Press RETURN

The screen display is similar to:

> Spooling MEMO.DOC to pipe LETTER [1] . . . .
> . . . .
> 84 block(s) spooled to pipe [1] named LETTER
> ---
> Corvus Spool Utility [x.xx]
> Spool a file
> ---
> File name: __

11. Spool another file or return to the spool program.

To send another file, **type** the new file name and **press** RETURN .

To spool to that pipe name, **press** RETURN . The screen displays the spool program main menu.

12. Exit the spool program.

Press E

Printing and Receiving Files

Follow the steps below to print or receive files,
a procedure called despooling. Files will stay
in the pipes area until despooled. Data files
won't despool to a printer or console, only a file.

To check for messages, use the display pipes
option in the spool program main menu. If
messages are waiting, use the despool program
to retrieve them. The console screen will receive
messages without saving them. To save files
and messages, send them to a file.

To print files, first format the printout with the
change parameters option. Also make sure a
printer is connected to a computer or utility
server. The computer or utility server reads
files from the pipes area and sends the
information, or despools it, to the printer.

Attach the printer to the computer or utility
server that will despool the files. Connect the
printer following the usual setup. Consult the
printer manual. If the computer that despools
doesn't always run the despool program, run
the program when the computer is not doing
other tasks.

If beginning a session, sign on with your user
name and password and begin the despool
program. The program won't run with the
system manager's name and password.

1. Select the despool utility.

Type n:DESPOOL [RETURN]

where n is the unit letter for the volume containing the despool program.

The screen displays the despool main menu:

```
Copyright 1982, 1983   Corvus Systems, Inc.
             All Rights Reserved


Corvus Despool Utility [x.xx]
Main Menu
-------------------------------------------------------------
D — Despool a file


C — Change despool parameters


H — Help


E — Exit
-------------------------------------------------------------
Please select an option: _
```

2. Select the change parameters option.

Press C

The screen displays the change parameters menu:

```
Corvus Despool Utility [x.xx]
Change Parameters
-------------------------------------------------------------
P — Pipe name                        : PRINTER
O — Output device                    : PRINTER
L — Do you want <lf> after <cr>  : YES
S — Single page printing             : NO
E — Exit to main menu
-------------------------------------------------------------
Please select an option: _
```

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3.   Select the pipe name option.

Press P

Despooling will send a file to one of three places.

The despool program automatically will look for pipes addressed PRINTER. If this is the name of the printer, press ⌈RETURN⌉ . Go to the next section, "Printing Files."

If the printer has a different name, **type** the correct name and press ⌈RETURN⌉ . Go to the next section, "Printing Files."

To despool the file to yourself, **type** your pipe name as it appears in the user directory and press ⌈RETURN⌉ . Skip to the section, "Receiving Files."

Printing Files

The screen is displaying the change parameters menu. First adjust the print options. Then print the file.

1.   Adjust your print options.

When a carriage return <cr> embeds the file to be printed, some printers will automatically linefeed; others will keep returning to the beginning of the same line. Consult the printer manual to see whether the printer automatically advances the page one line after each carriage return.

If the printer automatically linefeeds <lf> when it sees a carriage return, change the linefeed option to "no" by **pressing** L.

If feeding paper one sheet at a time, change the single page printing option to "yes" by **pressing** S.

2. Print the file.

Press D

The screen display is similar to:

```
Corvus Despool Utility [x.xx]
Despool a file
-----------------------------------------------------------
Currently searching for pipe named : PRINTER
Press any key to escape . . .
```

The despool program uses the pipe name given it to search the pipes area for an identically named pipe. When it finds the pipe, the program removes it from the pipes area and despools it to the printer hooked to the computer or utility server. After each pipe is despooled, the program returns to search for more pipes that have been spooled.

3. When finished despooling, exit the despool program.

Press [SPACE]

Press E

Receiving Files

The screen is displaying the change parameters menu. Unless directed elsewere, the file will automatically go to a printer.

1.

Change the output device.

Press O

2.

Select where to send the file or message.

To read a message on the console screen without saving it, select the console option. **Press** C.

A file disappears from the pipes area after despooling to a printer or console. Save information by sending it to a file. **Press** F.

3.

Return to the despool program main menu.

Press E

4.

Despool the file.

Press D

The screen display is similar to:

```
Currently despooling pipe named : STEVE
Pipe number                      : 2
Spooled filename                 : TEST.DOC
Filename to despool to           : __
```

5.

Select where to despool the file.

Type a location and a file name and **press** [RETURN]. The despool program will create a file at this location and will put the despooled data into it.

For example,

Type B:TEST1.DOC [RETURN]

The screen display is similar to:

```
. . . . .
5 block(s) read from pipe 2 named STEVE
```

If more than one file had the same name, the program will ask for the next file name. Otherwise, the screen display is similar to:

```
Currently searching for pipe named : STEVE
Press any key to escape . . .
```

6.

Return to the despool main menu.

Press E

The screen displays the despool program main menu.

The pipes area is useful for sending messages between users electronically and spooling and despooling files to a printer. But with time, mislabeled files from mistakes in spooling and despooling will clutter the pipes area and reduce the amount of useful space. Periodically, clean the pipes area and reclaim space from unwanted files. Begin at the Constellation II main menu.

1. Select the maintenance utilities.

Press M

The screen displays the maintenance utilities main menu.

2. Select the parameter manager option.

Press P

3. Identify the mass storage device containing the desired pipe area.

Type in the names written at the back of the Disk System Initialization or System Generation Guide.

If the names can't be found, **press** the ESC key to return to the drive management menu. Contact a Corvus Service representative for assistance.

Once the device is identified, the screen displays the parameter manager main menu.

4. Select the pipes option.

Press P

The screen displays the pipes menu.

5. Select the option to list active pipes.

Press L

The screen lists all pipes in the pipes area. The display is similar to:

```
Active pipes are:


1. PRINTER  Open    Read    Contains data  53 blocks
2. PRINTER  Closed  ---     Contains data  25 blocks
3. STEVE    Open    Read    Contains data  10 blocks
4. SMTIH    Closed  ---     Contains data  12 blocks
5. SMITH    Open    Write   Contains data   6 blocks
6. LETTER   Open    Read    Contains data   0 blocks


Press <space> to continue __
```

In the example above, the list gives the status of each pipe and its size. Pipes are either open or closed. All pipes, whether of data or text, will "contain data" or be "empty."

PIPE 1 is a pipe addressed to the pipe name PRINTER. The file is open and probably is being despooled by the printer. If listing the pipe area again and the pipe's number of blocks has decreased, the pipe is being despooled.

PIPE 2 is waiting to be despooled once PIPE 1 finishes.

Steve is probably despooling PIPE 3. Again, confirm this by listing the pipe area a second time to see if the number of blocks has decreased. If the number remains the same, the pipe isn't being despooled. If so, the pipe may have a problem and should be purged.

A user accidentally transposed the letters in SMITH when he spooled the file in PIPE 4 with the name SMTIH. This name isn't on the electronic message center directory. This pipe is taking up space and should be purged.

A user is spooling the file in PIPE 5. He should soon finish spooling and the pipe will close. If a second listing doesn't show more blocks or the pipe closing, the pipe may have a problem. Either close the pipe to avoid respooling it or purge the pipe and respool it.

It appears the letter-quality printer finished despooling PIPE 6. But the pipe is still open. The despool program may not know to go on to other files named LETTER. Purge the pipe.

Note the pipes that have problems and what action to take. You may need to purge a pipe or close an open pipe.

6. Continue the program.

Press SPACE

The screen displays the pipes menu.

7. Purge a pipe.

Press P

The screen displays:

> Purge which pipe? [pipe number]:

Choose which pipe to purge. **Type** the number of the pipe to be purged and **press** ⌷RETURN⌷ .

The screen display is similar to:

> Pipe 6 purged
>
> Press <space> to continue __

Press ⌷SPACE⌷

The screen returns to the pipes menu.

8. Close an open pipe to avoid respooling.

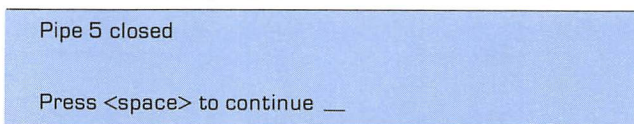**Press** C

The screen displays:

> Close which pipe? [pipe number]:

Type the pipe's number ⌷RETURN⌷

The screen display is similar to:

Pipe 5 closed

Press <space> to continue __

Press `SPACE`

The screen returns to the pipes menu.

9. Once the pipes area is clean, return to the Constellation II main menu.

Press E

twice.

Chapter 9: System Backup

Protect information on computer storage media from accidental loss by backing up, or making copies of, everything. These copies can be kept on a different piece of storage media, often at a remote location to increase the odds of survival.

There are three ways to back up your Corvus disk system:

Method	Backs up	Refer to
● CP/M-86 standard copy program	Files within a volume to diskette	Rainbow 100 Operating System Manual
● Corvus backup-to-floppy program	Volumes to one or several diskettes	Network Station User's Guide
● Corvus MIRROR hardware and software	Volumes or disks to video cassette tape	This chapter

The system manager may want to back up an entire disk system quickly. For such tasks, Corvus Systems developed the Corvus MIRROR hardware and software, an effective and low-cost way to back up disk systems.

The MIRROR creates an image, or copy, of a drive or drive volume and saves the image with a video cassette recorder (VCR). The MIRROR is available either built into the Corvus disk system or later as an add-on option. The Corvus management utility includes Mirror software.

Using the Corvus MIRROR

Any computer can execute the Mirror program. All other users aside from the system manager should not use the network during backup. The Mirror program uses the disk extensively and does not allow other disk activities.

Use the MIRROR with a VCR. Before using the recorder, become familiar with how it works.

Always use the same VCR to back up and restore the Corvus disk system. Set the VCR at standard play speed and use the highest quality tape to prevent errors. Use a VCR without the color enhancement feature or turn off this feature when using the MIRROR.

When finished backing up, turn off the VCR to prevent it from overwriting the tape image.

The next section describes the MIRROR's functions. Following sections describe how to use those functions to back up and restore drives and volumes.

To display the Mirror program, sign on as the system manager and enter the Constellation II main menu.

1. Select backup utilities.

Press B

The screen displays:

```
CORVUS UTILITY [x.xx]                                    DS
Backup Utilities                                         Drive
-----------------------------------------------------------
M — Mirror
A — Archival Storage
R — Remote Backup


S — Select Drive
L — List Drives
H — Help
E — Exit
-----------------------------------------------------------
Please select an option: __
```

The Mirror program works with all drives containing MIRROR hardware and backs up the disk by making an image of it. Two other backup options come with the backup utilities. Archival storage places several images on tape with a directory. This requires remote option hardware. Remote backup allows a timer to delay the start of backup. It too requires remote option hardware.
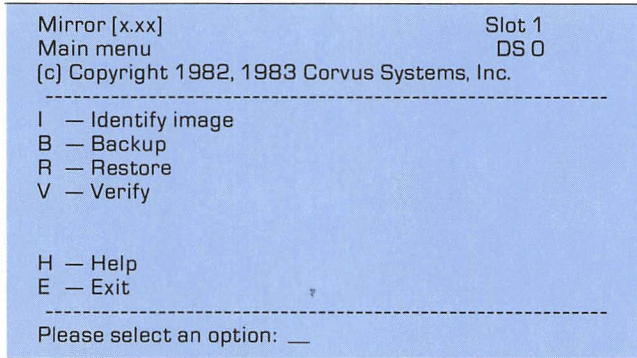
2. Select the Mirror program.

Press M

3. Identify the disk system containing information to back up.

Type the names written at the back of your Disk System Initialization or System Generation Guide.

If the names can't be found, **press** the `ESC` key to return to the drive management menu. Contact a Corvus Service representative for assistance.

Once the correct names and passwords are typed in, the screen displays:

```
Mirror [x.xx]                               Slot 1
Main menu                                   DS 0
(c) Copyright 1982, 1983 Corvus Systems, Inc.
------------------------------------------------------
I  — Identify image
B  — Backup
R  — Restore
V  — Verify


H  — Help
E  — Exit                        
------------------------------------------------------
Please select an option: __
```

Identify— Reads and displays the image header and determines the image's tape position.

Backup — Copies all or part of a Corvus drive to tape while checking the cyclical redundancy code (CRC) to find errors. Backup only writes to the tape and can't detect whether tape is in the VCR. Always verify immediately after backing up to make sure images were copied correctly.

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The option produces a tape image with a header block that includes the image's date, time, size, system type and optional comments.

Restore —Copies images, block by block, from tape and places them on the disk while checking the CRC.

Verify —Checks the accuracy of the tape recording. Verify checks the CRC to determine if the backup tape could be restored. Verify doesn't compare data on the tape to that on the drive and doesn't write the stored data back to the disk.

Help —Defines the four options above.

Exit —Returns the program to the backup utilities main menu.

During backup, the program records each block on the disk four times. If the verify program finds an error on the block's first copy, it counts a soft, or recoverable, error and reads the second copy of the block. The CRC check repeats itself after each faulty image and quits when it finds an error-free block. If the CRC check finds all four images are faulty, it counts a tape read, or hard, error. Tape read errors are blocks that couldn't be restored properly.

If the CRC check reports more than 250 recoverable errors, the tape probably is worn out and should be replaced.

Backup

This section shows how to back up either a drive or volume. The steps are the same except for selecting either the drive (steps 4 and 5) or the volume (steps 6 and 7).

Backup consists of two major tasks. First back up the disk or volume to tape while the computer checks the disk for errors. Then verify the tape, to make sure the disk or volume image was copied correctly.

1. From the Mirror main menu, select backup.

Press B

The screen displays:

```
Mirror [x.xx]                              Slot 1
Backup to tape                             DS 0
-----------------------------------------------------------------
V  — Volume
D  — Drive
M — Manual


E  — Exit
-----------------------------------------------------------------
Select Backup option: __
```

If backing up a drive, go on to step 2.

If backing up a volume, skip to step 4.

2. Select the drive option.

Press D

The screen displays:

> Enter BACKUP parameters:
>
> Drive number? 1

3. Select which drive to back up.

If drives are chained together, select which drive to back up. The program can back up only one drive at a time.

Press [RETURN]

The screen display is similar to:

> Backing up 11540 blocks from drive
>   starting at block 0.
> Date: 9-Mar-83

Skip to step 6.

4. Select the volume option.

Press V

The screen displays:

> Name of volume? __

5. Select which volume to back up.

Type the name of the volume and **press** RETURN .

The screen display is similar to:

> Backing up 3072 blocks from drive 1
>   starting at block 4304
>
>
> Enter date : 31-JAN-83

6. Label the tape image.

The computer will ask for the image's date, time, name and any comments. Responses will be written at the beginning of the tape to help identify its contents.

Type the date. For example, **type** 9-MAR-83 RETURN .

Type the time. For example, **type** 5:00 P.M. RETURN .

Type a name of up to 16 characters for the tape image that will be created. For example, **type** DRIVE BACKUP RETURN .

Type a comment of up to 80 characters that labels the contents of the drive backup. For example, **type** MARKETING DRIVE.

When the four responses are typed in, the screen display will be similar to:

```
Date:      9-MAR-83

Time:
Date:      9-MAR-83
Time:      5:00 P.M.
Name:      DRIVE BACKUP
Comment:   MARKETING DRIVE


Position Recorder and Start Record
Press <return> when ready __
```

7. Load your video cassette recorder.

Set the VCR's speed to standard play. Insert a tape and rewind it. Back up only one image per tape.

Backup requires almost 2 minutes of tape per megabyte (2048 blocks). A Model 6 or Model 11 drive needs a 30-minute tape for backup; a Model 20 drive needs a 60-minute tape. A 30-minute tape will back up most volumes.

8. Begin the backup process.

When the VCR is loaded, **press** the recorder's PLAY and RECORD . After a few moments, on the computer, **press** RETURN .

Cancel the command by **pressing** the computer's ESC and return to the Mirror program main menu.

The screen displays:

```
Backup in Progress...
```

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Backup requires about 1½ minutes per megabyte (2048 blocks) of information. Backup takes about 12 minutes for Model 6, about 24 minutes for Model 11 and about 36 minutes for Model 20. Once the backup is completed, the screen displays:

```
Backup Finished

Error Status:

          Disk Errors:  0

     --- ALL DATA STORED ---
```

If any disk errors are reported, see Chapter 10, "Troubleshooting," to correct possible media defects.

Note that the backup option only writes to the tape. If the tape is faulty, restoring the image from the tape may not be possible.

9. Verify whether the image can be restored.

Press V

The screen displays:

```
Verify selected.

Position Recorder and Start PLAYBACK
Press <return> when ready __
```

Rewind the tape to its beginning and press the recorder's ⌐PLAY⌐ . On the computer, press ⌐RETURN⌐ .

The screen displays:

> Verify in Progress . . .

Verification takes as long as backup. When done, the screen displays:

> Error Status:
>
> Recovered Errors: 16
> Tape Read Errors: 0
>
> --- ALL DATA RECEIVED ---

If the computer reports more than 250 recovered errors, the tape probably is wearing out and should be replaced. If tape read errors occur, repeat the backup with a new tape.

10. Return to the backup utilities menu.

Press E

Restoration

The steps below show how to use the MIRROR to restore an image three ways: volume images to volumes and disk drives to equal-size or larger drives.

Restoring a volume or disk drive consists of two major steps. First identify the tape to make sure it's the desired one. Then restore the image on the disk as the computer checks both tape and disk for errors.

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The restored volume must be the same size as the backed up volume. Otherwise, the program will write over volumes where other information is stored. Select which volume to restore in steps 4 and 5.

Usually restoration from a tape to a drive restores the image on the original drive or another equal-size drive. Select the equal-size drive to restore in steps 6 and 7.

However, restoration from a tape to drive can restore the image on an alternate, larger drive than the original. But the receiving drive must be larger than the original. Select an alternate drive in steps 8 and 9.

Begin at the Mirror main menu.

1. Make sure the tape contains the correct backup information.

To select the identify image option,

Press I

The screen displays:

Identify selected.

Position recorder and start PLAYBACK
Press <return> when ready __

2. Position the recorder and start playback.

Rewind the video tape. When it is rewound, on the recorder **press** PLAY . On the computer, **press** RETURN .

The screen display is similar to:

```
Image ID    : 1
Size        : 11540
Generated on: IBM PC
Date        : 9-MAR-83
Time        : 5:00 P.M.
Name        : DRIVE BACKUP
Comment     : MARKETING DRIVE
```

3. If the tape contains the desired image, select the restore menu.

Press R

The screen displays the restore menu:

```
Mirror [x.xx]                                    Slot 1
Restore to tape                                  DS 0
------------------------------------------------------------
V  — Volume
D  — Drive
M  — Manual


E  — Exit
------------------------------------------------------------
Select Restore option: __
```

If restoring a volume, go to step 4.

If restoring a drive, skip to step 6.

If restoring an alternate-size drive, skip to step 8.

4. To restore a volume, select the volume option.

Press V

5. Select the volume to restore.

Type the name of the backed up volume that will now be restored. **Press** RETURN .

The screen displays:

```
Restoring 3072 blocks to drive 1
  starting at block 4304.
Position recorder and start PLAYBACK
Press <return> when ready __
```

Skip to step 10.

6. To restore a drive, select the restore menu's drive option.

Press D

The screen displays:

```
Enter RESTORE parameters:

Drive number: 1
```

If drives are chained together, select the drive that will receive the image. The drive where the image came from and the drive that will receive the image must be the same size.

7. Select the drive to receive the image.

For example, to restore the image on drive 1,

Type 1 [RETURN]

The screen displays:

> Restoring 11540 blocks to drive 1
> starting at block 0.
> Position recorder and start PLAYBACK
> Press <return> when ready __

Skip to step 10.

8. To restore an alternate-size drive, select the manual option.

Press M

The screen displays:

> Enter RESTORE parameters:
>
> How many blocks: 0

9. Check the size of the tape.

In step 2, the identify option reported the size of the original drive's image. The image's size must be smaller than the drive that will receive it. To check the size of the drive, use the disk diagnostic's version check under the maintenance utilities.

If the image is smaller than the drive that will receive it, **type** the image size and **press** [RETURN] .

For example, **type** 11540 [RETURN]

The screen displays:

> For drive: 0

If drives are chained together, **type** the number of the drive that will receive the image and **press** [RETURN] .

If no drives are chained, **type** 1 [RETURN] .

The screen displays:

> Restoring 11540 blocks to drive 1
> starting at block 0.
> Position recorder and start PLAYBACK
> Press <return> when ready __

Go to step 10.

10. Position the recorder and start playback.

Rewind the tape. When it is rewound, on the recorder, press ⌊PLAY⌋ . On the computer, press ⌊RETURN⌋ .

The screen displays:

> Restore in progress . . .

Restoration takes as long as the original backup. When finished, the screen displays:

> Error Status:
>
> Recovered Errors: 30
> Tape Read Errors: 0
> Disk Write Errors: 0
>
> --- ALL DATA RECEIVED ---

If more than 250 recovered errors are reported, the tape probably is wearing out and should be replaced. If the computer encounters any tape read errors, the tape media could be faulty. Try to restore the image again. If the computer encounters disk write errors, see Chapter 10, "Troubleshooting," to correct possible media defects.

11. Exit the Mirror program.

Press E

The program returns to the backup menu.

Errors

The three most common error messages when using the MIRROR involve tape problems.

The error message "image not found" displays if the tape was improperly aligned when recording started. Or the message may indicate that the VCR's color enhancement feature wasn't turned off before backup, and color was superimposed on the image. The program will search for the start of the image and the header block for about 1 minute before abandoning the search.

The error message "image size mismatch" indicates the size of the area being restored doesn't match the image's size.

The error message "tape dropout during playback operation" indicates the tape being read has been partially erased. This can occur if a magnet came near the tape or the tape wasn't positioned properly when recording began.

Chapter 10: Troubleshooting

The system manager can fix many of the problems that may occur with the Corvus disk system. But before beginning any unfamiliar routines, take the time to back up the drive. Backup will prevent loss of information and serious problems. During troubleshooting procedures, no one but the system manager should use the disk.

A disk drive consists of several disk platters that are divided into tracks. Each track is divided into sectors. As the platters rotate, heads read and write data to the sectors on a track. The firmware governs the actions of the heads and platters. Firmware is the factory-supplied software that controls the disk and enables the computer to communicate with the disk.

Disk problems may result if the drive firmware is outdated or damaged or if the disk platter, the media which stores information, has scratches, flakes or other defects.

This chapter will address disk problems caused by faulty firmware or hardware.

The tools to fix such problems are the drive indicator lights, installation guide and the Corvus diagnostic utilities.

Begin by using the drive indicator lights and the disk installation guide. Refer to the installation guide for your particular computer and system. If the problem still occurs, turn to the Corvus diagnostic utilities.

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Drive Indicator Lights

The three lights on the drive show its status. When only the ready light is on, the drive is operational and can communicate with computers. The ready light goes off when the disk is actually in use. Often the lights will flicker when the disk is in use.

The table below shows common problems and their solutions.

Symptom	Possible Problem	Remedy
No indicator lights on disk	Power cord not properly connected	Properly connect power cord
	Fuse blown	Replace fuse
	Voltage setting incorrect	Select proper voltage setting (See hardware setup.)
Indicator lights function yet ready light doesn't stay on	Improper hardware setup	Check hardware setup, especially cable attachments
	Drive error	Flip and release the reset switch
	Improper firmware	Replace firmware (See firmware section below)
Ready light on but computer cannot communicate with drive	Improper hardware setup	Check hardware setup especially drive controller switches
	Problems in inter-leave factor or virtual drive offset (VDO) table	Properly set inter-leave factor and VDO table (See section below)
Ready light on and computer can commu-nicate with the drive but inter-mittent problems	Media defects	Check for media defects (See section below)
	Problems in inter-leave factor or or VDO table	Properly set interleave factor and VDO table (See section below)

Corvus Diagnostic Utilities

The disk diagnostic program helps solve disk problems. Diagnostic tools include exercising the heads and correcting faulty media by checking the cyclical redundancy code or substituting spare tracks. More serious diagnostic procedures include setting the drive parameters, including the interleave factor and virtual drive offset (VDO) table; updating the firmware; and if all else fails, formatting the disk. Parking the heads is preventative; it protects the disk platters from damage by locking the heads over the innermost portion of the disk, which does not record data.

Exercise the heads to check whether they are operating properly. Heads read data from the various disk platters inside a Corvus drive. The screen will display the results of the check.

Check the cyclical redundancy code (CRC) to look for media defects on the disk platters. If the CRC check finds defects, substitute spare tracks for the damaged tracks.

Set the drive parameters, either the virtual drive offset (VDO) table or the interleave factor, if the drive can't communicate with the computer. The VDO table tells the size of each logical drive. The interleave factor determines how many sectors on a track to skip before the head reads the next sector. For example, a factor of 12 means the head will skip 12 sectors before reading the next sector.

First check the firmware version number, then update the firmware if the ready light is on but the drive can't communicate with the computer. Updating is necessary after reformatting a drive. Updating the firmware may destroy data on the disk.

If all of the diagnostic procedures fail, as a last resort, format the disk. Formatting the disk erases all data on a drive. After reformatting a drive, replace the firmware using the firmware update procedure. Any tracks that a previous CRC check found defective must be replaced with spare tracks.

Entering the Diagnostic Program

Use the diagnostic program either from Constellation II or from a diskette. To use the diagnostic program from Constellation II, follow the steps below.

If the Corvus disk system isn't working, use the diagnostic program from the diskette drive. The program is on the diskette labeled CORCP83. To use the diagnostic program from CORCP83, place the diskette in drive A. **Type** A:DIAG [RETURN] and go to step 2 below. The diskette must be used when updating firmware.

Begin at the Constellation II main menu.

1.

Select the maintenance program.

Press M

2. Select the disk diagnostic option.

Press D

If not using OMNINET, the screen displays the diagnostic program main menu. Go to the next section.

If using OMNINET, the screen displays:

```
CORVUS DIAGNOSTIC UTILITY
VERSION [x.xx]
(c) Copyright 1982, 1983 Corvus Systems, Inc.


    Slot 1:  an OMNINET interface


Select slot number [1]  :  0
```

3. Select the slot number.

Type 1 RETURN

The screen displays:

```
Select server number [0..63]  :  0
```

4.

Select the server number.

Type the OMNINET node address of the disk server and **press** [RETURN] .

The screen displays:

```
DDIAG [x.xx]:  Disk Diagnostic
(c) Copyright 1982, 1983 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
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; server is 64
```

Exercising the Heads

The heads read data from and write data to the recording surfaces of the disk platters. The steps below show how to test whether the heads are functioning properly. First, enter the diagnostic program.

1. **Select the option to perform servo exercise.**

Press X

The screen displays:

> How many passes do you wish to run? [80]

2. **Select the passes to run.**

Press RETURN

The screen displays:

> Disk exerciser option.
>
> Disk exerciser option.
> Press <space> to stop test.
> . . . .
> . . . .
> . . . .
> . . . .

3. Stop the test.

Press [SPACE]

The screen display is similar to:

```
Error Summary:


Number of passes    :   80
Number of soft errors:   1
Number of hard errors:   0
Press <space> to continue
```

Hard errors may indicate a serious problem with the disk drive. If the screen reports any hard errors, contact a Corvus Service representative for assistance.

Press [SPACE]

The screen displays the disk diagnostic menu.

4. Exit the diagnostic program.

Press E

Correcting Media Defects

Media defects, blemishes on the disk platters, can cause intermittent problems with the Corvus disk drive. If media defects appear to be the problem, first check the cyclical redundancy. If the check lists a track three or more times, substitute the bad track with a spare track.

Substituting spare tracks destroys data on the disk. Always back up the disk before substituting spare tracks. Restore the data to the disk when finished.
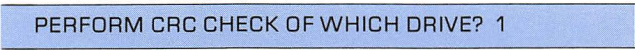
Checking the Cyclical Redundancy.

When the disk drive won't work, the diagnostic program must be run from diskette. Enter the diagnostic program.

1. Select the option to perform CRC scan for bad tracks.

Press C

The screen displays:

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

2. Select the drive.

Press [RETURN]

This starts checking the cyclical redundancy code (CRC) to determine the quality of the disk media.

The screen displays:

> CRC scan in progress
> (takes from 1 to 3 minutes)

The BUSY light on the Corvus drive blinks rapidly.

After 1 to 3 minutes, the CRC test finishes and the screen displays the results. If no errors were found, the screen displays:

> No blocks with CRC errors found
>
> Press <space> to continue

If the test found errors, the screen displays:

HEAD	CYL	SECTOR	TRACK
----	---	------	-----
1	200	18	801

Press <space> to continue

3. Copy the error information.

If the test found media defects, note the head, cylinder, sector and track of any errors. If errors occurred on cylinder 0 or 1, they can't be corrected. Contact a Corvus Service representative for assistance.

Press [SPACE]

The screen displays the disk diagnostic menu.

4. If the test found errors, repeat steps 1 to 4 five times.

If a track appears bad three or more times, replace the bad track with a spare. The procedure is called sparing the track.

Sparing Tracks

Sparing a track destroys all drive information on it. So first back up the entire drive before sparing any tracks. After sparing all bad tracks, restore the drive information to the drive. Begin in the disk diagnostic menu.

1. Select the option to display/modify parameter.

Press P

The screen displays:

    Parameters of which drive? 1

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2.

Select the drive.

Press [RETURN]

The screen displays:

```
Disk Map for Drive 1
No tracks are spared
Interleave spec: 12

Virtual Drive / Track Offset
        1       0


Press <space> to continue
```

Press [SPACE]

The screen displays:

```
--------------------------------------------------------------
L  — Display parameters
S  — Save changes


T  — Set spare tracks
I  — Set interleaving
V  — Set Virtual drive offset table


E  — Exit
--------------------------------------------------------------
Select PARAMETER option
```

3. Spare 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
----------------------------------------------------------
Select TRACK SPARING option:
```

4. Select the option to add a track.

Press A

The screen displays:

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

5. Select the bad track.

Type the number of a track that the CRC check listed as bad. For example, type 306 RETURN .

The screen displays:

```
Spared tracks:
  306
            1 tracks are currently spared.
           31 total tracks may be spared.
```

6. Continue sparing tracks.

Repeat steps 3 through 5 until all tracks listed as defective are spared.

7. 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: 12
Virtual Drive / Track Offset
          1        0
          2      896
Press <space> to continue
```

Press SPACE

The screen displays:

```
-----------------------------------------------------------
L — Display parameters
S — Save changes


T — Set spare tracks
I — Set interleaving
V — Set Virtual drive offset table


E — Exit
-----------------------------------------------------------
Select PARAMETER option
```

8. Save the changes.

Press S

The screen displays:

> You are about to destroy data
> on the disk. Continue? [Y/N]

9. Back up the disk data.

Data on the disk must be backed up, either on diskettes or on video tape using the Corvus MIRROR. Also, make a list of spared tracks and keep it with the disk drive, to use when necessary.

If the data isn't backed up, **press** N. See Chapter 9, "System Backup," for instructions on drive backup.

If the data is backed up, **press** Y.

The screen displays:

> Parameters updated.
>
> Press <space> to continue

Press [SPACE]

The screen displays the disk diagnostic menu.

10. Exit the diagnostic program.

Press E

Setting the Drive Parameters

Normally, it's not necesary to set the drive
parameters of the virtual display offset (VDO)
table or the interleave factor. But if the drive
can't communicate with the disk, the drive
parameters could be the cause.

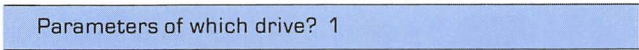The VDO table gives the starting address of
any virtual drives on the disk.

The interleave factor numbers sectors of the
disk according to the rotational speed and
timing of the read-write operations. Numbers
are not in sequential order. The wrong
interleave factor will greatly delay the disk
operations.

Setting the VDO table and interleave factor
destroys data on the disk. Before selecting this
option, back up your disk. Restore the data to
the disk when finished. Begin at the disk
diagnostic menu.

1. Select the option to display/modify drive parameters.

Press P

The screen displays:

> Parameters of which drive? 1

2. Select which drive to modify.

Press RETURN

The screen displays:

```
Disk Map for Drive 1
No tracks are spared
Interleave spec: 9
Virtual Drive / Track Offset
         1         0
```

Press SPACE

The screen displays:

```
----------------------------------------------------------
L — Display parameters
S — Save changes


T — Set spare tracks
I — Set interleaving
V — Set Virtual drive offset table


E — Exit
----------------------------------------------------------
Select PARAMETER option
```

3. Set the interleave factor.

Press I

The screen displays:

```
Enter Interleaving: 9
```

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4.

Enter the interleave factor.

Type the factor corresponding to the Corvus drive.

The proper interleave factor is 9 for Models 6, 11 and 20. However, one exception is a Model 6 drive without an "H" in the serial number, which has an interleave factor of 12.

If the screen displays the correct factor for the drive, **press** RETURN .

If the Corvus service department suggests changing the interleave factor, or if the displayed interleave factor is incorrect, **type** the correct number.

The screen displays:

```
Disk Map for Drive 1
No tracks are spared
Interleave spec: 9
Virtual Drive / Track Offset
        1         0
```

Press SPACE

The screen displays:

```
---------------------------------------------------------
L — Display parameters
S — Save changes


T — Set spare tracks
I — Set interleaving
V — Set Virtual drive offset table


E — Exit
---------------------------------------------------------
Select PARAMETER option
```

5. Set the VDO table.

Press V

The screen displays:

> Enter −1 to terminate entry
> Track offset for virtual drive 1: 0

Press RETURN

The screen displays:

> Track offset for virtual drive 2: −1

Press RETURN

The screen displays:

> Disk Map for Drive 1
> No tracks are spared
> Interleave spec: 9
> Virtual Drive / Track Offset
>   1   0

Press SPACE

The screen displays:

> ---
> L — Display parameters
> S — Save changes
>
> T — Set spare tracks
> I — Set interleaving
> V — Set Virtual drive offset table
>
> E — Exit
> ---
> Select PARAMETER option: __

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6. Save the changes.

To save the changes to the interleave factor and VDO table,

Press S

The screen displays:

```
Disk Map for Drive 1
No tracks are spared
Interleave spec:  9
Virtual Drive / Track Offset
          1        0


You are about to destroy data
on the disk. Continue?  [Y/N]
```

7. Back up the disk data.

Data on the disk must be backed up, either on diskette or on video tape using the Corvus MIRROR.

If the data isn't already backed up, **press** N. See Chapter 9, "System Backup," for instructions on backing up your drive.

If the data is backed up,

Press Y

The screen displays:

```
Parameters updated.

Press <space> to continue
```

Press [SPACE]

The screen displays the disk diagnostic main menu.

8. **Exit the diagnostic program.**

Press E

twice.

Updating the interleave factor and the VDO table is done.

Updating the Firmware

It may be necessary to update the firmware when adding Corvus devices, Corvus utilities or new versions of the computer's operating system to your system. Updating or replacing the firmware may destroy data on the drive. Be sure to back up the disk before selecting this option.

Follow the steps below first to check the disk's firmware version, then update or replace the Corvus firmware.

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1. Check the firmware version number.

From the disk diagnostic menu, **press** V

The screen display is similar to:

Drv	P/V	Capacity	SPT	TPC	CPD
1	P	35860	20	6	306

Drv	ROM	Firmware
1	62	V18.4AP -- CONST II - 10/82

The firmware version is a number, here V18.4AP, and a short message. Also displayed are the drive model and capacity, physical or virtual drive (P/V), number of sectors per track (SPT), tracks per cylinder (TPC), and cylinders per disk (CPD).

2. Press SPACE

The screen displays the main disk diagnostic menu.

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3.

Select the update option.

Be sure the program booted from diskette.

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.
>
> Target controller is : slot 1, server 0
>
> Continue? [Y/N]

Press Y

The screen displays:

> Update firmware on which drive? 1

Press [RETURN]

The screen displays:

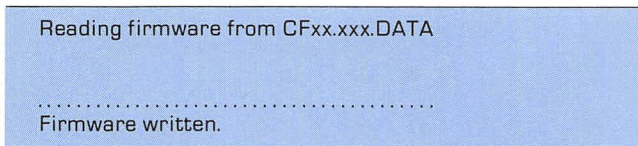> Change drive tables? N

Press [RETURN]

The screen displays:

> Enter firmware file name: CFxx.xxx

4. Enter the firmware file name.

To update or replace the firmware with the displayed version number,

Press RETURN

The screen displays:

> Reading firmware from CFxx.xxx.DATA
>
> . . . .
> Firmware written.

Press SPACE

The screen displays the main disk diagnostic menu.

5. Confirm the new firmware is on the drive.

Press V

6. Exit the diagnostic program.

Press E

Formatting the Corvus Drive

The steps below will destroy all data on the disk. Before performing these procedures, data on the disk must be backed up, either on diskettes or video tape using the Corvus MIRROR.

Format the drive only when no other diagnostic procedure makes the Corvus drive work. After formatting a drive, it's necessary to replace the firmware and substitute any bad tracks. Begin at the diagnostic menu.

1. Select the option to perform platter format.

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.


Target controller is : slot 1, server 0


Continue? [Y/N]
```

2. Confirm which drive to format.

Press Y
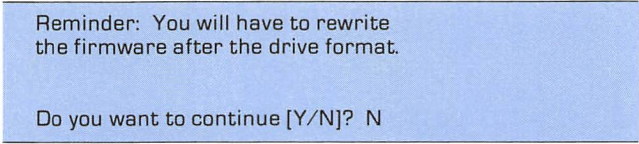
The screen displays:

> Format which drive? 1

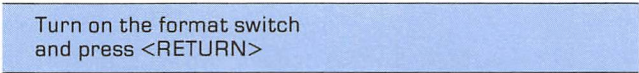Press [RETURN]

The screen displays:

> Reminder: You will have to rewrite
> the firmware after the drive format.
>
> Do you want to continue [Y/N]? N

Press Y

The screen displays:

> Turn on the format switch
> and press <RETURN>

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3.

Turn on the format switch.

Under the three red lights on the front of the Corvus disk drive are four drive controller switches. When facing the front of the Corvus drive, the third switch from the left is the format switch. Flip this switch to the right. Leave the other three switches as they are.
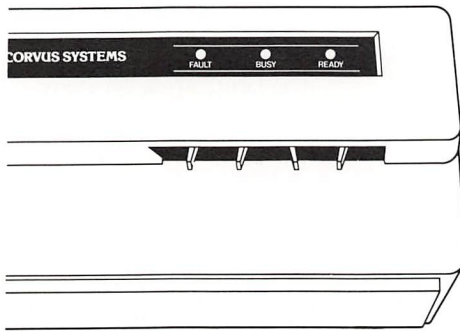
Press [RETURN]

The screen displays:

```
            Format in progress
         (takes from 1 to 2 minutes)
```

The busy light on the drive will blink rapidly during the formatting. When the drive is formatted, the screen display is similar to:
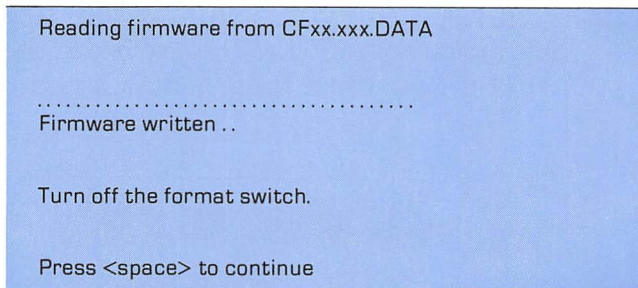
```
Format complete...


Enter firmware file name: CFxx.xxx
```

4. Enter the firmware file name.

Press [RETURN]

The screen displays:

```
Reading firmware from CFxx.xxx.DATA


.......................................
Firmware written . .

Turn off the format switch.

Press <space> to continue
```

5. Turn off the format switch.

Flip the format switch, the third switch from the left on the front of the drive, back to the left.
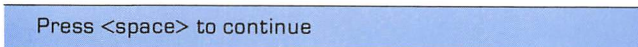
Press [SPACE]

Flip and release the reset switch, which is the right switch on the front of the drive.

When only the ready light on the drive stays lit,

Press [RETURN]

The screen displays:

```
Press <space> to continue
```

Press [SPACE]

The screen displays the disk diagnostic menu.

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6. Substitute any necessary spare tracks.

See the section above, "Correcting Media Defects."

7. Exit the diagnostic program.

Press E

See Chapter 9, "System Backup," for instructions on restoring all data to the disk using the Corvus MIRROR.
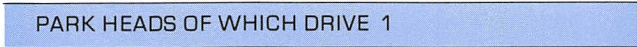
Parking the Heads

Parking the heads places the heads over an unused area of the disk drive. The procedure prevents the heads from damaging the disk when the disk is moved. Begin at the diagnostic program's main menu.

1. Select the option to park heads of the disk.

Press O

The screen displays:

PARK HEADS OF WHICH DRIVE 1

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2. Select the drive.

Press [RETURN]

All three of the drive's red indicator lights will turn off.

The disk drive heads now are over an unused area of the disk platters. After turning off and unplugging the drive, it's safe to transport the drive without damaging the disk surface. The heads would touch only a portion of the disk not used for recording.

Turning on the drive again returns the heads to a useable part of the disk. The drive is ready for use.

To release the heads without turning off the drive, flip the reset switch, the right switch on the front of the drive. The heads return to a useable part of the disk, and the drive is ready for use.

Appendix A: Glossary

In this glossary you will find brief definitions of specific Corvus Systems terms and some general data processing terms. For further study, please see:

Chandor, Anthony, *The Penguin Dictionary of Microprocessors,* New York: Penguin Books, 1981

Chandor Anthony, *The Penguin Dictionary of Computers,* New York: Penguin Books, 1978

Sippl, C.J. and Sippl, R.J., *Computer Dictionary,* Indianapolis: Howard W. Sams & Co., Inc., 1982

Terms in boldface also are defined elsewhere in the glossary.

Account
: Network resources assigned by the system manager to a user. The account identifies the user to the system. A user may use his account from all computers of the same type on the network.

Block
: A unit of storage space on the Corvus mass storage system eqal to 512 bytes or 4K bits. Two thousand and forty-eight blocks is approximately one **MB.**

Boot
: Short for bootstrap, the procedure which loads the operating system from a storage device into a computer.

Boot volume	A **volume** on the Corvus mass storage system containing **boot** information for a computer. Only operating systems which can boot from the mass storage system need a boot volume.
Constellation II	Also written as Constellation or Const II, the network software managing a number of users and computers and their access to one or more Corvus mass storage systems.
CRC	Cyclical redundancy code, a calculation used to check for errors on a storage device.
Default	A value the computer automatically assumes if no other value is specified.
Despool	Method of transferring a **file** from the **PIPES volume** to a user's console, a **file** of his own or a printer.
Directory	A list of the **files** on a specific **volume.**
Disk	A Corvus hard disk unless otherwise noted.
File	A collection of data.
Initialization	A procedure which sets values and defines hardwae characteristics to enable the software to run properly.
K	Short for kilo or 1000. In terms of computer storage, 1024.

Logical	In the context of operating systems, a term describing objects as they appear to the computer, as opposed to the term physical, describing objects as they concretely exist.
Logical device	A general microcomputer function as opposed to physical device, the equipment that performs a microcomputer function.
MB	Short for megabyte, one million bytes.
MIRROR	A Corvus product which backs up disks onto video cassettes.
Mount	To activate a volume for use.
PIPES	A volume on the mass storage system enabling users to share data and equipment. A pipe carries information to a common area called the pipes area, or PIPES volume. Any station may create and fill a pipe with data, and another station may then retrieve this data, transferring it to a file, console or printer.
Read	To retrieve data.
Semaphores	Flags or signals generally used to prevent two or more users from changing data at the same time.
Server	A network device linking the network and other devices, such as printers, which perform specific tasks.

Spare tracks	Good tracks which replace defective ones. Also used as a verb, to skip over defective tracks.
Spared tracks	Tracks no longer used because defects were found on them.
Spooling	A way of sharing information among users by temporarily sending a file to a storage area. Corvus software lets network stations spool files to a PIPES volume. A user may then retrieve the information by despooling.
Sysgen	Short for system generation, a program which must be run before using the system. This program structures the system to accept volumes according to the requirements of a particular operating system.
Track	Concentric rings on the surface of the storage media.
Unit	A logical device number or letter used to address a volume.
Utility server	A network device which can use printer server software to take files from the pipe area to printers.
VDO	Virtual drive offset, a number representing the starting address of a logical drive.

Version	A number used to identify the individual releases of equipment and software. Version numbers may vary, though the function of each product remains basically the same.
Volume	An area of the Corvus mass storage system formatted for a particular operating system.
Write	To store data.

★★ **CORVUS SYSTEMS**
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