



**CORVUS
SYSTEMS**

MASS STORAGE DISK SYSTEM

CORVUS USER GUIDE

CORVUS DISK AND NETWORK SYSTEMS



FOR APPLE II COMPUTERS

☆☆☆ **CORVUS SYSTEMS**

Price: \$35.

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Scope

The purpose of this manual is to guide Corvus users through the installation and initialization procedures for Apple II compatible Corvus systems. This manual does not take the place of the operating system and language manuals provided by Apple; it presumes that users have a somewhat working knowledge of their computer and associated software.

This manual has eight chapters that are divided into two major sections. The first major section is comprised of Chapters One through Five, which cover introductory material, hardware installation, and single user software. The second major section is comprised of Chapters Six through Eight, which cover network software.

Both major sections are included with the Disk Drive and Disk Server packages. Only the second major section is included with the Multiplexer package.

No matter what the specific configuration is, it is recommended that this entire manual be read through from start to finish before following any of the instructions detailed in this manual.

GENERAL CHECKLIST

Follow the general checklist below for directions to the chapters and sections needed to configure your system.

- For ALL Corvus drives:
 - 1) Read Chapter One, specifically the section titled 'Background' on pages 1-15 through 1-19.
 - 2) Read 'How to Set Up a Disk System' in Chapter Two, pages 2-3 through 2-11.
 - 3) Read and follow the directions in the section titled 'Installation Checkout' in Chapter Two, page 2-11.
 - 4) If you ordered a Mirror backup device, read and follow the directions in the section titled 'Connecting a Mirror to the Disk' in Chapter Two, pages 2-13 through 2-16.

- For single user systems:
 - 1) Read and follow the directions in the section titled 'Connecting the Disk to a Single Computer' in Chapter Two, page 2-17.
 - 2) Read Chapter Three then initialize your disk according to the appropriate sections.

- For Multiplexer networks:
 - If you are setting up a Multiplexer on an uninitialized disk:
 - 1) Follow the directions above for single user systems.
 - 2) Read Chapter Six then initialize your disk with Constellation software according to the appropriate sections.
 - 3) Read and follow the instructions in the section titled 'Connecting the Disk to a Multiplexer' in Chapter Two, pages 2-18 through 2-23.
 - If you are upgrading an existing single user system:
 - 1) Check your firmware as described in Chapter Five.
 - 2) Follow steps 2 and 3 above.

- For Omninet systems:
 - If you are setting up an Omninet on an uninitialized disk:
 - 1) Connect the Omninet network as described in Chapter Two and in the 'Omninet Installation Guide'.
 - 2) Initialize your disk according to the appropriate sections in Chapter Three, then according to the appropriate sections in Chapter Six.

GENERAL CHECKLIST (Cont.)

- If you are upgrading an existing single user system:
 - 1) Update the firmware on the Corvus drive as described in Chapter Five.
 - 2) Replace the Corvus utilities with the new utilities provided with your Omninet system as described in Chapter Six.
 - 3) Initialize your disk with Constellation software as described in Chapter Six.
 - 4) Connect the Omninet network as described in Chapter Two.

- If you are upgrading an existing Constellation system:
 - 1) Update the firmware on the Corvus drive as described in Chapter Five.
 - 2) Replace all utilities on the Corvus drive with the new utilities provided with your Omninet system as described in Chapter Six.
 - 3) Run the new Setboot utility and press C for C(onst).
 - 4) Connect the Omninet network as described in Chapter Two.

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Introduction

CHAPTER 1: INTRODUCTION TO CORVUS SYSTEMS

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Checklist

Chapter One Checklist

This chapter covers introductory material. The checklist below outlines the sections of this chapter that **MUST** be read.

- Read the section titled 'Conventions' on page 1-15.
- Read the section titled 'Some Terms' on page 1-17.
- Read the section titled 'Cautions' on page 1-19.

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Overview

Introduction to the Corvus Disk System

The Corvus Disk System is a microprocessor controlled intelligent peripheral that adds high performance mass storage capability to micro-computers. The Corvus Disk System uses proven Winchester technology to provide reliable high density storage. Systems can be single user or multiple user, the latter linked together in a Corvus Constellation network. In addition, the system can be expanded by adding up to three additional disk drives as a larger data base is needed.

The Corvus disk system uses a Winchester technology drive with a fixed disk in a sealed environment. The low load, low mass Winchester type read-write heads are positioned with a stepping motor and a band actuated assembly on the Model 5AP. The Models 10AP and 20AP use a linear voice coil actuator utilizing a closed loop, track following, servo system to position the read-write heads. The recirculating filtered air flow system within a sealed enclosure prevents contamination. The brushless dc drive motor with built-in disk spindle, motor electronics and speed control provides for a universal 50/60 Hz operation.

Three printed circuit boards, read-write, servo control and controller logic are installed within the base of the disk drive enclosure.

In a drive with Winchester technology, the read-write heads do not touch the disk surface. Instead, they are designed with a wing-like shape that allows them to fly above the surface of the rapidly spinning disk. The heads ride on a cushion of air that suspends them approximately 18 micro-inches (0.46 μm) above the disk. That's about a hundredth of the diameter of a human hair. In a floppy drive, the heads actually touch the floppy disk's surface. To provide high speed read-write operations of exceptional accuracy, the disk system incorporates a Corvus intelligent controller with a Z-80 microprocessor.

A single user Corvus System can be configured for up to four high speed disk drives, a microprocessor based intelligent controller, and a interface card that links the controller to your computer.

There is, however, a potential problem that exists in all Winchester drives; the heads rest on the media when powered down. The head is attached to the body of the drive (the main mass) by a flexure arm. This arm is a long thin cantilever with a high magnification factor at certain frequencies. With this arrangement, shocks applied to the main mass can produce shocks magnified over 100 times to the heads. An acceleration of

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2 gravities (G's), applied to the main mass could result in a 200 G shock applied to the heads.

A critical shock is produced by banging the drive on a table while moving it or by dropping one end less than an inch while mounting it in an enclosure. These actions result in lifting the heads off the media and forcing them back down again. Remember, the drive is a precision instrument and must be handled carefully.

Primary features of the Corvus Disk Drive are:

- Fixed Media (magnetically oriented and lubricated)
- Winchester type recording features
- Sealed environment, clean air filter system
- Brushless dc Drive Motor
- Small size
- No scheduled maintenance
- Daisy chain up to 4 drives (original drive and three add-on drives)

Reliability

The Mean Time Between Failures is calculated to exceed 10,000 hours. The Mean Time To Repair will not exceed 0.5 hours. There is no preventive maintenance required on the Corvus Disk Drive.

Disk System Specifications

5 Megabyte Drive Specifications

Operational Specifications

Number of platters	2
Number of data surfaces	4
Number of tracks per surface	144
Bytes per sector (formatted)	512
Sectors per track (formatted)	20
Bytes per drive (formatted)	5.65 Mb
Track density	200 tpi
Bit density	8,800 bpi
Rotational speed	4,800 rpm \pm 1%
Average latency	6.25 ms
Single track access time	3 ms
Average access time	125 ms
Maximum access time	240 ms
Settling time	40 ms
Data transfer rate	960 kb/sec
(to internal controller RAM)	(5.1 mega HZ clock rate)
Recording code	MFM
Heads per surface	1
Data heads	4
Start time	30 seconds (maximum)
Stop time	7 seconds (maximum)

Physical Dimensions

Height (inches/centimeters)	5.25/13.34
Width (inches/centimeters)	14.50/36.83
Length (inches/centimeters)	15.00/38.10
Vertical rack space	
(inches/centimeters)	6.25/15.88
Rack depth (inches/centimeters)	14.00/35.56
Weight (pounds/kilograms)	24/11

Environmental Specifications

Operating temperature	50° F to 113° F (10° C to 45° C)
Temperature variation	18° F (10° C) per hour (no condensation)
Operating relative humidity (no condensation)	10% to 80% R.H.
Operating altitude	-1,000 to +10,000 feet (-305 to 3,050 meters)
Operating vibration	0.1 G (5 cps linear increase to 100 cps)
Non-operating temperature	-40° F to 140° F (-40° C to 60° C)
Non-operating relative humidity (no condensation)	10% to 80% R.H.
Non-operating vibration	1.0 G (10 cps linear increase to 100 cps)
Non-operating shock	5.0 G for 5 ms duration

10 Megabyte Drive Specifications

Operational Specifications

Number of platters	2
Number of data surfaces	3
Number of tracks per surface	418 (354 data, 4 diagnostic, 60 guardband)
Bytes per track (formatted)	10,240
Bytes per sector (formatted)	512
Bytes per drive (formatted)	10.7 Mb
Track density	300 TPI
Bit density	5,868 BPI
Rotational Speed	3,600 RPM + 1%
Average Latency	8.33 ms
Single track access time	10 ms
Average access time	50 ms
Maximum access time	100 ms
Data transfer rate (to internal controller RAM)	648 KB/S-(5.1 Mega HZ Clock Rate)
Recording code	MFM
Heads per surface	1
Data heads	3
Servo head	1
Start time	30 seconds (maximum)
Stop time	15 seconds (maximum)

Physical Dimensions

Height (inches/centimeters)	6.375/16.19
Width (inches/centimeters)	14.50/36.83
Length (inches/centimeters)	23.00/58.42
Vertical Rack Space (inches/centimeters)	7.25/18.42
Rack Depth (inches/centimeters)	21.50/54.61
Weight (pounds/kilograms)	48/22

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Environmental Specifications

Operating Temperature	+50° F to 120° F (10° C to 50° C)
Operating Relative Humidity (no condensation)	20% to 80% R.H
Operating Altitude	-1,000 to +10,000 feet
Non Operating Temperature	-40° F to 140° F (-40° C to 60° C)
Non Operating Relative Humidity (no condensation)	10% to 90% R.H.
Temperature Variation	18° F (10° C) per hour (no condensation)
Operating Vibration	0.1 G (5 cps linear increase to 100 cps)
Non Operating Vibration	1.0 G (2 cps linear increase to 100 cps)
Non Operating Shock	5.0 G for 5 ms duration

20 Megabyte Drive Specifications

Operational Specifications

Number of platters	3
Number of data surfaces	5
Number of tracks per surface	448 (384 data, 4 diagnostic, 60 guardband)
Bytes per track (formatted)	10,240
Bytes per sector (formatted)	512
Bytes per drive (formatted)	19.6 Mb
Track density	300 TPI
Bit density	5,868 BPI
Rotational Speed	3,600 RPM + 1%
Average Latency	8.33 ms
Single track access time	10 ms
Average access time	50 ms
Maximum access time	100 ms
Data transfer rate (to internal controller RAM)	648 KB/S-(5.1 Mega HZ Clock Rate)
Recording code	MFM
Heads per surface	1
Data heads	5
Servo head	1
Start time	30 seconds (maximum)
Stop time	15 seconds (maximum)

Physical Dimensions


Height (inches/centimeters)	6.375/16.19
Width (inches/centimeters)	14.50/36.83
Length (inches/centimeters)	23.00/58.42
Vertical Rack Space (inches/centimeters)	7.25/18.42
Rack Depth (inches/centimeters)	21.50/54.61
Weight (pounds/kilograms)	48/22

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Environmental Specifications

Operating Temperature	+50° F to 120° F (10° C to 50° C)
Operating Relative Humidity (no condensation)	20% to 80% R.H
Operating Altitude	-1,000 to +10,000 feet
Non Operating Temperature	-40 F° to 140° F (-40° C to 60° C)
Non Operating Relative Humidity (no condensation)	10% to 90% R.H.
Temperature Variation	18° F (10° C) per hour (no condensation)
Operating Vibration	0.1 G (5 cps linear increase to 100 cps)
Non Operating Vibration	1.0 G (2 cps linear increase to 100 cps)
Non Operating Shock	5.0 G for 5 ms duration

Introduction to the Corvus Mirror




The Corvus Mirror is an inexpensive interface that adds the ability to provide backup and archival storage for present hardware and software—all programs and peripherals that work on your present computer and Corvus disk will work with the Mirror installed.

The Mirror is an innovative device combining the intelligence of the Corvus Disk Controller with a data formatting interface that converts data from a digital signal on the disk to a video signal that can be recorded with any standard video cassette recorder. Our intelligent Controller uses a Z-80 microprocessor and 16 kilobytes of random access memory to provide a high performance, intelligent interface.

The Mirror allows over 70 megabytes of storage on an inexpensive, removable, and transportable media, which is a video cassette tape. Information transfers many times faster than a floppy system. The actual bit recording rate is well within the ability of the tape and recorder. And, the Mirror is accurate.

Redundancy and CRC error detection insure the ability to recover data. Because of redundancy and built in error checking, it is possible to recover data reliably even when it encounters errors that could not be recovered on conventional tape storage media. The result is reliable backup and mass storage.




A six hour video cassette can store approximately 70 megabytes of formatted data. With time allowed to do disk accesses, the effective capacity is either 110 or 80 megabytes.

In approximately fifteen minutes, the contents of an entire ten million byte disk can be transferred onto a standard video cassette.

Plus, Corvus supplies well-engineered, friendly utility programs that allow you to quickly and easily manipulate large amounts of data.

The following are the main features of the Corvus Mirror System.

- Capacity — 70 megabytes (formatted)
- Small media size
- Less than 3 watts power dissipation
- All dc power supplied by the Corvus Disk



The mean time between failures is calculated to exceed 25,000 hours (interface). The mean time to repair will not exceed 0.5 hours. There is no preventive maintenance required for the Corvus Mirror interface, other than to follow the directions set out in this manual. Consult manufacturer's directions as to service procedures required for your VCR.

Mirror Specifications

Operational Specifications

Video formats	NTSC, PAL, or Secam non-interlaced
Bytes per video field (unformatted)	1310
Burst data transfer rate	1.1 megabaud
Effective data transfer rate	17 kilobytes/sec. (fast mode) 12 kilobytes/sec. (normal mode)
Bit density	3,000 BPI
Recording Code	start/stop
Error checking	CRC-16
Error correction	Redundancy, comparison and rechecking
Format	quad-redundant

Physical Dimensions

Height (inches/centimeters)	2.75/6.99
Width (inches/centimeters)	7.5/19.05
Length (inches/centimeters)	13.25/33.66
Weight (pounds/kilograms)	3/1.36

Environmental Specifications

Operating Temperature	+50° F to +120° F (+10° C to +50° C)
Operating Relative Humidity (no condensation)	20 % to 80 % R.H.
Operating Altitude	-1,000 to +10,000 feet
Non-Operating Temperature	-40° F to +140° F (-40° C to +60° C)
Non-Operating Relativity Humidity (no condensation)	10 % to 90 % R.H.
Temperature Variation	+18° F (+10° C) per hour (no condensation)

Introduction to the Corvus Networks

The micro-electronics revolution has reduced the cost of processors —and the cost of the computations they perform— faster than the cost of mass storage and data communications. Consequently, many personal computer applications are limited by inadequate data storage and data communications. Computer networks can alleviate this mismatch by allowing processors to share facilities and communicate with each other interactively.

Corvus OMNINET Network

The Corvus Omninet local network is a CSMA (Carrier-Sense-Multiple-Access) serial network for microcomputers with many of the features and capabilities of Ethernet and other large system networks. It utilizes an RS-422 twisted pair of wires up to 4,000 feet in length to transfer data at the rate of one million bits per second.

Each microcomputer attached to the Omninet local network contains a Corvus designed interface controller called a Transporter. It transfers and receives data with minimal host software intervention and performs all network management functions. A separate network controller is not required. The Transporter interfaces directly to the serial RS-422 network and to the host microcomputer's memory.

Omninet is a shared access local network. It allows any of the up to 64 network devices to use the network to transfer data without interfacing with each other. To avoid collisions on the network, Omninet utilizes the state-of-the-art CSMA mechanism to ensure the line is available before a device utilizes the network.

The Omninet local network supports a shared data medium. By means of a Corvus Disk Server, one or more Winchester disk subsystems with up to four twenty megabyte drives can be shared by all the microcomputers on the Omninet local network. By attaching more disk subsystems via disk servers, additional storage can be included.

Corvus Multiplexer Network

A second Corvus network, which has an established user base of over 1,000 systems, is called the Corvus Multiplexer. The Corvus Multiplexer is a star network structure surrounding a central data storage device. It gives the low cost microcomputer direct access to a large shared data medium.

A Winchester disk subsystem with up to eighty megabytes (four twenty megabyte drives) is the shared data storage medium for the Corvus Multiplexer network system. The Multiplexer system allows up to sixty-four microcomputers to have direct high speed access to the disk subsystem. The computers are connected in a star configuration: the center of the star

is the host multiplexer. This central node contains hardware that polls up to eight computers in a round robin fashion. For larger networks, a central master multiplexer is connected to eight host multiplexers, each of which can be connected to eight host computers, forming a network of up to 64 computers.

Every computer in the multiplexer network can be active and no dedicated computer is required to control the system. The hardware system allows each computer to access the entire central disk system as if it were the only computer attached to the disk. Communication between computers can be performed by using store and forward techniques that send messages through the shared data medium.

Constellation Software


The Constellation software is available for either Corvus network system: Omninet or the Corvus Multiplexer. It supports several simple, flexible schemes that allow users to share the disk. The Constellation software manages the shared medium, and prevents the computers from unintentionally using the same area of the disk.

The Constellation software allows each computer to use its own native operating system without modification. A typical operating system is a single user, file oriented system, such as DOS 3.3 or UCSD Pascal. Each native operating system interfaces through a special I/O driver. The Constellation software comes with an I/O driver for every supported operating system. This I/O driver appears to the operating system as a system disk and contains a table of areas on the disk that its computer is allowed to access. Each area is called a volume and usually contains a file directory. The Constellation access table also contains a flag for each volume to indicate if the computer can write to the volume or has read-only access.

The method used on the Apple for controlling access to volumes is the Users Table. This is a special file that contains information as to which volumes a user can access. One user is called the System Manager. This is the only user who can change the privileges of other users. When the computer boots, a log-on program checks the user's identity and if valid, gives the user the access rights specified by the user's access table.

One of the volumes that can be read by all computers is called a system volume. This usually contains all the common programs and utilities such as text editors, compilers, etc. Each computer can have personal volumes that are referenced only by a particular user. The user can have read and write access to these personal volumes. Shared volumes are available in a read-write fashion to more than one computer. Uncontrolled use of these areas can be dangerous, as all computers with access can write to an area at the same time. Corvus allows you to control access to these shared areas through the use of semaphores.


Semaphores



The Constellation software provides Semaphores, which are used to control access to shared volumes. Volumes that are shared in a read-write manner by more than one computer should be accessed only by programs that use semaphores or some other user defined access scheme. Semaphores are eight character labels maintained by the disk controller. Each computer may ask to lock a semaphore at any time. The request is granted only if no other computer has the semaphore locked. The label for the semaphore is any eight character name agreed upon by the programs that share access.

Pipes


Quite often two microcomputers wish to communicate directly with each other in a simple serial fashion. The Constellation software provides data paths, called pipes, between computers. These pipes provide a simple means of implementing peripheral spooling. The sending computer writes data into the input end of the pipe and the receiving computer reads the data from the output end. The pipe is actually a buffer that is maintained in an assigned area of the disk and managed by the disk controller.



Since the data is stored on the disk, the two computers can proceed in a totally asynchronous manner.

Expansion

Because the single processor systems use the same hardware and software as the Corvus network system, several microcomputers can be upgraded to provide network capabilities by simply adding a host multiplexer or an Omninet Disk Server and Transporters. Corvus networks hold great promise in helping the personal computer grow into large scale data processing applications.



Multiplexer Specifications

Primary features of the Corvus Multiplexer system are:

- Capacity of up to 80 Mbytes
- Less than 1 watt power dissipation (Multiplexer interface)
- Sharing of the disk by up to 64 computers

Reliability

The Mean Time Between Failures is calculated to exceed 25,000 hours. The Mean Time To Repair does not exceed 0.5 hours. There is no preventative maintenance required on the Corvus Multiplexers.

Physical Dimensions

Height (inches/centimeters)	2.75/6.99
Width (inches/centimeters)	7.5/19.05
Length (inches/centimeters)	13.25/33.66
Weight (pounds/kilograms)	5/2.27
Link Lengths (feet/ meters)	50/15.24

Operational

Burst Data Transfer Rate	60 Kbytes
Maximum Users	64
Number of Semaphores	32 active
Keysize	8 bytes
Timeslot Attributes	
max transactions	30
required response to maintain link	<50 Usec
max time between bytes (timeout)	4 seconds round robin polling

Environmental

Operating Temperature	+50° F to 120° F (10° C to 50° C)
Operating Relative Humidity (no condensation)	20% to 80% R.H.
Operating Altitude	-1,000 to +10,000 feet
Non-Operating Temperature	-40° F to 140° F (-40° C to 60° C)
Non-Operating Relative Humidity (no condensation)	10% to 90% R.H.
Temperature Variation	18° F (10° C) per hour (no condensation)

Background

The first step in setting up any computer system is to examine its projected uses in relation to its potential applications. Once you have an idea of what the system will be and do, you can organize the layout of the hard disk.

Before carrying out the instructions in this manual, we strongly suggest that you become familiar with the operation of both the Corvus drive and your computer.

Vast quantities of hardware and software are ruined annually because people do not take the time to do the necessary reading. We urge you to make certain that you have read the applicable computer manuals and that you are certain that you are familiar with the operating language of your system.

Conventions

The following conventions are important aids for understanding this manual.

Brackets and Command Keys

Angle brackets < > indicate certain special keys. <ctrl>, <return>, <esc> and <reset> are the most common. The function of the <return> key is equivalent to the function of the <enter> key on some systems.

In this manual, when you see a prompt followed by <return>, press the <return> key in response to the prompt.

When a command such as F(ile or R(emove is mentioned, here is what you do. Look at the menu displayed on your screen. Select the command. Type the first letter of that command—i.e. the letter that is displayed to the left of the parenthesis in the word.

Prompt

When the computer prompts you for an input, this manual will show both the prompt and the appropriate response. For example, if the computer asks

TRANSFER ?

Chap1

The screen cursor sits after the ?, waiting for your response. One response might be

```
MYDISK:EXTRA.DATA,SPARE:$
```

This manual will show

```
TRANSFER ? MYDISK:EXTRA.DATA,SPARE:$
```

The prompt will be on a black background and the response will be beside it on a white background.

Symbols

WARNING

THIS SYMBOL INDICATES A WARNING. IT REMINDS YOU TO BE EXTRA CAREFUL. FAILURE TO FOLLOW THE CAUTIONARY INSTRUCTIONS THAT ARE WITHIN THE BOX NEXT TO THE WARNING SYMBOL COULD CAUSE DAMAGE TO YOUR COMPUTER, CORVUS DISK, MIRROR, MULTIPLEXER, DISK SERVER, OR TRANSPORTER. IT COULD CAUSE YOU TO LOSE DATA, START OVER, AND GNASH YOUR TEETH.

► **This symbol indicates information that deserves extra attention.**



POWER OFF !

This symbol acts as a reminder to you to turn off your computer, your Corvus disk, or both. It is absolutely essential that they be powered down any time you remove or install any circuit card or cable. A good rule of thumb is: before any additions to, or subtractions from, the system, **TURN IT OFF.**

When you power down, always turn the drive off before you turn your computer off. This prevents your computer — when being powered down — from accidentally scrambling information on the disk.

Some Terms



Block

A block is 512 bytes (4K bits).

Cassette

A video tape cassette of VHS or Beta format is the data storage media of the Mirror. Corvus recommends the use of professional grade VHS format tape for best results.

Default

When default is mentioned in this manual, it means an option assumed automatically if no other specific parameter is explicitly stated.

The default mount table is a list of mounted volumes that are set to be automatically accessible at the time your computer is booted.

Disk

When we refer to disk, drive, disk drive, or Corvus drive we always mean the disk drive that is the heart of your Corvus mass storage system.



Floppy

When this manual refers to floppies we are using the common term for what others may call diskettes. And when we say floppy drive, we are referring to a diskette drive.


Initialize

Initializing is a necessary step in preparing the Corvus disk system. Initialization generates system information on specific areas of the disk which allows the system to cold boot as well as receive data.

Platter

Platters are the flat, circular, magnetic medium contained in the drive enclosure and used for data storage.

Physical drive



Physical drive refers to the entire available recording area contained on the disk platters.

Mount

Mount means to associate a volume with a unit. Floppies are physically mounted by placing a floppy (the volume) in a drive (the unit).

Chap1

Corvus Pascal volumes are mounted by a program (the Volume manager), since there are only six logical device units and, in most cases, many more than six volumes on the drive.

Multiplexer

A multiplexer is an electronic circuit that allows two or more signals to share the use of a single channel or wire for transmission to a distant point. The Corvus Multiplexer allows several computers to share the same disk by collecting the input transmissions from these computers and then connecting the input channel to the output channel.

Sector

A sector is 256 bytes (2K bits) or half a block.

VCR

VCR refers to a video cassette recorder.

Version

When each utility is run or executed a heading along with a version number appears. This manual uses xx.xx for the current version number. Version numbers of different Corvus utility diskettes may vary, yet the functions of each utility remain the same.

Virtual drive

A virtual drive is a software emulation within the Corvus controller that gives the illusion of multiple physical drives to the computer attached to the Corvus drive.

Volume

In Pascal when we say volume we mean a block structured device—specifically, a set of files with a directory, recorded on a floppy or on the Corvus disk. A volume can be any size in multiples of eight blocks.

In BASIC, a volume implies a fixed unit of disk area equivalent in size to a standard diskette. All volumes are the same size.

Unit

A unit is a logical device number used to denote accessibility.

In pascal units 4,5,9,10,11, and 12 are used for mounting floppy drives and volumes on the Corvus disk.

In BASIC, a volume number is used for gaining access to BASIC volumes on the Corvus disk.

Cautions

These suggestions will help you protect your computer and your Corvus drive from damage.

Power Off

Always turn off, or better still, unplug both your computer and your drive when inserting or removing any cables or circuit cards. If you forget, you may permanently damage your computer or your drive.

Remember, when you see



POWER OFF

turn off or unplug your computer.

We tell you to power off because when you remove or replace a card or a cable, one or two pins may connect before the others. The circuit was not designed to operate that way and it is possible that an illegal voltage may be applied to the circuit or that the circuit may power up in an unusual state. It is quite possible that these conditions could destroy portions of your computer, requiring extensive and expensive repair.

Handling the Corvus Disk Drive

Although the Corvus disk drive is considerably more durable than a floppy drive, it can be damaged. Here is how to avoid damaging it.

- The drive needs cooling. Don't put it in a box, drawer, or sealed cabinet without adequate ventilation. Do not obstruct the airflow slots with loose papers or other objects.
- The upper housing of the drive is sealed shut to avoid dust problems. Do not attempt to open the black disk drive box and do not remove the stickers that are labeled, "Warranty Void If Seal Broken." The stickers keep the air seals intact and keep dust out. If the stickers are removed, the warranty is void.
- Keep the drive away from magnetic fields. Magnetic fields can erase the information on the drive.
- All switches on the drive cabinet front panel must be kept at the correct setting for your system.

Handling Floppy Disks

For the proper care of diskettes, the following are important cautions.

- Keep away from magnetic fields and temperature extremes. In particular, keep them away from the Corvus drive and its power supply.
- Never, never touch the floppy's magnetic surface.
- If you write on a label that is already on the floppy, never use a ball point pen or a pencil. Use only a soft tipped pen and don't press hard.
- Keep the floppy disk clean.
- Do not leave the floppy disk laying around out of its protective envelope. The various elements within a working environment (dust, coffee, staplers etc.) can destroy the naked floppy. Store your floppies in safe places.

Handling Flat Cables and Connectors

- Flat cables and connectors are not meant to perform great feats of strength. When you run cables, avoid unnecessarily stressing the cable or the connector.
- When you place cables, avoid placing them on the floor where people are expected to walk.
- Order and use cables of the appropriate length. Do not use a 50 foot cable to connect to a computer that is next to the disk.
- If you find yourself with extra flat cable, gather it into an accordion fold. Do not roll it into a coil. Even though this would make for a neater appearance, it creates an inductor or choke coil. This will adversely affect performance. It is much better to accordion fold the cable or just leave it in a wad.
- A periodic inspection of all cables will help to keep your system running smoothly and trouble free. Cables should always have a snug connection.

Installation

Chapter Two

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Checklist

This chapter covers the hardware configuration procedures for the various Corvus products.

- For ALL disk and network systems, read and follow the instructions in the section titled 'How to Set Up a Corvus Disk System.'
- If you ordered a stand-alone Mirror, connect the Mirror to your system by following the instructions in the section titled 'Connecting a Mirror to a Disk.'
- If you ordered a single user system, connect the drive to your computer following the instructions in the section titled 'Connecting a Disk to a Single Computer.'
- For Multiplexer systems:
 - 1) if you are upgrading from a single user system, READ the section titled 'Connecting the Disk to a Multiplexer', then configure your software before following the hardware installation procedures.
 - 2) if you are setting up a Multiplexer network from an uninitialized disk set up your hardware according to the section titled 'Connecting a Disk to a Multiplexer System', then configure your software.
- For Omninet systems:
 - 1) if you are upgrading from a single user system, READ the section titled 'Connecting the Disk to Omninet', then configure your software before following the hardware installation procedures.
 - 2) if you are setting up an Omninet on an uninitialized disk, set up your hardware as described in the section titled 'Connecting a Disk to Omninet', then configure your software.
 - 3) if you are upgrading from a Multiplexer system set up your hardware as described in the section titled 'Connecting a Disk to Omninet' then replace all your old utilities.

Chapter Two

Hardware Installation

How to Set-up a Corvus Disk System

Installing your Corvus drive is not difficult, but it is very important that you follow the directions. Please resist the temptation to just plug it all in — the result could be damaged hardware.

► **IN ORDER TO BE SURE THE CONNECTIONS YOU MAKE ARE CORRECT, TAKE SPECIAL NOTICE OF THE POSITIONING OF THE COLORED STRIPES ON THE FLAT CABLES IN THE PICTURES AND DIAGRAMS IN THIS CHAPTER.**

Unpacking and Parts

Carefully unpack the installation package and check for shipping damage. Retain all packing material and receipts in the event that any claims for shipping damage are filed. All damage claims should be filed promptly with the transportation company.

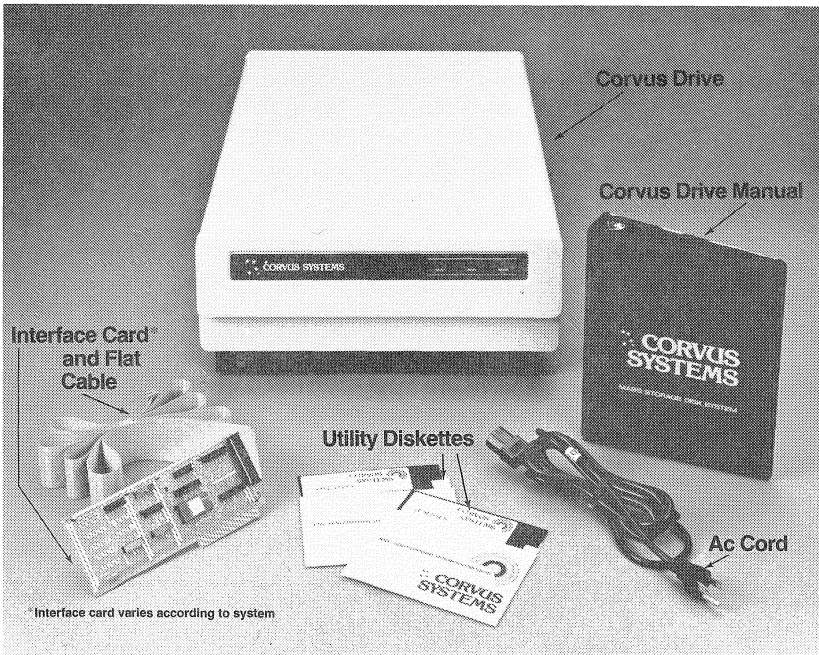


FIGURE 2.1 CORVUS DISK SYSTEM PACKAGE

Your Corvus Disk System comes in two boxes and consists of the following items (see figure 2.1).

- Disk drive with power supply
- Flat cable
- Interface card
- ac cable
- Corvus utilities diskettes
- The Corvus Disk System Manual
- Warranty Card

You will also need a computer, a diskette drive, and the operating system diskettes that come with your particular computer.

Drive Features

Indicator Lights

There are three red indicator lights on the upper right hand corner of the drive cabinet front panel. These are labeled Fault, Busy, and Ready (see figure 2.2).

To the left is the Fault light. When lit, this light indicates an error in operation — such as a read error, write error, hard error, soft error, or a command that cannot be carried out.

The center light, labeled Busy, blinks when the drive is active. If your Format switch is set to the normal position, the busy light flickers and then goes off when you power on or reset.

To your right is the Ready light. It indicates the drive is ready to be used. When you power on, all three lights come on. Then the Fault and Busy lights go off and the Ready light stays on. When your drive is ready, only the Ready light stays on. The Ready light is dimmer when the Mux switch (see below) is set to the Constellation setting.

Switches

Approximately two inches below the indicator lights, the front panel protrudes slightly. Directly beneath the lights, and up under the lip of the protrusion, are four switches labeled from left to right; LSI-11, MUX, FORMAT, and RESET. When you look straight on at the front of the drive case, these switches are not visible (see figures 2.2 and 2.3).

If an LSI-11 is attached to the drive, the LSI-11 switch is put in the LSI-11 position. Otherwise, it remains in the Normal position, which is the case for all Apple computers (see figure 2.3)

The MUX switch is set to the Constellation position only when a Multiplexer is attached to the system. Otherwise, it remains at the Single setting (see figure 2.3).

When using the F(ormat option of the Diagnostic program described in Chapter Five, the FORMAT switch is put in the Format position. Otherwise, it is left at the normal setting (see figure 2.3).

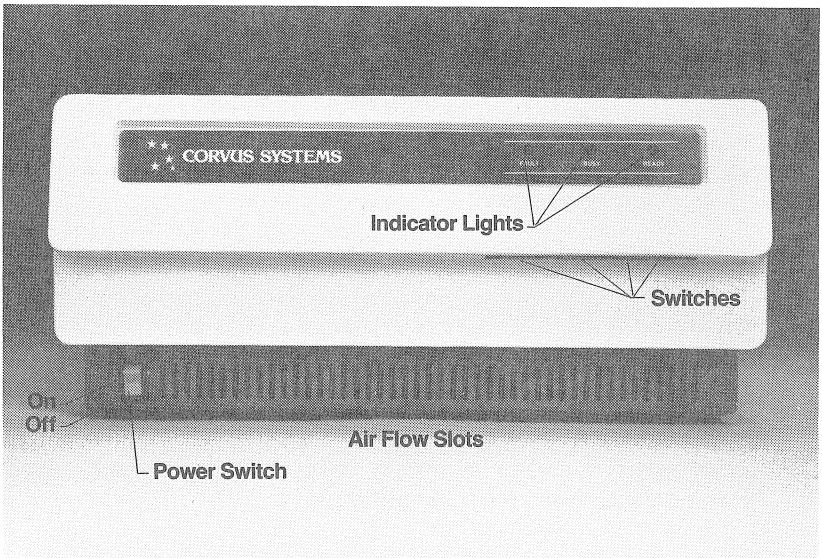


FIGURE 2.2 FRONT PANEL SWITCHES

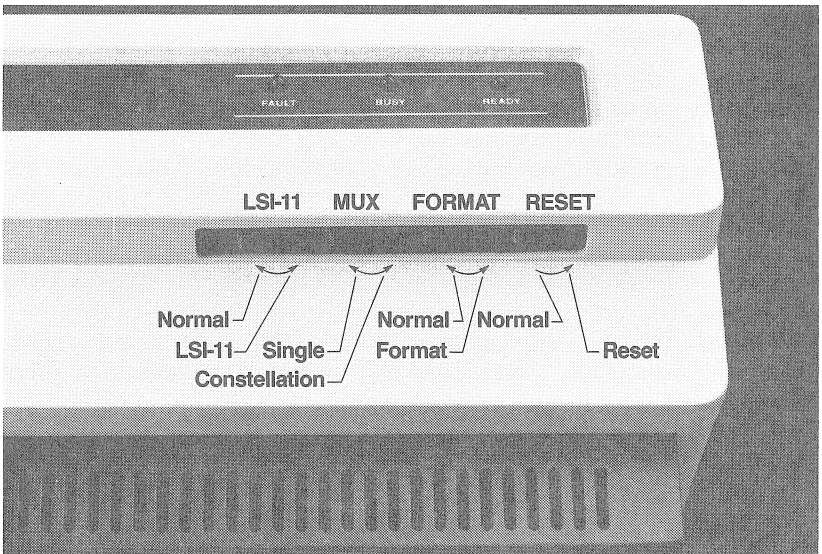


FIGURE 2.3 DISK SYSTEM CABINET FRONT PANEL (5, 10 OR 20 MB)

RESET momentarily reset the drive (see figure 2.3).

On the lower left corner of the drive cabinet front of the 10 and 20 MB models, you will find the power switch. On the 5 MB model, the power switch is located in the lower right hand corner of the back panel. A power switch has two positions: upper part depressed is ON, lower part depressed is OFF (see figures 2.2 and 2.4).

Mirror Dip Switch (5 MB only)

A Corvus 5 megabyte drive has four (4) microswitches which are used to set up the self contained Mirror (see figure 2.4). If the drive does not have a self-contained Mirror, all four switches are placed in the closed position.

▶ A SWITCH IS PLACED IN THE OPEN POSITION BY DEPRESSING THE LOWER PART OF THE SWITCH. A SWITCH IS PLACED IN THE CLOSED POSITION BY DEPRESSING THE UPPER PART OF THE SWITCH.

If the drive contains an internal NTSC type Mirror (U.S. delivery), all four switches are placed in the open position. If the drive contains an internal PAL/SECAM type Mirror (European delivery), the number one switch is placed in the closed position and the number two, three, and four switches are placed in the open position.

Video Connectors

On the bottom left side of the back panel of 10 and 20 megabyte drives and on the top right side of the back panel of 5 megabyte drives, there are two video connectors (see figures 2.4 and 2.5). They are used to connect a video tape recorder if you have a self-contained Mirror connected to your system.

The top connector is labeled IN. This means video in or the input to the disk system. It connects to the video OUT cable from the video recorder.

The lower connector is labeled OUT. This means the output from the disk system. It connects to the video IN cable from the video recorder.

A flat cable connector, labeled VCR REMOTE, is directly to the right of the video connectors. This connector is used to connect to a remote control cable from a video tape recorder.

Computer and Drive Connectors

Near the bottom center of the drive cabinet back panel of 10 and 20 megabyte drives, there are two flat cable connectors (see figures 2.4 and 2.5). The top one, labeled Processor, connects to the flat cable leading to your interface card, multiplexer, or disk server. The lower one, labeled Drive, connects to the flat cable leading to an add-on Corvus drive (if you have an add-on drive).

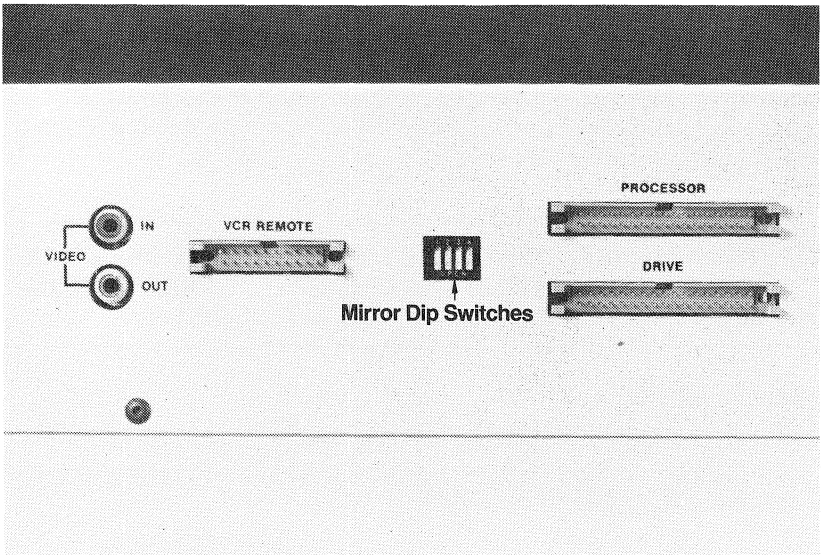


FIGURE 2.4 5 MEGABYTE DRIVE BACK PANEL

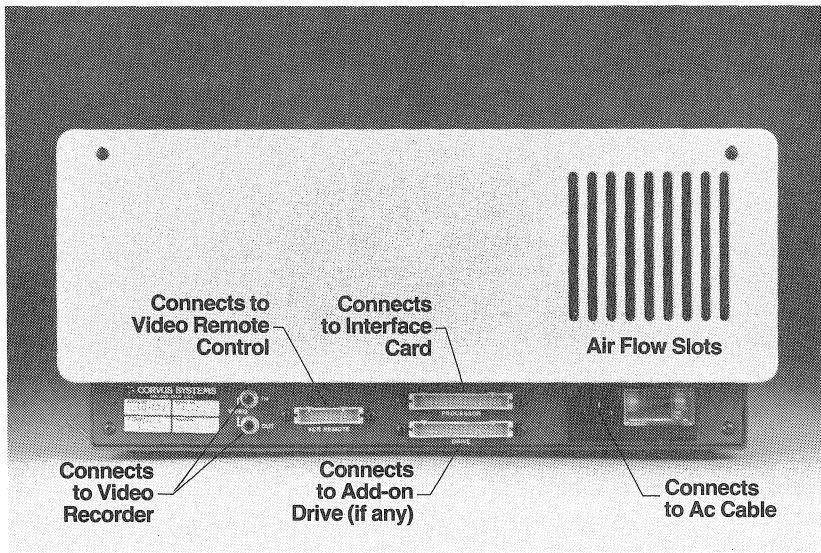


FIGURE 2.5 10 OR 20 MEGABYTE DISK SYSTEM CABINET BACK PANEL

Both of these connectors should only be connected with the cables leading down and away from the drive (see figures 2.6 and 2.7). When facing the drive cabinet back panel, the colored stripe should be to your right. To safeguard your drive's hardware, do not try to force a cable to connect in any other way.

WARNING

IT IS POSSIBLE TO CONNECT THE CABLE INCORRECTLY. PLEASE GO SLOW AND TAKE CARE TO CORRECTLY CONNECT THE CABLE (AS DEPICTED IN FIGURE 2.6).

ac Connector

To the bottom right of the back panel on all drive models, there is the ac cord connector and fuse (see figures 2.4 and 2.5). You have a voltage option of 110V, 120v, 220v or 240v.

WARNING

THE VOLTAGE SETTING, FUSE, AND LOCAL VOLTAGE MUST MATCH. ANY TYPE OF MISMATCH HERE WILL CAUSE DAMAGE TO YOUR DRIVE HARDWARE.

To change voltage, you change to the proper fuse and flip the small circuit board as follows (see figure 2.8).

Open the cover door, rotate the fuse-pull to the left, and remove the fuse.

Select the operating voltage by orienting the PC Board to position the desired voltage on the top left side. Push the board firmly into the module slot.

Rotate the fuse-pull back into the normal position and insert a fuse into the holders. If you have chosen a voltage setting different from the original setting when you received the drive, do not re-insert the fuse you removed. Please use caution to select the correct fuse value. For eight inch drives, a4 Amp fuse is used with 110 or 120 volt systems. For eight inch drives, a2 Amp fuse is used with 220 and 240 volt systems. For five inch drives, the fuse values are 2 and 1, respectively.

The Corvus Disk Server enclosure and Multiplexer enclosure also use this same type of ac connector. The fuse values for these devices are: .5 amp fuse for 110 or 120 volt systems and .25 amp fuse for 220 or 240 volt systems.

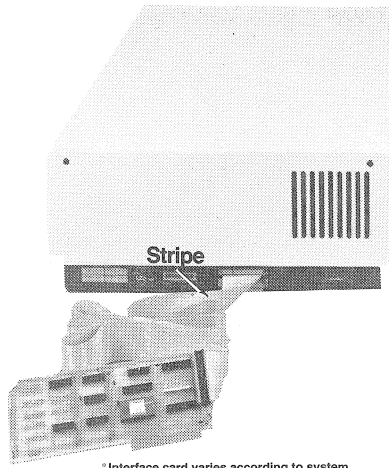


FIGURE 2.6 PROPERLY CONNECTED DRIVE

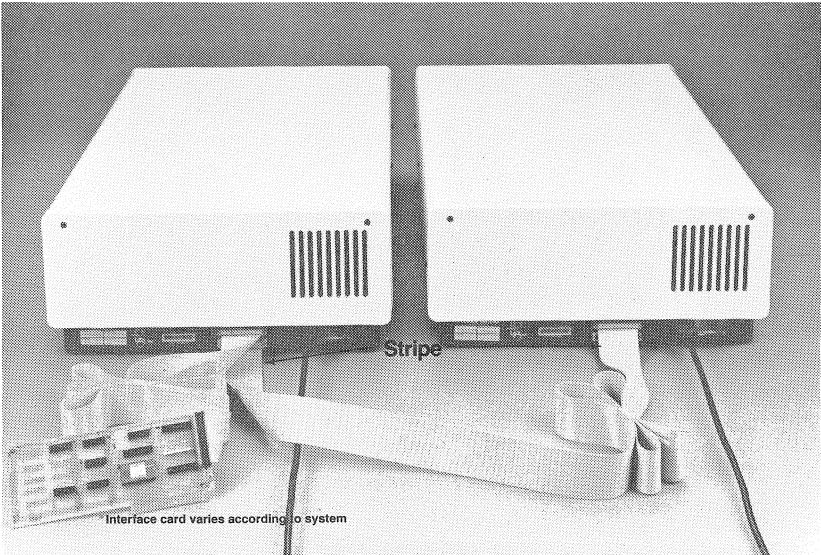


FIGURE 2.7 PROPERLY CONNECTED ADD-ON DRIVE

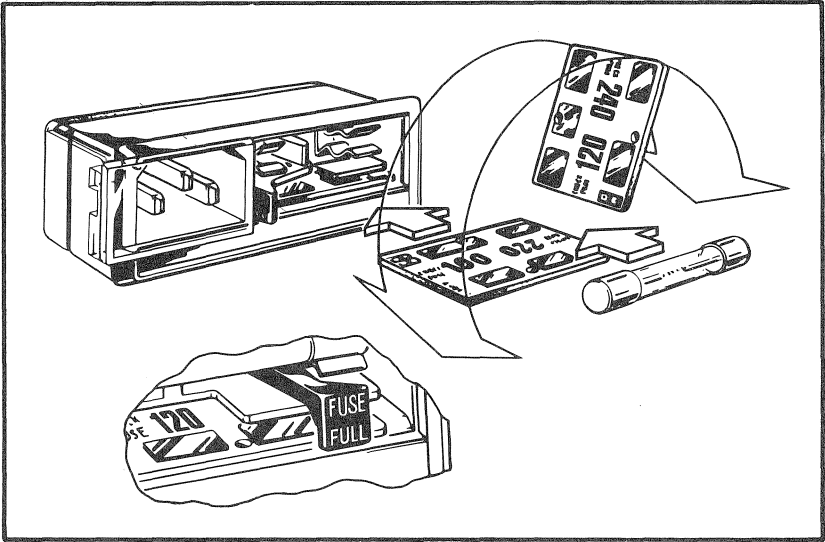


FIGURE 2.8 VOLTAGE SELECTION

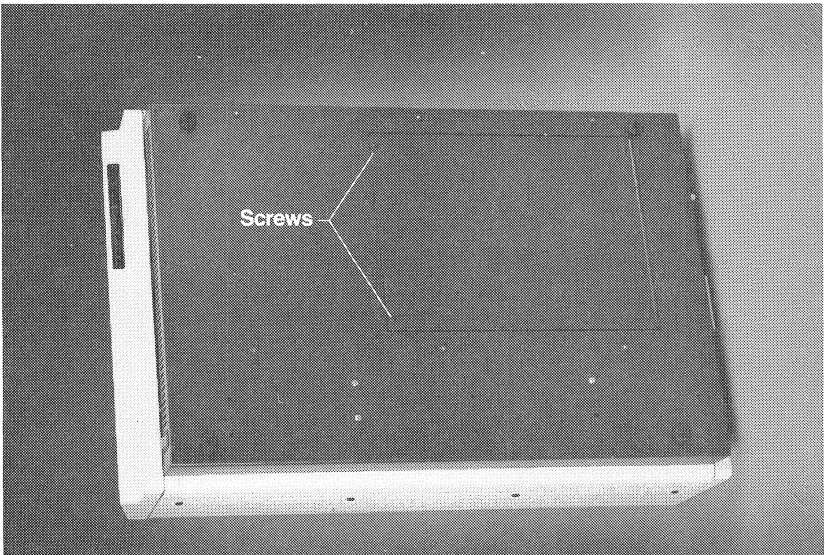


FIGURE 2.9 SERVICE DOOR

Service Door (10 and 20 MB drives only)

Underneath the drive cabinet, there is a hinged door (see figure 2.9). This door allows access to the circuit boards underneath the drive. The drive cabinet was also designed to contain the Mirror just inside the service door.

Power On Sequence

When powering up your system, always turn on the computer first. Then turn on the Corvus Drive. If you have more than one drive, power the drives up in the reverse order from which they are connected — i.e. the last drive connected is the first to be powered up. When additional devices are connected, such as a Disk Server, a Multiplexer, or Mirror, all devices are turned on before the drive.

When the system is powered down, always turn off power to the drive first.



IF YOU HAVE YOUR COMPUTER AND DRIVE(S) CONNECTED TO ONE POWER STRIP, DO NOT USE A MASTER SWITCH TO POWER THEM UP AND DOWN IN UNISON. FOR SINGLE-USER SYSTEMS, ALWAYS FOLLOW THE POWER ON SEQUENCE ABOVE. FOR NETWORK SYSTEMS, THE POWER ON SEQUENCE APPLIES ONLY TO THE INITIAL POWER UP.

Installation and Checkout

Place the disk unit on a flat surface either on its side or on its base. Never operate the unit upside down or with the long direction at an incline. Protect the disk unit from electromagnetic fields. Never place the power cord or other electromagnetic field generating equipment on top of the disk unit.

1. Set the front panel switches to the appropriate settings. At this point all switches should be set to the left position.
2. Verify that the voltage setting matches the local voltage. Make sure the power supply is set for the proper line voltage. Failure to do so may damage the unit. The disk works with either 50 or 60 Hertz power.

WARNING

THE VOLTAGE SETTING, FUSE, AND LOCAL VOLTAGE MUST MATCH. ANY TYPE OF MISMATCH HERE WILL CAUSE DAMAGE TO THE DISK SYSTEM HARDWARE.

To change the voltage setting see the preceding section titled 'ac Connector.'

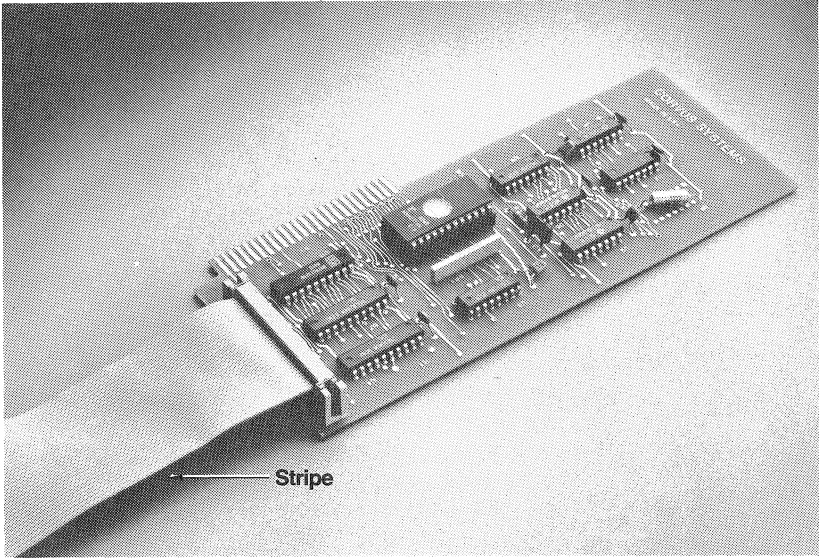


FIGURE 2.10 FLAT CABLE CONNECTED TO INTERFACE CARD

3. Connect the ac cord to the disk unit and a power receptical.
4. Turn on the disk drive. After approximately 40 seconds, the Ready light should be on, the Busy and Fault lights off, indicating that the disk system is ready.

If after one minute the disk system is not ready, then the unit has failed its self-test. In which case, you should follow the troubleshooting procedures in Chapter Five in the section 'Firmware Update or Replacement.'

5. If you ordered a stand-alone Mirror or a self-contained Mirror, install the Mirror according to the instructions in the following section titled 'Connecting a Mirror to the Disk.'

After connecting the Mirror or if you have no Mirror, go to the appropriate section:

- for single user systems, go to the section titled 'Connecting a Disk to a Single Computer.'
- for Multiplexer systems, go to the section titled 'Connecting the Disk to a Multiplexer.'
- for Omninet systems, go to the section titled 'Connecting the Disk to an Omninet.'

Connecting a Mirror to the Disk

The Corvus Mirror is packaged in one of two configurations: self-contained within the drive cabinet or a stand-alone Mirror in its own enclosure.

The following installation procedures apply to both single-user and network systems.

If you received a self-contained Mirror, all connections between the drive and the Mirror have already been made. You need only make the connections between the drive cabinet back panel and your video cassette recorder.

Unpacking and Parts

Carefully unpack the Mirror and check for shipping damage. Retain all packing material and receipts in the event that any claims for shipping damage are filed. All damage claims should be filed promptly with the transportation company.

If you have ordered a Mirror, your Corvus Mirror installation package should include the following items.

- A mirror (if you ordered a stand-alone Mirror, it is packaged in the white Corvus Mirror enclosure)
- Phono plug cable for the VCR
- Remote option cable (if you ordered the remote option with your Mirror)
- Corvus Mirror utilities diskette. If you ordered a separately packages Mirror for an 11A Disk System or if you Corvus interface card PROM is less than version 3.0, you receive this diskette. Otherwise, Mirror utilities are on the Corvus Disk Drive Utility diskette that comes with your drive.
- Warranty Card

Installation

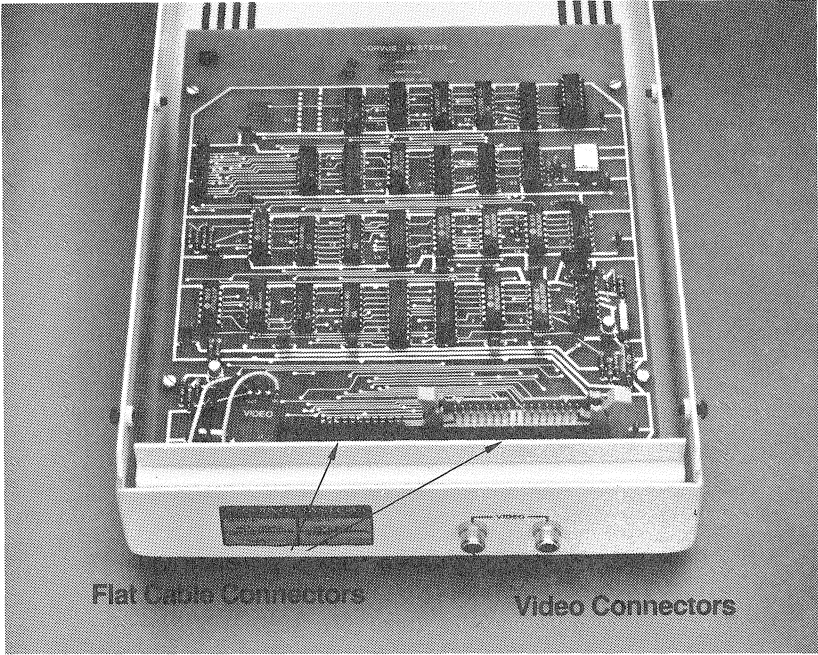
Be sure the power to both the computer and to the Corvus drive is off anytime you install or remove any circuit cards or cables. Failure to do so may cause permanent hardware damage.



POWER OFF

Self-contained Mirror

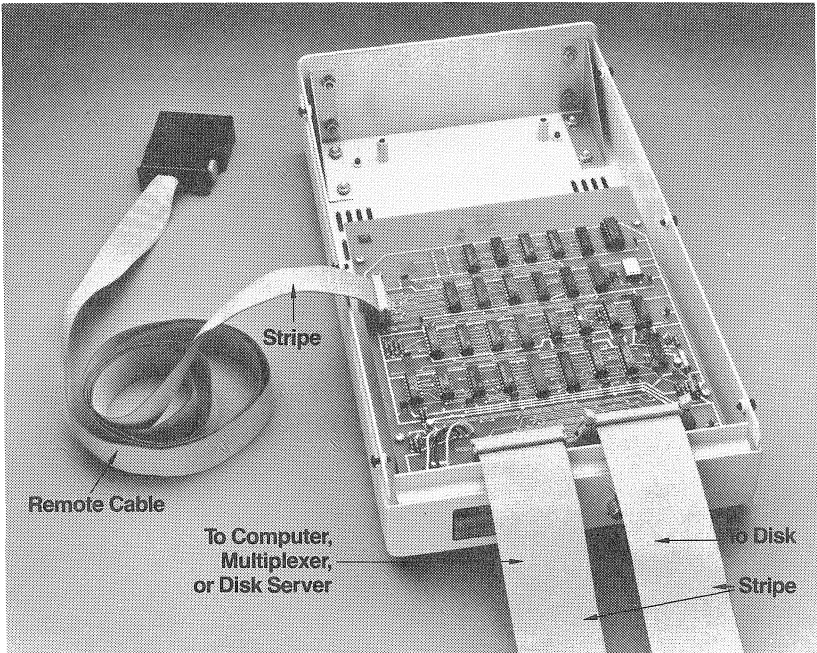
If you ordered a drive with a self-contained Mirror, the Mirror p.c. board is located inside the drive cabinet. You need only connect the video plug cable to the drive cabinet back panel and, for 5 megabyte drives, set the microswitches. For directions on how to connect your video cable, see the section below labeled 'Video Cable.'



Flat Cable Connectors

Video Connectors

FIGURE 2.11 MIRROR CONNECTORS



Remote Cable

Stripe

To Computer,
Multiplexer,
or Disk Server

To Disk

Stripe

FIGURE 2.13 MIRROR WITH FLAT
AND REMOTE CABLES CONNECTED

If you also ordered the Remote option, you must connect the Remote option flat cable to the drive cabinet back panel. For directions on how to connect your Remote cable, see the section below labeled 'Remote Option Cable.'

Stand-alone Mirror

If you have ordered a Mirror to complement an already existing Corvus system, the Mirror is packaged in its own box and must be connected to the drive with flat cable. For stand-alone Mirrors, the Mirror is connected between the Corvus disk and interface card that plugs into your computer. On network systems, it is connected between the Corvus disk and the Multiplexer or Disk Server.

This installation requires you to detach the cable that connects the drive to the interface card, Multiplexer, or Disk Server from the drive cabinet back panel and attach the free end of this cable to the Mirror interface board. The flat cable supplied with the Mirror is then connected to the drive cabinet back panel and Mirror interface board. Finally, the Mirror is connected to the VCR with the supplied phone plug cable and, if you ordered the remote option, the remote option cable.

1. To begin, remove the cover from the stand-alone Mirror enclosure.
2. There should be a flat cable connected to the connector labeled PROCESSOR on the drive cabinet back panel. The end of this cable should be attached to the disk interface card, a Multiplexer, or a Disk Server. Detach this cable from the connector labeled PROCESSOR on the drive cabinet backpanel.
3. Attach the cable that came with the Mirror to the drive cabinet backpanel to the connector labeled PROCESSOR. Attach the other end of this cable to the drive connector on the Mirror interface board (as shown in figure 2.12).
4. Connect the cable from the interface card, Multiplexer, or Disk Server to the remaining 34 pin connector on the Mirror interface board (as shown in figure 2.12).
5. If you have a 5 megabyte drive, set the microswitches on the back panel to the appropriate settings.
6. If you ordered the Remote option, connect the Remote option flat cable as described below in the section titled 'Remote Option Cable' (see figure 2.13).
7. When you are sure that the connections at the Mirror interface board are correct according to these instructions (double check), re-assemble the Mirror interface box and connect the ac cable.

Chap2

8. Proceed to the appropriate following section:
 - for single user systems, the section titled 'Connecting a Disk to a Single Computer.'
 - for multiplexer systems, the section titled 'Connecting the Disk to a Multiplexer.'
 - for Omninet systems, the section titled 'Connecting the Disk to Omninet.'

Video Cable

You received a phono plug cable with your Mirror. For self-contained Mirrors, connect this cable to the drive cabinet backpanel and to the VCR (see figure 2.12).

The VIDEO OUT connector on the Mirror box or drive cabinet back panel connects to the VIDEO IN connector on the VCR. The VIDEO IN connector on the Mirror box or drive cabinet back panel connects to the VIDEO OUT connector on the VCR.



READ THE ABOVE PARAGRAPH AGAIN

Remote Option Cable

If you ordered the Remote Option, you received a Remote Option flat cable with your Mirror.



THE REMOTE OPTION WORKS WITH ONLY A PANASONIC NV8200 VIDEO CASSETTE RECORDER.

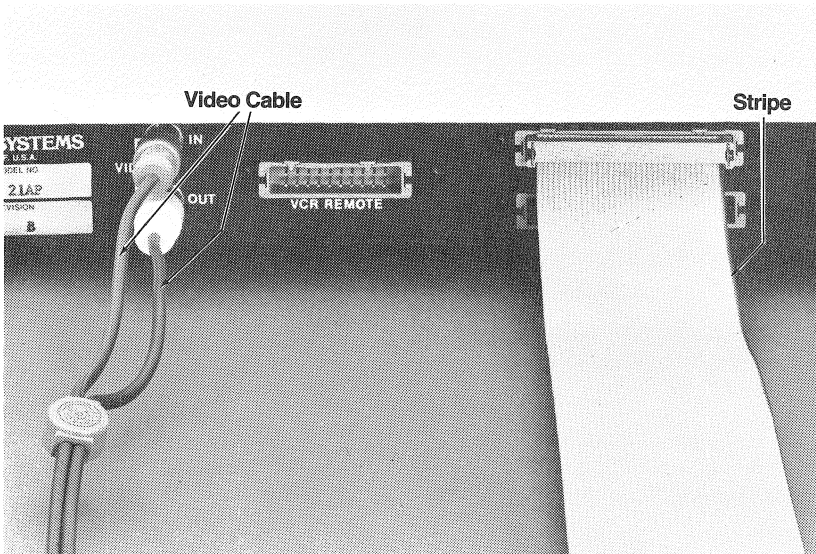


FIGURE 2.12 VIDEO CABLES CONNECTED TO DRIVE CABINET BACK PANEL

One end of this cable has a large connector. The other end of this cable has a small connector.

1. For self-contained Mirrors, the small end of the Remote Option cable attaches to connector labeled REMOTE OPTION on the drive cabinet back panel. The cable should lead down and away from the back panel the same as the other flat cables.

For stand-alone Mirrors, the small end of the Remote Option cable attaches to the Mirror p.c. board. Off to the side of the drive and processor connectors on the Mirror board is a smaller connector. The Remote Option cable connects to this connector (see figure 2.15) so that the cable leads up and away from the Mirror p.c. board. When closing the Mirror box, the cable may then be fed through one of the same openings as the other two larger cables.

2. For both stand-alone and self-contained Mirrors, the large connector end of the Remote Option cable connects to the Remote Control connector on the back of the video cassette recorder.

Connecting the Disk to a Single Computer

At this point, you have tested your drive as described in the disk set up section and ready. You are ready to connect it to your computer.

1. Be sure the power to both the computer and to the Corvus drive is off anytime you install or remove any circuit cards or cables. Failure to do so may cause permanent hardware damage.



POWER OFF

2. If you have not connected a stand-alone Mirror to your system, you must now connect the interface cable to the connector on the drive cabinet backpanel labeled PROCESSOR. The interface cable should only be connected with the cable leading down and away from the drive (as depicted in figure 2.6). When facing the drive cabinet back panel, the colored stripe should be to the right. To safeguard the drive's hardware, do not try to force a cable to connect in any other way.

3. Connect the interface cable to the interface card (see figure 2.10). The stripe on the interface cable should be up; facing away from the gold connecting fingers on the bottom of the card.

4. Next the interface card must be plugged into the computer. For Pascal initialization, the interface card initially goes into slot 2 (two) of your Apple. For BASICs initialization, the interface card goes into slot 6 (six) of your Apple.

5. Proceed to Chapter Three to initialize the Disk.

Connecting the Disk to a Multiplexer

Installing your Corvus Multiplexer is not difficult, but it is very important that you follow the directions. Please resist the temptation to just plug it all in — the result could be damaged hardware.

If you are upgrading your system from a single user system, configure your software according to Chapter Six of this manual before you follow any of the hardware installation procedures.

If you are setting up a Multiplexer system from scratch, set up your hardware according to the section titled 'Connecting a Disk to Single Computer', before configuring your software.

Unpacking and Parts

Carefully unpack the Multiplexer and check for shipping damage. Retain all packing material and receipts in the event that any claims for shipping damage are filed. All damage claims should be filed promptly with the transportation company.

Your Corvus Multiplexer installation package should include the following items.

- Corvus Network manual.
- Multiplexer Controller board enclosure and a flat cable
- ac cable
- Corvus Network Utilities diskette; if you are receiving a new Corvus drive with the Multiplexer, these programs are included on the diskettes sent with the disk drive.
- Additional flat cables and interface cards for each host computer.
- Warranty Card

Installation

Before hooking up your Multiplexer hardware, you must configure your software. Finish reading this chapter and the chapter on configuring your software, then configure your software.



AFTER CONFIGURING THE SOFTWARE, YOU CONNECT THE MULTIPLEXER HARDWARE.

All Corvus Multiplexer enclosures have an ac connector that is the same type of connector found on the drive cabinet. Please read the section of this chapter titled 'ac Connector.'

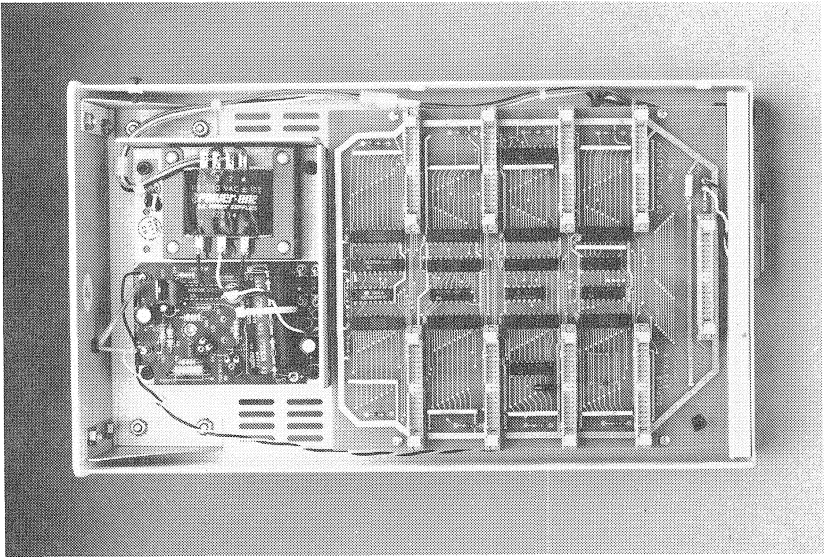


FIGURE 2.14 THE CORVUS MULTIPLEXER

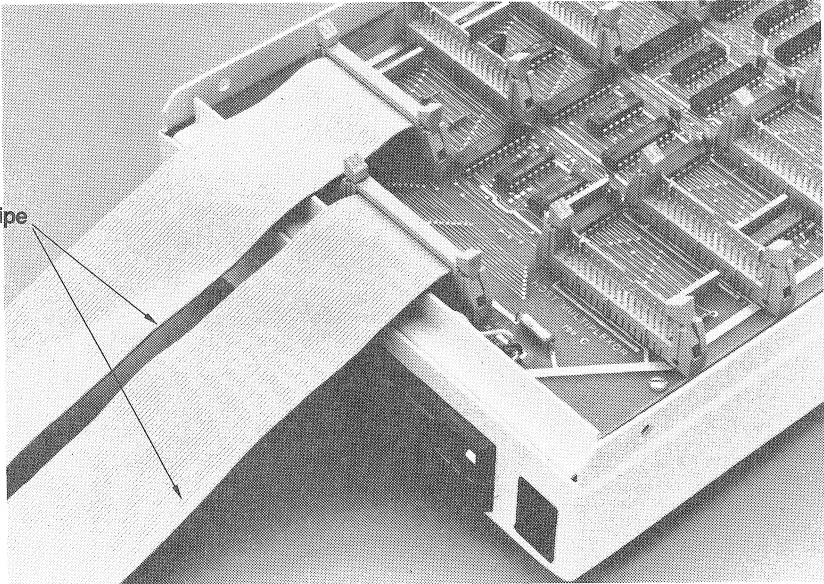


FIGURE 2.15 CORVUS MULTIPLEXER WITH ONE COMPUTER CABLE ATTACHED

The Multiplexer is connected between the Corvus disk and the interface card that plugs into your computer. If there is a stand-alone Mirror attached to the system, the Multiplexer board is connected between the Mirror and interface card.

Host Multiplexer

1. Power off your drive and computer.



POWER OFF

2. Disconnect the flat cable from your interface card.

▶ **THE LENGTH OF THE CABLE BETWEEN THE DRIVE AND THE MULTIPLEXER MUST NOT EXCEED 6 FEET (1.83 meters). FOR SYSTEMS THAT HAVE A MIRROR, THE COMBINED LENGTH OF THE MIRROR AND MULTIPLEXER CABLES MUST NOT EXCEED 8 FEET (2.44 meters).**

3. After disconnecting the flat cable from the interface card, attach the free end of this cable to the Multiplexer's disk connector (see figure 2.15), which is the single connector closest to the back end of the Multiplexer board.

If a stand-alone Mirror is installed, it should be installed so that the cable leaving the drive goes immediately to the Mirror connector labeled DRIVE. The cable that leaves the Mirror, from the Mirror connector labeled HOST, should go directly to the Multiplexer.

▶ **IN ORDER TO BE SURE THE CONNECTIONS YOU MAKE ARE CORRECT, TAKE SPECIAL NOTICE OF THE POSITIONING OF THE STRIPE ON THE FLAT CABLES IN THE PICTURES AND DIAGRAMS IN THIS CHAPTER.**

4. The flat cables supplied with the Multiplexer are then connected to the interface cards for each host computer (refer to figure 2.10).

Each additional interface card that is requires a flat cable for connection to the multiplexer. Each one of these cables is limited to 50 feet (15.24 meters) in length and is connected to any one of the eight multiplexer connectors that remain after the drive has been connected to the multiplexer. Cables may be connected in any order to any or all of the remaining connectors.

5. Connect the ac cord to the multiplexer and a power receptical.
6. Set the Mux switch on the front of your drive to the Constellation position (see figure 2.3).

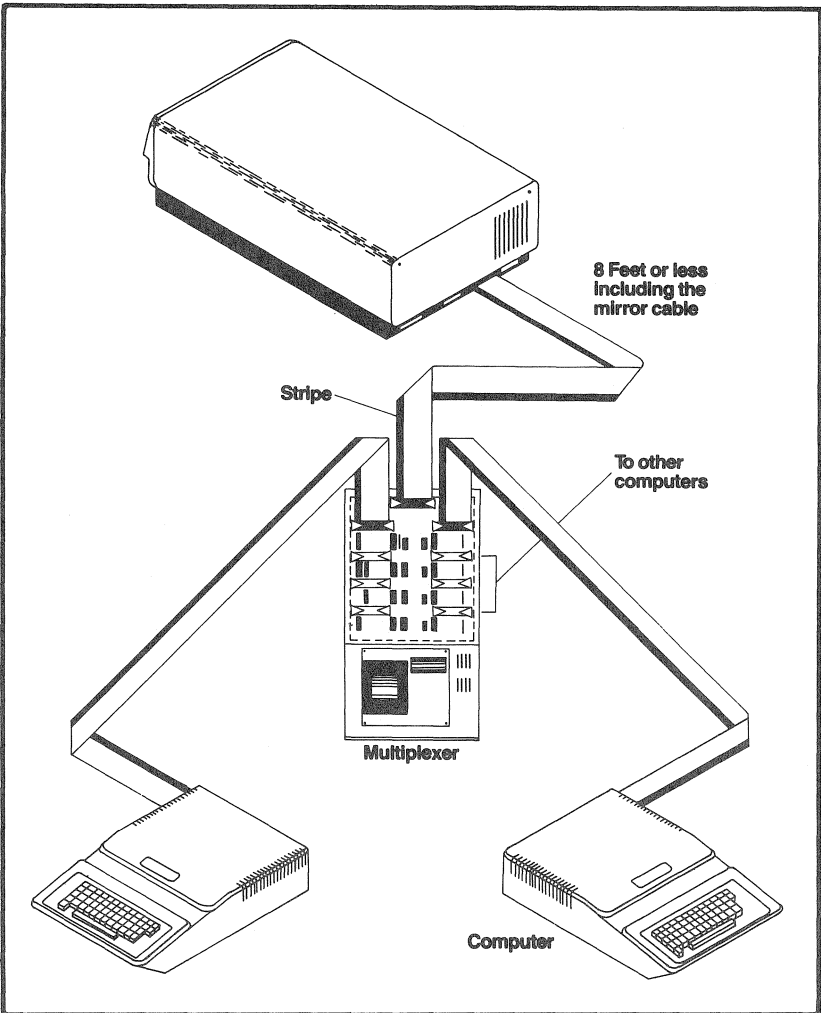


FIGURE 2.16 SINGLE LEVEL MULTIPLEXER SYSTEM

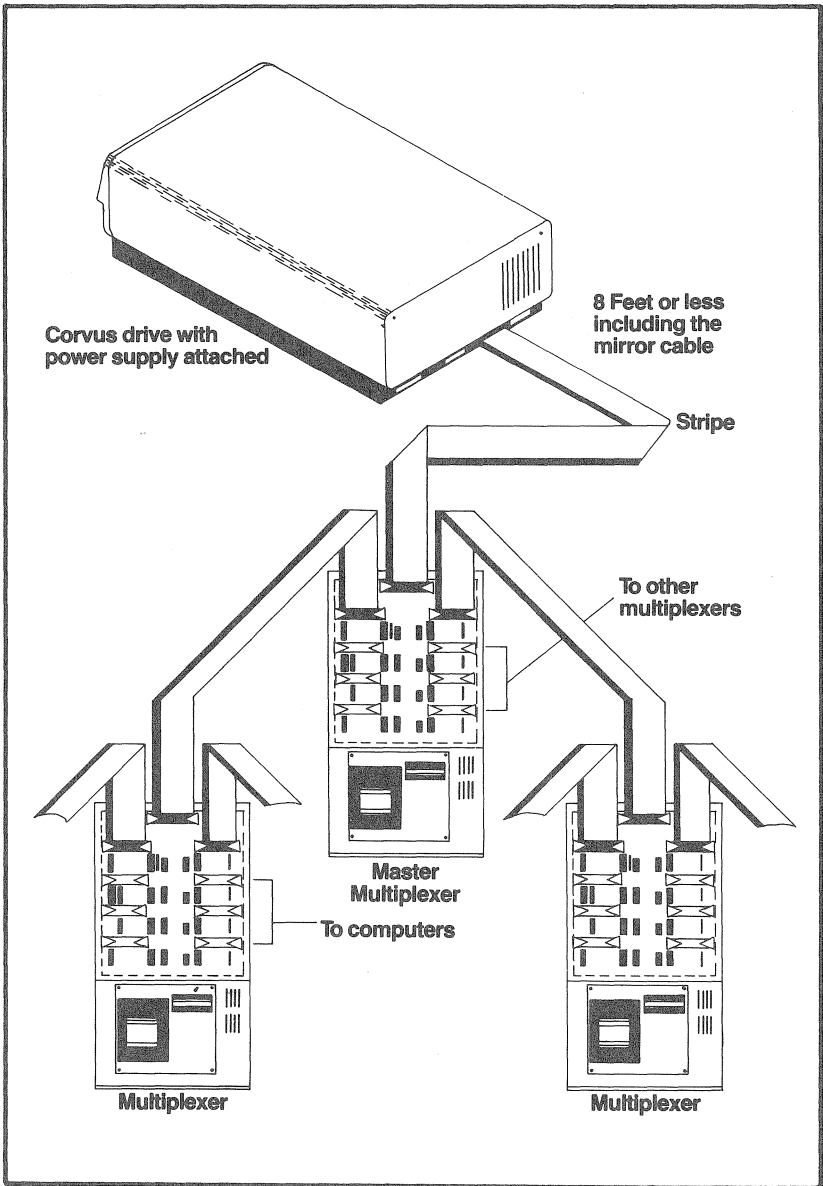


FIGURE 2.17 TWO-LEVEL MULTIPLEXER SYSTEM

7. Power up the computer(s) and the Multiplexer, then the drive.

▶ FOR NETWORK SYSTEMS, AFTER THE INITIAL POWER ON, THE POWER ON SEQUENCE NO LONGER APPLIES. INDIVIDUAL COMPUTERS CAN BE POWERED UP AND DOWN AS DESIRED.

Master Multiplexer

The use of a Master Multiplexer allows the Multiplexer network to expand access from eight to 64 host computers. There is no software change to any host computer. This expansion is accomplished with a Master Multiplexer board, which is housed within the same type of package as the Host Multiplexer and looks exactly the same externally, and multiple Host Multiplexer Controllers .

If a Mirror is installed, it should be installed so that the cable leaving the drive goes immediately to the Mirror connector labeled DRIVE. The cable that leaves the Mirror, from the Mirror connector labeled PROCESSOR, should go directly to the Master Multiplexer.

The installation of the two level system is similar to the single level system (see figure 2.17). However, the following conditions must be followed if the system is to work properly.

1. A table exists, called the Constellation Mux table, which must be updated when a Master Multiplexer is attached to the system. By updating this table you tell the disk controller what is attached to each port of the Master Multiplexer. This is necessary only when a Master Multiplexer is attached to the system.

For Pascal or Pascal-BASICs systems, the Constellation Mux table can be accessed by the C(onst option of the Cmgr program as described in the section titled 'Cmgr' in chapter six.

For BASICs-only systems, the Constellation Mux table can be accessed by the C(onst option of the P(arams option of the Diagnostic program as described in the section titled 'The Diagnostic Program' in chapter five.

2. The cable length from the Master Multiplexer to the drive can be no longer than eight feet, including three feet of Mirror cable.
3. The controller firmware must be version 2.0 or greater. To determine the version, use the V(ersion check function in the Diagnostic program. If the controller's firmware version number is less than 3.0, only Host Multiplexers may be connected to the Master Multiplexer. Or if the controller version is greater than 3.0, Host Multiplexers and host computers may be connected to the Master Multiplexer and you do not have controller firmware version 3.0 or greater, contact Corvus Systems for a controller firmware upgrade package.

4. Be sure the Mux switch on the front of the drive is in the Constellation position. This switch must be set to the Constellation position for both Host and Master Multiplexers (see figure 2.3).
5. Double check to be certain that you have correctly installed the cable from the drive to the Multiplexer central connector, installed the individual cables from the Multiplexer to each of the interface cards, and plugged the cards into their computers (your system should look similar to figure 2.16 or 2.17).

After you make a final check, you are ready to power the system up and share the disk between all the host computers. Follow the power on sequence this time; computers and Multiplexers first, then your drives. In the future, individual computers can be powered up and down as desired.

Connecting the Disk to Omninet

If you are upgrading a single user or Multiplexer system, configure your software according to instructions in Chapter Six before installing the hardware.

If you are setting up an Omninet system on an uninitialized disk, install the hardware FIRST, before configuring your software.

Unpacking and Parts

Carefully unpack the Omninet hardware and check for shipping damage. Retain all packing material and receipts in the event that any claims for shipping damage are filed. All damage claims should be filed promptly with the transportation company.

There are several different Omninet packages available from Corvus. For purposes of the following installation section we concentrate on the Disk Server package. The Disk Server package should contain the following:

- Omninet Disk Server
- Two network tap boxes
- 15 foot network tap cable
- Flat cable
- ac cable
- Omninet Installation Guide
- Corvus Disk and Network Manual
- Corvus Utilities Diskettes
- Warranty Card

Installation

See the 'Omninet Installation Guide' for instructions on how to install your Omninet local network.

Address	Switch Setting					
	1	2	3	4	5	6
0	↑	↑	↑	↑	↑	↑
1	—	↑	↑	↑	↑	↑
2	↑	—	↑	↑	↑	↑
3	—	—	↑	↑	↑	↑
4	↑	↑	—	↑	↑	↑
5	—	↑	—	↑	↑	↑
6	↑	—	—	↑	↑	↑
7	—	—	—	↑	↑	↑
8	↑	↑	↑	—	↑	↑
9	—	↑	↑	—	↑	↑
10	↑	—	↑	—	↑	↑
11	—	—	↑	—	↑	↑
12	↑	↑	—	—	↑	↑
13	—	↑	—	—	↑	↑
14	↑	—	—	—	↑	↑
15	—	—	—	—	↑	↑
16	↑	↑	↑	↑	—	↑
17	—	↑	↑	↑	—	↑
18	↑	—	↑	↑	—	↑
19	—	—	↑	↑	—	↑
20	↑	↑	—	↑	—	↑
21	—	↑	—	↑	—	↑
22	↑	—	—	↑	—	↑
23	—	—	—	↑	—	↑
24	↑	↑	↑	—	—	↑
25	—	↑	↑	—	—	↑
26	↑	—	↑	—	—	↑
27	—	—	↑	—	—	↑
28	↑	↑	—	—	—	↑
29	—	↑	—	—	—	↑
30	↑	—	—	—	—	↑
31	—	—	—	—	—	↑
Address	1	2	3	4	5	6
	Switch Setting					

Address	Switch Setting					
	1	2	3	4	5	6
32	↑	↑	↑	↑	↑	—
33	—	↑	↑	↑	↑	—
34	↑	—	↑	↑	↑	—
35	—	—	↑	↑	↑	—
36	↑	↑	—	↑	↑	—
37	—	↑	—	↑	↑	—
38	↑	—	—	↑	↑	—
39	—	—	—	↑	↑	—
40	↑	↑	↑	—	↑	—
41	—	↑	↑	—	↑	—
42	↑	—	↑	—	↑	—
43	—	—	↑	—	↑	—
44	↑	↑	—	—	↑	—
45	—	↑	—	—	↑	—
46	↑	—	—	—	↑	—
47	—	—	—	—	↑	—
48	↑	↑	↑	↑	—	—
49	—	↑	↑	↑	—	—
50	↑	—	↑	↑	—	—
51	—	—	↑	↑	—	—
52	↑	↑	—	↑	—	—
53	—	↑	—	↑	—	—
54	↑	—	—	↑	—	—
55	—	—	—	↑	—	—
56	↑	↑	↑	—	—	—
57	—	↑	↑	—	—	—
58	↑	—	↑	—	—	—
59	—	—	↑	—	—	—
60	↑	↑	—	—	—	—
61	—	↑	—	—	—	—
62	↑	—	—	—	—	—
63	—	—	—	—	—	—
Address	1	2	3	4	5	6
	Switch Setting					

↑ = on
 — = off

FIGURE 2.18 UNIQUE DEVICE ADDRESS TABLE

Setting the Unique Device Address

Each network device must have a unique device address. The device address is set in a dip switch on Omninet interface card or network server. The dip switch contains eight microswitches labeled 1 through 8. Microswitches 1 through 6 are used to set the device address. Normally, device addresses are assigned in numeric order starting at 0 and continuing toward 63, however, any set of unique addresses will work.

The switch labeled number 7 is used to set a network bias. Only one device on the network should have this switch set. This should be the Disk Server. All the network devices should have this switch set the OFF. The settings for the Disk Server are as follows:

Switch	Setting	Meaning
1 — 6	On	Device address zero (optional)
7	On	Bias set on
8	Off	Reserved (terminator off)

Switch number 8 is reserved as a network terminator. It should be off for all network devices in normal network installations because network terminators (resistors) are physically installed at both ends of the network.

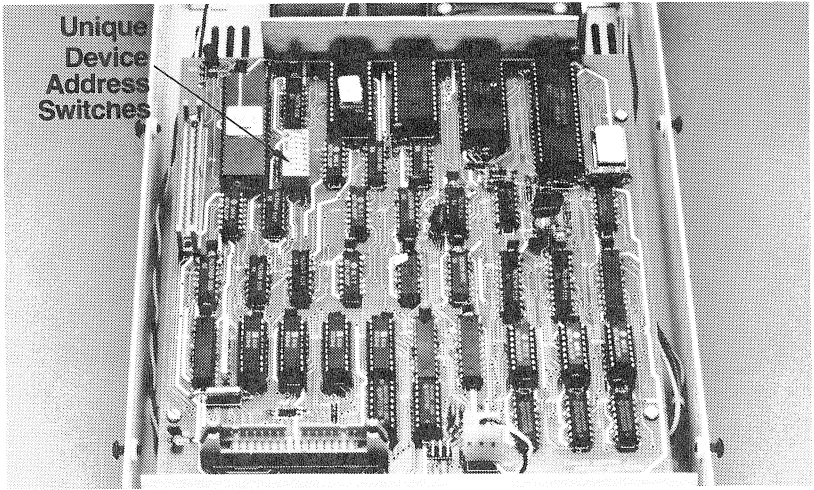


FIGURE 2.19 CORVUS OMNINET DISK SERVER

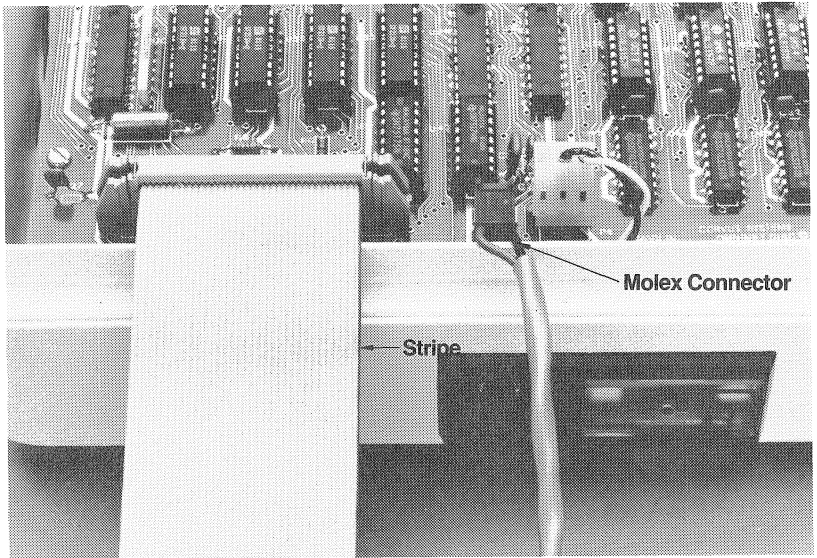


FIGURE 2.20 PROPERLY CONNECTED DISK SERVER

How to Connect the Disk Server

1. A disk server is attached to the network trunk using a network tap and a 15 foot tap cable in the same manner as other Omninet network devices. Attach the Molex connector end of the tap cable to the conenctor on the disk server processor board.

2. Omninet Disk Servers enclosures have an ac connector that is the same type of connector found on the drive cabinet. Please read the section of this chapter titled 'ac Connector.' Plug the ac cable into the proper recepticles.

3. A five foot flat cable is used to connect the disk server to the Corvus disk system. One end of the cable is plugged into the flat cable connector on the disk server processor board and the other end is plugged into the port marked PROCESSOR on the back of the Corvus disk drive. The power must be off for both the Disk Server and the disk drive when the cable is connected.

If a Mirror is attached, it connects between the disk and the disk server.

4. When Omninet is used with an existing Corvus Multiplexer system the disk server flat cable is plugged into any computer port of the Multiplexer instead of the disk drive. In networks with more than one Multiplexer, the disk server must be connected to a computer port on the Master Multiplexer, which is the Multiplexer directly connected to the Corvus disk drive.

5. Once the disk server and one or more Omninet interface cards have been connected to the network, and the network terminators have been installed, the disk system can be set up and the disk initialized.

6. If you are setting up an Omninet system on an uninitialized disk, you must now initialize your disk according to the initialization procedures in Chapter Three, and then according to the initialization procedures in Chapter Six.

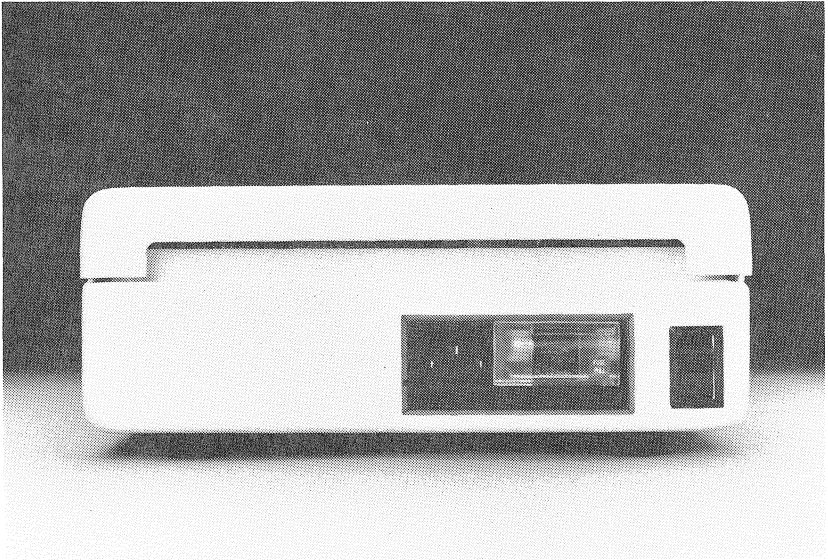


FIGURE 2.21 DISK SERVER AC CONNECTOR

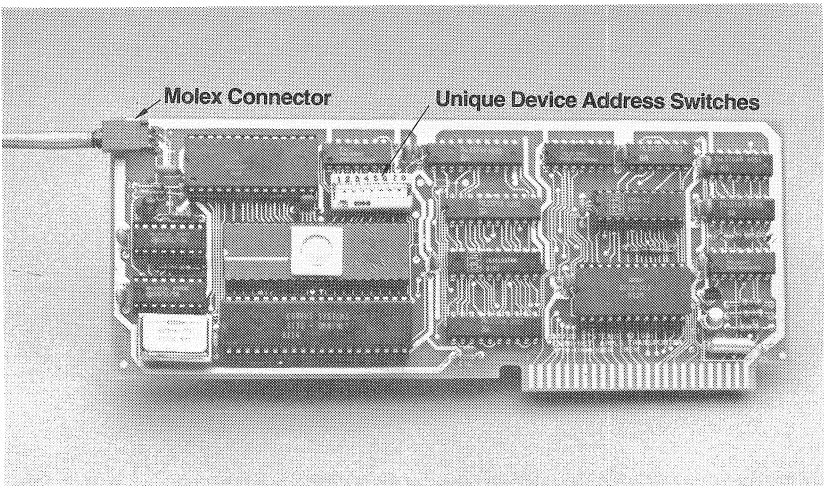


FIGURE 2.22 OMNINET TRANSPORTER INTERFACE CARD

Initialization

Chapter 3

Disk Initialization and Management Software

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Checklist

Checklist for Disk Initialization

This chapter deals with the software and procedures used to initialize your Corvus drive for various system configurations. Follow the checklist below, based on the type of system you are initializing.

- For Pascal Only or Pascal-BASICs Systems:
 - 1) Read 'Description of Initialization Utilities' in the Pascal section of this chapter. (Page 3-6)
 - 2) Read 'Initialization Procedures for Pascal or Pascal-BASICs' in the Pascal section of this chapter. (Page 3-13)
 - 3) Perform the procedures detailed under the heading, 'Initialization Procedures for Pascal or Pascal-BASICs.' (Page 3-13)
 - 4) If you are creating a Pascal only system, read 'Drive Management for Single user Systems' for information on adding and managing the Pascal volumes on the Corvus drive. (Page 3-60)
 - 5) If you are creating a Pascal-BASICs system proceed to the BASICs section of this chapter. (Page 3-43)
 - 6) Read 'Description of Initialization Utilities' in the BASICs section of this chapter. (Page 3-44)
 - 7) Read, 'Initialization Procedures for BASICs' in the BASICs section of this chapter. (Page 3-52)
 - 8) Perform the procedures detailed under the heading, 'Initialization Procedures for BASICs.' (Page 3-52)

- 9) If you are creating a Pascal only or Pascal-BASICs system with Constellation software, after you have completed the appropriate initialization procedures outlined above you should proceed to Chapter Six, 'Network Initialization and Management Software.' (Page 6-3)
 - 10) If you are creating a single user system, after you have completed the initialization procedures outlined above, read the section 'Drive Management for Single User Systems'. (Pascal page 00, BASICs page 3-60)
- For BASICs Only Systems or BASICs only with Constellation Software:
 - 1) Read, 'Description of Initialization Utilities' in the BASICs section of this chapter. (Page 3-44)
 - 2) Read, 'Initialization Procedures for BASICs' in the BASICs section of this chapter. (Page 3-52)
 - 3) Perform the procedures detailed under the heading, 'Initialization Procedures for BASICs' in the BASICs section of this chapter. (Page 3-52)
 - 4) If you creating a system with Constellation software, after completing the appropriate initialization procedures outlined above, proceed to the Pascal section of Chapter Six, 'Network Initialization and Management Software.' (Page 6-3)
 - 5) If you have created a BASICs only single user system, after you have performed the initialization procedures from above, read 'Drive Management for Single User Systems' in the BASICs section of this chapter for information on managing the BASICs volumes on the Corvus drive. (Page 6-51)

Pascal

The Pascal portion of this chapter deals with the utilities found on the diskettes labeled, 'CorvusAP Utilities Pascal 1.1, Vol 1 and Vol 2.' There are nine utilities, all together, on the Corvus diskettes. These utilities are divided into different categories.

Psysgen, Vinit, Basics and Setboot are drive initialization utilities. These utilities allow you to initialize your drive to function with the Pascal operating system and to partition the drive so as to allow a DOS area to reside along with the Pascal volumes. The initialization utilities are described in the first section, 'Description of Initialization Utilities.'

Following the 'Description of Initialization Utilities' section, is the section 'Initializaton Procedures for Pascal or Pascal-BASICs.' This section covers step by step the procedures to configure your drive for Pascal or Pascal-BASICs.

The remaining utilities found on the Corvus Pascal diskettes are Vmgr, Mirror, Diagnostic, Backup and Restore. They are used for volume management, device control, drive maintenance and file manipulation.

Vmgr is covered in the section titled, 'Drive Management for Single User Systems.'

The Mirror utility is described in Chapter Four, 'Using Your Corvus Mirror.'

In Chapter Five you will find information on the Diagnostic utility as well as information on drive trouble shooting.

The utilities Backup and Restore are covered in this chapter under the heading, 'Drive Management for Single User Systems.' The information on Backup and Restore can be read after you have configured your system.

- ▶ **IN ORDER TO USE ANY OF THESE UTILITIES YOU NEED AN APPLE LANGUAGE CARD (OR 16K RAM CARD) AND THE APPLE PASCAL SYSTEM DISKETTES.**
- ▶ **THE TERMS BASICS AND DOS ARE USED INTERCHANGEABLY IN THIS MANUAL.**

Description of Initialization Utilities

This section discusses the initialization utilities found on the Corvus Pascal utilities diskettes. It is designed to familiarize you with the initialization utilities before you begin the initialization process. It can also be read after the initialization procedures for a review or for further insight on the utilities.

Psysgen is the first utility you should execute when initializing your Corvus drive. This utility sets up your drive to function with the Pascal operating system.

The Vinit utility is used for two initialization functions. One option allows you to initialize an add-on drive or the second ten megabytes of a twenty megabyte drive. The other option enables you to create a specified number of DOS volumes on the same drive with the Pascal volumes.

If you create a DOS area you will need to configure that area with the appropriate BASICs volumes. To switch from the Pascal operating system to BASICs you will need to use the utility called Basics.

If you create DOS volumes on the drive you can choose which operating system you want the Corvus drive to boot up with, DOS or Pascal. This is done by executing the Setboot utility.

Psysgen

Psysgen is the first utility you must run when initializing the Corvus drive because it sets up the Corvus drive to operate under the Pascal operating system.

Psysgen initializes the Corvus volume table and boot tracks that occupy the first few blocks of the Corvus drive. Psysgen also transfers the contents of the bringup diskette to the drive, consequently copying the Pascal operating system into the first volume on the drive.

The procedure for creating the bringup diskette is described in chapter Three of this manual under the heading, 'Initializing for Pascal.'

Once the bringup diskette is copied to the Corvus drive, the Apple can boot directly from the Corvus drive. This allows your system to operate as it did when booting from a diskette drive.

Before running this utility you must temporarily alter your system slot assignment. Power down the Apple computer and all Corvus devices connected to it. Insert the Corvus interface card into slot 2 and the diskette drive controller card into slot 6 of the Apple computer. The Apple and all Corvus devices should then be powered on, according to the power on sequence.

Next you boot from the bringup diskette you created, as described in chapter Three under the heading 'Initializing for Pascal.' This diskette must contain at least the Apple Pascal files System.Apple, System.Pascal, System.Miscinfo, System.Filer and System.Library. It must also contain the Corvus utility files Psysgen.code, Boot.data and Diag.Code.

When the computer is booted from the diskette, the screen displays the Pascal command line which looks like the example below.

COMMAND: E(DIT, R(UN, F(ILE, C(OMPILE, X(ECUTE

At this level press X, for X(ecute. A Prompt displays and asks what file is to be executed. Reply with Psysgen <return>, as in the example.

EXECUTE WHAT FILE: PSYSGEN <return>

After typing Psysgen <return>, the screen displays the title and version number of the utility. It also displays the question, "ok to destroy all data on disk in alternate slot?"

Pressing N, for No, aborts the program and returns you to the command level without affecting the drive. Pressing Y, for Yes, continues the initialization program.

```
PSYSGEN UTILITY...VER ##.##
OK TO DESTROY ALL DATA
ON DISK IN ALTERNATE SLOT (Y/N)? Y
```

During the initialization process any data on the drive is destroyed. Psysgen sets the boot for Pascal version 1.1. Initialization takes only a few minutes, during which time the screen displays the following:

```
OPENING FILE BOOT DATA ...
WRITING BOOT TRACKS ...
SETTING BOOT FOR PASCAL 1.1 ...
COPYING FLOPPY ...
```

The initialization process consists of three steps: 1) The program copies the appropriate boot tracks from the file Boot. data onto the Corvus drive. 2) It initializes the Corvus volume table and mount table. 3) Psysgen finishes the initialization by copying the entire bringup diskette to the Corvus drive.

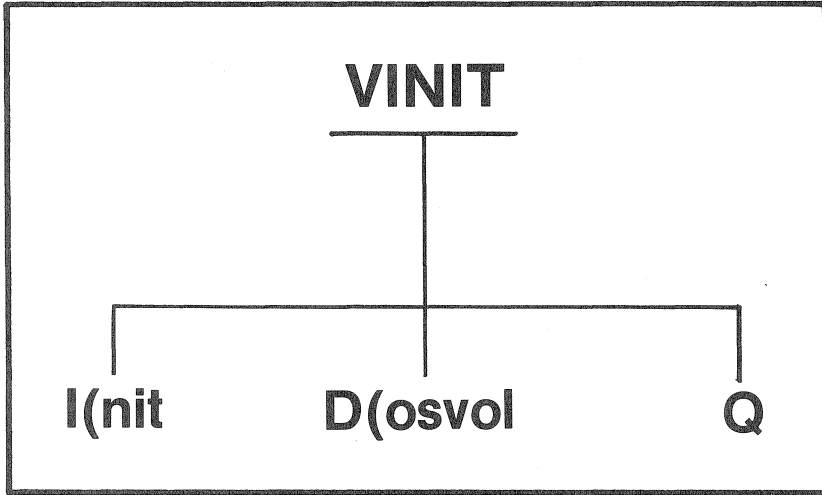
The boot and system information is stored in the first volume on the drive. If this volume is ever removed, or if another volume is placed before it, you will be unable to boot from the Corus drive.

WARNING

THE FIRST VOLUME ON THE CORVUS DRIVE MUST CONTAIN THE PASCAL SYSTEM AND BOOT INFORMATION, OR ELSE YOU WILL BE UNABLE TO BOOT FROM YOUR CORVUS DRIVE.

Following initialization, the disk system and Apple computer should be powered down. Move the diskette drive controller card to slot 4 and the Corvus interface card to slot 6. After this is accomplished, the Apple computer and all Corvus devices connected to it should be powered on again.

Within 40 seconds after the drive is powered on, the system automatically boots up and is running under Pascal with the command line displayed on the screen.



Vinit

Vinit performs two functions. One function you can select is to initialize a second drive (physical or virtual) from a previously initialized drive. The other function creates DOS volumes on the drive.

To run this program, type X for X)ecute, then type VINIT <return>. Once this is done the program displays three options.

```
VINIT: I)NIT D)OSVOL Q
```

Pressing Q for Quit exits the program and returns you to the Pascal command level.

I)nit

Pressing I for I)nit brings up a new prompt. This prompt pertains to the initialization of an add-on drive. Initialization by the I)nit option zeroes the Corvus tables contained in the first block of the add-on drive.

Since the Corvus disk system controller treats a twenty megabyte disk drive as if it were two ten megabyte disk drives, the

l)nit option must be run as part of the initialization of a twenty megabyte drive. This is because Psysgen only initializes the first drive of a multiple drive system. In turn the second drive (second half of a 20 megabyte drive) must be initialized by the Vinit utility.

Whether you are setting up an add on drive or the second half of a twenty megabyte drive, you must specify which drive number is to be initialized. Key in the appropriate number and press <return>. The following example is based on a twenty megabyte disk system.

```
INITIALIZE VOLUME DIRECTORY ON DRIVE #:2 2 <return>
```

Initialization takes about one second. When finished the user is returned to the Vinit prompt level.

D)osvol

D)osvol is another option offered by the Vinit utility. This option creates a DOS area on the drive.

Pressing D, for D)osvol, brings up this option. The screen displays a prompt for DOS 3.3 volumes, which you should press Y for Yes. Pressing N, for No, exits the option and returns you to the Vinit prompt level.

► DOS VOLUMES MUST BE CREATED ON DRIVE ONE BEFORE THEY CAN BE CREATED ON DRIVE TWO.

After answering yes, you are asked to specify how many volumes you want on drive one. Included in this prompt is the maximum number of volumes that can be created.

If you just press <return>, the program will default to the number displayed. However, any valid number of volumes can be created by typing in the number desired and pressing <return>.

To create DOS volumes, follow the example below after keying D for D)osvol.

```
CREATE DOS 3.3 VOLUMES ON DRIVE 1? Y
```

```
ENTER # OF DOS VOLUMES (MAX=63): 20 24 <return>
```

```
MOUNTING DOS1 ON #9
```

```
OPENING BASICS3.DATA
```

```
WRITING DOS1: DOS VOLUMES
```

```
.....
```

```
ZEROING DOS1: DOS VOLUMES
```

```
.....
```

```
UNMOUNTING DOS1
```

When the program is finished you are returned to the Vinit prompt level.

Initialization of a DOS volume area consists of four steps: 1) A volume called DOS1 (or DOS2 for the DOS volume area on drive 2) is created and mounted on unit #9. 2) The file Basics3.data or Basics3.Omni is copied into the DOS warmboot area. 3) The directory of each BASIC volume is zeroed. 4) DOS1 (or DOS2) is unmounted from unit #9.

DOS volumes on drive one are always created in a Pascal volume called DOS1 located at the end of the drive, and must remain as the last Pascal volume on drive one. If DOS1 is moved, or if another volume is placed after it, the BASICs area will be unusable.

To create DOS volumes on drive two, you must execute the Vinit program and key D for D)osvol. When there is a DOS area on drive one the program defaults to drive two. It will create a DOS volume area on drive two the same length and location as on drive one. Pressing Y, for Yes, tells the program to continue.

CREATE DOS 3.3 VOLUMES ON DRIVE 2?

Y

The DOS volume area on drive two must be the same size and at the same starting block address as the DOS volume area on drive one. If there is not an area of this size available at the end of drive 2 an error message is displayed. To correct this problem you will have to make room at the location for the DOS2 volume by using the Corvus Volume Manager (see the heading, 'Drive Management for Single User Systems' found in this section).

Basics

After you have initialized the DOS area, you will use this utility to switch from Pascal to BASICs.

To use the DOS area of the drive, you must boot BASICs. You can do this by setting the Corvus drive boot to BASICs, or you can execute the Corvus utility called Basics.

If no DOS volumes have been created on the drive this program will not work.

▶ EXECUTING THE BASICS UTILITY DOES NOT CHANGE THE CORVUS DRIVE COLD BOOT.

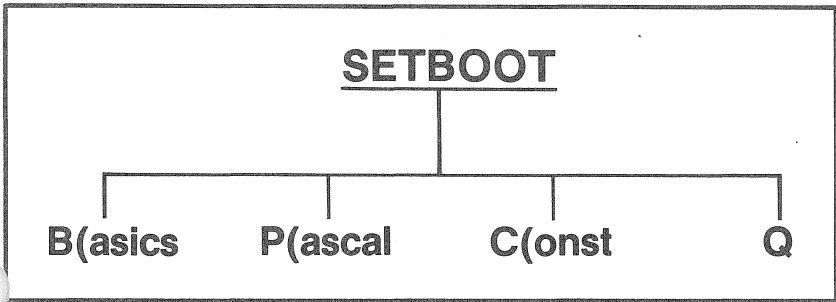
To get into the BASICs operating system, you execute the file Basics. For a moment the screen blacks out, after which a header

appears followed by the Applesoft or Integer prompt.

Once you are running in BASICs you should carry on with the procedures for initializing a BASICs system. All the BASICs initialization utilities should be run, except for the utilities Bsysgen and Bringup.

Setboot

Setboot allows you to choose which operating system, BASICs or Pascal, the Corvus disk system automatically boots up with when powered on. This utility only needs to be run if a DOS volume area has been created, and you desire to cold boot up with BASICs instead of Pascal.



To run this utility press X, for X)ecute, and type Setboot <return>. The screen displays two boot selections.

WARNING

DO NOT PRESS B FOR BASICS IF NO DOS VOLUMES HAVE BEEN CREATED. DOING THIS PREVENTS THE DRIVE FROM BOOTING.

If Pascal and BASICs volumes exist on the drive and you want to default to BASICs then press B, for B)ASICS. Follow the example shown.

```

CORVUS BOOT SELECT PROGRAM
P)ASCAL B)ASICS <ESC>          B <return>
SETTING BOOT FOR BASICS...
OPENING BOOT DATA...
CORVUS BOOT NOW SET TO BASICS
  
```

When the program is finished the Pascal command line reappears on the screen.

Initialization by Psysgen automatically sets the boot information to default to Pascal. There is no need to reset the boot to Pascal, unless the boot information is somehow destroyed. In such a case the system must be booted from a BASICs diskette in a diskette drive connected to slot four of the Apple computer and the BASICs version of the Corvus Setboot utility run to set the boot information back to Pascal.

The reason for using a BASICs version of the Setboot utility as opposed to the Pascal version is that Pascal can only be booted from slot six. However, the BASICs Setboot utility can be booted and run from slot four and sets the boot on the Corvus drive in slot six.

Initialization Procedures For Pascal Or Pascal-Basics

This section describes the procedures used to initialize your Corvus drive for a Pascal-only or a Pascal-BASICs system, and is designed to take you step by step through the initialization process.

It is to your best advantage to read the entire procedure before beginning, since doing so decreases the number of questions that may arise during the actual initialization process. For the first time user, the entire initialization procedure could take approximately 1 to 1 1/2 hours. Please allow yourself enough time to carry out the procedures properly.

At this point we presume that you are familiar with the function of the Corvus Pascal utilities described in the previous section. We also presume that you are familiar with the fundamentals of Apple Pascal. If you are not familiar with Apple Pascal, please refer to the Apple II APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL.

Whether you desire a Pascal or Pascal-BASICs system you must first initialize the Corvus drive for Pascal. After initialization for Pascal, if desired, a DOS section can be added.

The following is checklist of the procedures you will perform to initialize your Corvus drive.

- For a Pascal only or Pascal-BASICs system:

- 1) Be sure to have all the Apple Pascal system diskettes and the Corvus Pascal and BASICs utilities diskettes. Power down all devices. Insert the Corvus interface card into slot 2 of the Apple computer and a diskette controller into slot 6.
- 2) Power on the Apple, but not the Corvus devices connected to your Apple. Boot Pascal from the diskette drive with the Apple1 diskette.
- 3) Create a Bringup diskette by transferring the Apple files: System.Apple, System.Pascal, System.Filer, System.library. From the Apple1 diskette and the Corvus Pascal files: Boot.data, Diag.data and Psysgen.code from the Corvus1 diskette.
- 4) After creating the Bringup diskette, power on the Corvus drive and from the Bringup diskette, execute the Corvus utility Psysgen.
- 5) When the Psysgen program is finished, power down all devices and place the diskette controller card into slot 4 and the Corvus interface card into slot 6. Next, power on all devices.

- 6) Change the name of the Bringup volume on the Corvus drive to Sys.
- 7) Transfer all the files from Apple1, Apple2, Corvus1 and Corvus2 to Sys. If you are creating a Pascal only system, your initialization is complete. Read the section, 'Drive Management for Single User Systems' for information on creating and managing volumes on the Corvus drive.
If you are creating a Pascal-BASICs system, you will need to add DOS volumes to your Pascal system, as described below.

- To add DOS to Pascal:

- 1) Execute the Corvus Pascal utility Vinit. Use the D)osvol option to create a DOS volumes area called DOS1.
- 2) After creating DOS1, mount DOS1 and create the file System.Basic by transferring the appropriate BASICs file from the Apple diskette called Basics Integer and Applesoft II.
- 3) Next, execute the Corvus Pascal program called Basics. This will warm boot the system to the BASICs environment.
- 4) When you are in the BASICs environment, type FP <return> and continue with the instructions detailed under the heading, 'Initialization for BASICs.' That section contains the instructions for initializing the DOS volumes for you Pascal-BASICs system.

- For a Pascal only or Pascal-BASICs system with Constellation software:

- 1) For a Pascal only system, perform the initialization procedures outlined above, then continue to the Pascal section of Chapter Six in the Corvus Network Software section.
- 2) For a Pascal-BASICs system, perform the initialization procedures outlined for a Pascal-BASICs system above, then continue to the Pascal section of Chapter Six in the Corvus Network Software section.

Initializing for Pascal

The Corvus drive must be initialized for Pascal before you can add DOS volumes.

WARNING

INITIALIZING THE CORVUS DRIVE REMOVES ALL DATA FROM THE DISK. IF YOU DECIDE TO REINITIALIZE YOUR CORVUS DRIVE, YOU MUST BACK UP THE DATA ON THE DRIVE OR ELSE THE DATA WILL BE DESTROYED.

The Apple computer cannot boot from the Corvus drive until the drive has been initialized. Because of this, you must boot Apple Pascal from a diskette drive with a bootable Pascal diskette.



POWER OFF

1. Before beginning, be sure your Apple computer and Corvus devices are powered down. Next, insert the Corvus interface card in slot two and a diskette controller card in slot six of the Apple computer. This slot assignment is temporary and will change after the drive is initialized.

Be sure to have all the Apple Pascal system diskettes, the Corvus Pascal utilities diskettes and a blank Pascal formatted diskette with the volume name Blank. Formatting a diskette is explained under the heading, 'Formatting New Diskettes' in Chapter 8 of the Apple II APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL.

2. Place the Apple1 system diskette in the diskette drive and turn on your Apple. The system will load Pascal. For more information on the contents of the Apple Pascal system diskettes see, 'Appendix D' of the Apple II APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL.

After you have booted the Pascal system, the command level menu displays across your screen as in the example below.

COMMAND: E(DIT, R(UN, F(ILE, C(OMP, X(ECUTE

3. You are going to create a diskette containing the Apple Pascal boot information, system information and three Corvus files. If you have never created a backup copy of a Pascal diskette, please read the section, 'Transfer' in Chapter Three of the Apple II APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL.

First, use the Pascal Filer to copy a few essential files from the Apple1 diskette to a blank diskette. The Apple files you want to transfer are System.Pascal, System.Filer, System.Apple, Sys-

tem.Library and System.Miscinfo. These files will enable you to boot the Apple and run the Corvus Pascal system generation program.

► **WHEN USING THE PASCAL FILER, YOU MUST TYPE A COLON AFTER THE VOLUME NAME. IF YOU DO NOT TYPE A COLON AFTER THE VOLUME NAME, YOUR COMPUTER WILL DISPLAY AN ERROR MESSAGE.**

Press F, for the F(ile command. The Filer menu displays across your screen.

FILER: G, S, N, L, R, C, T, D, Q

Press T for the T(ransfer command. A prompt displays that asks for the volume name and file or files that are to be transferred. To this prompt type Apple1:? <return>. The question mark after the colon is a wild card which causes the Filer to request verification for each file before transferring it. The Filer requests verification by displaying each filename and asking if you wish to transfer the file. Press Y, for Yes, for the files you wish to transfer and N, for No, for the files you do not wish to transfer.

TRANSFER ? APPLE1:? <return>

The program then asks for the destination. Reply with BLANK:\$ <return>. The dollar sign after the colon is another wild card that specifies a destination filename which is the same as the source filename.

TO WHERE ? BLANK:\$ <return>

The Filer then displays each filename on the diskette and asks if you want to transfer it or not. Follow the example below when transferring the files from Apple1.

TRANSFER APPLE1:SYSTEM.APPLE? Y

If you have one diskette drive, the computer directs you to insert Blank, then remove Blank and insert Apple1, then insert Blank and so on until the transfer is complete.

PUT IN BLANK :
TYPE <SPACE> TO CONTINUE : <space>
PUT IN APPLE1 :
TYPE <SPACE> TO CONTINUE : <space>
PUT IN BLANK :
TYPE <SPACE> TO CONTINUE : <space>

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You continue to swap diskettes until the file is transferred. The computer tells you when the file transfer is complete with the following message.

```
APPLE1:SYSTEM.APPLE --> BLANK:SYSTEM.APPLE
```

If you have more than one diskette drive you are spared the trouble of swapping diskettes. After each file transfer the program will display the next file and ask you if you want the file to be transferred. When prompted, continue by pressing Y, for Yes, to transfer the files System.Pascal, System.Apple, System.Miscinfo, System.Filer and System.Library. Type N, for No, for all other files.

```
TRANSFER APPLE1:SYSTEM.PASCAL?
```

Y

After you have transferred the Pascal system files, be sure to have Blank in the diskette drive before continuing.

4. Change the name of the new diskette to Bringup. From the Filer press C, for C(hange. Type BLANK:,BRINGUP: <return>. After pressing <return> the Change option indicates the change by displaying the old name with an arrow pointing to the new name.

```
CHANGE ?
```

```
BLANK: --> BRINGUP:
```

```
BLANK:,BRINGUP: <return>
```

If you have trouble with the Transfer or the Change option, refer to Chapter Three of the APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL.

5. Next, you must Copy three files from the Corvus AP Pascal Utilities diskette Corvus1 to the diskette Bringup.

Place the Corvus AP Pascal Utilities Vol 1 diskette into your diskette drive. Transfer the files Boot.data, Diag.data and Psysgen.code from the Corvus Pascal utilities diskette named Corvus1 to Bringup.

If you have two diskette drives, the dialogue will be slightly different.

From the Filer press, T for T(ransfer. Type CORVUS1:BOOT.DATA,BRINGUP:\$ <return>.

```
TRANSFER ?
```

```
CORVUS1:BOOT.DATA,BRINGUP:$ <return>
```

The computer then prompts you to:

```
PUT IN BRINGUP:
TYPE <SPACE> TO CONTINUE
```

and so on until the transfer is complete, as signalled by the message:

```
CORVUS1:BOOT.DATA -->BRINGUP:BOOT.DATA
```

Repeat the process for the files Diag.data and Psysgen.code found on Corvus1. Press T, for T(ransfer. Type CORVUS1:DIAG.DATA,BRINGUP:\$<return>. After the transfer has completed use the same procedure for the file Psysgen.code.

6. To be sure Bringup is complete, list its directory. From the Filer, press L for L(dir (list directory). Type BRINGUP: <return> to the prompt.

```
DIR LISTING OF ? BRINGUP: <return>
```

The system should respond with something similar to the following.

```
BRINGUP:
SYSTEM.PASCAL          41 22-Sep-80
SYSTEM.FILER           28 18-Sep-80
SYSTEM.APPLE           32  9-Nov-80
SYSTEM.LIBRARY         34 20-Jan-81
SYSTEM.MISCINFO         1  2-Feb-81
BOOT.DATA              18 23-Jul-81
DIAG.DATA              1 10-Jul-81
PSYSGEN.CODE          21 20-Jul-81
< UNUSED >            104
8/8 FILES<LISTED /IN-DIR>, 176 BLOCLS USED,
104 UNUSED, 104 IN LARGEST
```

Your Bringup diskette may not be arranged exactly like our example, but it must have at least all the Apple files shown above, plus the files Boot.data, Diag.data and Psysgen.code from the diskette Corvus1.

7. After creating the Bringup diskette turn on the Corvus disk drive and all other Corvus devices. A 10 or 20 megabyte drive will make a chirping noise, which will dissolve to a whirring purr in about 40 seconds. The whirring purr is the normal sound of a properly functioning drive. A 5 megabyte drive comes ready in about 30 seconds and makes a humming noise while running.

When the ready light on the front panel of the Corvus drive is the only light on, place the Bringup diskette that you have made into the diskette drive. If Bringup is already in the diskette drive, then be sure that the command level is on the display.

When all is ready, execute Psysgen.code. Press X for X(ecute. Type PSYSGEN <return>. When the computer asks if it is ok to desa the data on the disk, press Y for Yes.

```
EXECUTE WHAT FILE ?          PSYSGEN <return>
PSYSGEN UTILITY...VER ###.##
OK TO DESTROY ALL DATA
ON DISC IN ALTERNATE SLOT (Y/N)?          Y
```

Be sure the Corvus drive is on, and that the ready light is the only light on.

When the drive is ready the program continues, taking about a minute to finish initialization. During initialization the screen displays the following:

```
OPENING FILE BOOT.DATA .
WRITING BOOT TRACKS ...
COPYING FLOPPY ...
PSYSGEN OPERATION FINISHED.
```

After Psysgen finishes initialization, the screen displays the command line which indicates that you have successfully initialized your Corvus drive for Pascal.

Psysgen is a Pascal program that prepares the Corvus drive for operation. It creates a boot area on the disk and fills the area with the information from Boot.data, which is used to boot Pascal when your Apple is turned on. In addition, Psysgen copies the entire contents of Bringup onto the drive as the first volume.

► **THE DISK STRUCTURE IS DESCRIBED IN THIS CHAPTER UNDER THE HEADING, "DRIVE MANAGEMENT FOR SINGLE-USER SYSTEMS."**

8. If, after 70 seconds the command line has not appeared, something went wrong. Try again to execute Psysgen, if the system answers with:

```
NO FILE PSYSGEN.CODE
```

check the contents of the Bringup diskette to be sure Psysgen.code, Diag.data and Boot.data are present. If they are not, repeat steps 4 and 5 on transferring the files from Corvus1 to Bringup. If they are present, try again to execute Psysgen.

If the Corvus files are present and initialization still does not work, double check all the connections for your Corvus interface card and diskette controller card. Also be sure that all Corvus devices connected are powered on and repeat initialization step 7.

9. After you have successfully initialized your Corvus drive, you must rearrange the cards to their final configuration.



POWER OFF

Power down all devices connected to your Apple computer and then power down your Apple. If you have one diskette controller, plug it into slot four. If you have two controllers (i.e. more than two diskette drives) plug the second controller card into slot five.

Place the Corvus interface card into slot six, making sure the cable or wire exits smoothly (with no kinks) through one of the slots in the back wall of your Apple. Arrange all the cables neatly so you can easily identify the cables and devices they connect to.

Once the cables and cards have been rearranged properly, you can power on the Apple and the Corvus drive. After the Corvus drive comes up to speed (about 40 seconds) the computer responds with something like this:

```
WELCOME BRINGUP, TO
U.C.S.D. PASCAL SYSTEM II.1
CURRENT DATE is 26-JUL-79
```

After Psysgen has been run successfully the Apple can automatically boot from the Corvus drive instead of from a diskette drive.

Do not worry if the system revision number and the date are different from our example.

10. When Psysgen copied Bringup to the Corvus disk, it created a volume that is 1024 blocks long. A standard Apple Pascal diskette is 280 blocks long. The extra space of the Corvus drive volume is needed to complete the initialization process.

Before finishing the initialization process, try out this quick exercise to verify that the configuration went well and to give yourself a chance to become accustomed to the system.

The command level menu should display across the top of your screen. Press F to get into the Filer.

If the Bringup diskette has been removed then only units #1, #2, and #4 will be on line.

```

WARNING UNITS 4 & 9 HAVE THE SAME NAME
VOLS ON LINE:
1  CONSOLE:
2  SYSTEM:
4# BRINGUP:
9# BRINGUP:
ROOT VOL IS - BRINGUP:
PREFIX IS - BRINGUP:
    
```

To prevent a calamity, remove the diskette Bringup from the diskette drive. You won't need it once your Corvus drive is up and running. Nevertheless, save Bringup in case you ever have a need to reformat the drive. This diskette is also useful to reinitialize the first volume on the Corvus drive in the event that the boot tracks have been destroyed. Reinitializing the first volume is described in Chapter 5 of this manual under the heading, "Using the V Option of Psysgen."

- Change the name of Bringup (on the Corvus drive) to SYS. Remove any diskettes you have in the diskette drives. From the Filer press C, for C(hange. Type BRINGUP:,SYS: <return>.

```

CHANGE?
BRINGUP: --> SYS:          BRINGUP:,SYS: <return>
    
```

Press V, for the V(ols command, to verify that the change worked.

```

VOLS ON LINE:
1  CONSOLE:
2  SYSTEM:
4# SYS:
ROOT VOL IS - SYS:
PREFIX IS - SYS:
    
```

Now place any Pascal diskette in the diskette drive. Press V for V(ols. You get the same directory, except now unit #9 displays the name of whatever diskette you inserted into the diskette drive.

Press L, for L(dir, to get a volume directory listing. Then, type SYS: <return>.

DIR LISTING OF ?

SYS: <return>

You will recognize the resulting directory as the same one you saw when you listed the directory of the Bringup diskette. Now these files are in the first volume on the Corvus drive named Sys.

You can also list the contents of any Pascal diskette. By pressing L while in the Filer. Type #9: or the name of the diskette followed with a colon.

12. Your Pascal system is almost ready. The next step is to transfer some additional useful files into the volume Sys.

To transfer files between diskettes, you may choose to use this sort of dialogue:

TRANSFER ?

XAMPL1:,XAMPL2: <return>

It works, but Xampl1 and Xampl2 must be the same length. In addition Xampl2's name is changed to Xampl1. Here's why. When you transfer files by typing Xampl1:,Xampl2:, you are saying, transfer the whole volume. Sometimes this is the most convenient way to transfer whole volumes. Transferring volumes by typing Xampl1:=,Xampl2:\$ <return> also means to transfer all the files from Xampl1 to Xampl2, in this case the directory is updated but the volume name is not changed. In addition, different volume lengths are handled properly.

To complete the initialization procedures for Pascal, transfer all the files from the diskettes Corvus1 and Corvus2 to the volume Sys on the disk drive.

From the Filer, press T for the T(ansfer command. Type CORVUS1:=,SYS:\$ <return>.

TRANSFER ?

CORVUS1:=,SYS:\$ <return>

The \$ tells the program to make the destination filename the same as it was on the source volume.

When the Transfer program encounters the files Boot.data, Diag.data and Psysgen.code, it recognizes that these files are already in Sys and asks whether you want to remove the old versions or not. Since both copies are identical, answer N for No.

Now do the same thing for the Corvus2 diskette. Type
CORVUS2:=,SYS:\$ <return>.

- Place the Apple1 diskette in the diskette drive. Transfer all the files from Apple1, that weren't transferred before, to Sys. When the program encounters a file that is already on Sys type N, for No, to that transfer.

TRANSFER ?

APPLE1:=,SYS:\$ <return>

After that, transfer all the files from Apple2. This diskette contains files that are necessary to run most Pascal programs.

From the Filer press T, for T(ransfer. Type APPLE2:=,SYS:\$ <return>. Later, when you have created other volumes on the drive you can transfer the files from the diskette Apple3.

After all the files have been transferred from the Filer press L, for L(dir, and type SYS: <return> to get an updated directory listing of Sys with the new files.

DIR LISTING OF ?

SYS: <return>

If you correctly followed the procedures in this section Sys will contain the files listed below, though not necessarily in this exact order. Through the rest of this manual we presume that at least these files are in Sys, and suggest that you keep them there. For now, the files listed are the only files you'll be needing.

CORVUS:		
SYSTEM.PASCAL	41	22-Sep-80
SYSTEM.FILER	28	18-Sep-80
SYSTEM.APPLE	32	9-Nov-80
SYSTEM.LIBRARY	34	20-Jan-81
SYSTEM.MISCINFO	1	2-Feb-81
BOOT.DATA	18	23-Jul-81
DIAG.DATA	1	10-Jul-81
PSYGEN.CODE	21	20-Jul-81
BACKUP.CODE	4	13-Sep-79
BASICS.CODE	2	26-Feb-81
CF###.###.DATA	60	23-Jul-81
DIAGNOSTIC.CODE	50	20-Jul-81
MIRROR.CODE	32	20-Jul-81
SETBOOT.CODE	19	10-Jul-81
RESTORE.CODE	4	5-Oct-79
VMGR.CODE	49	1-Jul-81
BASICS3.DATA	96	28-Oct-80
BASICS3.OMNI	96	24-Jul-81
VINIT.CODE	50	22-Jul-81
SYSTEM.EDITOR	47	24-Sep-80


```
SYSTEM.CHARSET          2 14-Jun-79
SYSTEM.SYNTAX           14  1-Aug-80
SYSTEM.COMPIILER        75 19-Sep-80
SYSTEM.LINKER           24 16-Sep-80
SYSTEM.ASSMBLER         54 19-Sep-80
6500.OPCODES            2 20-Dec-78
6500.ERRORS             7 28-Mar-79
< UNUSED >              163
27/27 FILES<LISTED/IN-DIR> 863 BLOCKS USED,
163 UNUSED, 163 IN LARGEST
```

That completes the initialization procedure for the Pascal system.

Pause

Pause, and take this moment to determine which procedures you will need to carry out in order to finalize your system configuration. The checklists below outline the various system configurations you could have.

▶ PLEASE DO NOT POWER DOWN YOUR APPLE OR DISK SYSTEM UNTIL YOU HAVE FINISHED YOUR SYSTEM CONFIGURATION.

- If you are initializing a twenty megabyte drive or two drives at the same time, you must initialize the second half or second drive. To do this, execute the Corvus Pascal program Vinit. Press I, for I)nit at the Vinit option level. When asked which volume directory to initialize, press 2 <return>. The program only takes a second, after which you are returned to the Vinit option level. At that level press Q, for Quit, and continue with this checklist to determine the steps you will take to finalize your system configuration.
- If you desire a Pascal only system proceed to the section, 'Drive Management for Single User Systems' of this chapter. That section contains instructions on adding and managing volumes on the Corvus drive. For Pascal only systems your initialization is complete.
- If you desire a Pascal-BASICs system proceed to the subheading, 'Adding DOS to Pascal' found in this section. That portion of Chapter Three gives the instructions for adding a DOS area to your Pascal initialized drive. After you have created a DOS area, you are directed to the BASICs portion of Chapter Three to finish your Pascal-BASICs drive initialization.

- If you want to configure a Pascal only system running with Constellation software, proceed to the Pascal section of Chapter Six of the Corvus Network Software section. This manual is provided with your Constellation software.
- If you want to configure a Pascal-BASICs system with Constellation, proceed to the subheading, 'Adding DOS to Pascal' found in this section. After you have created a DOS area, you are directed to the BASICs portion of Chapter Three to finish your Pascal-BASICs drive initialization. When you finish the configuring the drive for Pascal-BASICs, you proceed to the Pascal section of Chapter Six of the Corvus Network Software section.

Adding DOS to Pascal

One of the major features of the Corvus disk system is that DOS format files can be stored on the disk along with Pascal. This section describes how to create and use DOS format volumes on a disk with Pascal.

— WARNING —

WHEN IN DOS, IT IS POSSIBLE TO ALTER ANY MEMORY LOCATION, ANY BYTE ON THE DISK INCLUDING THE OPERATING SYSTEM. USING CERTAIN POKES OR CALLS MIGHT CAUSE YOU TO LOSE THE ABILITY TO BOOT. YOUR BEST INSURANCE IS TO BACK UP YOUR DISK PERIODICALLY.

To create a DOS area on the drive, you need to: 1) Execute the Corvus program Vinit. 2) Mount the volume DOS1. 3) Initialize the file System.Basic by transferring either the file Fpbas.data or Inbas.data from the Apple diskette labeled Basics Integer & Applesoft II. 4) After you have created the DOS area, you then need to initialize the DOS area of the drive according to the procedures found in the BASICs section of Chapter Three.

► **IN ORDER TO CONFIGURE ANY PORTION OF THE DRIVE WITH BASICS, YOU ARE REQUIRED TO HAVE A 48K APPLE WITH APPLESOFT BASIC AND APPLE DOS VERSION 3.3.**

Before beginning, be sure you have completed the procedures detailed in the section under the subheading, 'Initialization for Pascal.'

Vinit's D(osvol command creates a Pascal volume that consists of three areas: 1) A 96 block area that is used as the 48K warm boot area. 2) A area that contains the DOS volumes. Its size is 280 blocks times the number of DOS format volumes contained in it. 3) A 24 block that can be used for the file System.Basic.

It is important to have an understanding of what the Warm Boot Area and System.Basic are. The Warm Boot Area contains an image of the Apple's entire main memory—all 48K bytes of RAM. When you boot DOS, either by executing the program Basics or by setting the boot to BASICS by Setboot, this boot image is copied into the Apples memory and executed. This boot image is the standard Apple DOS, with the exception of a 3 byte patch for the Corvus drive.

System.Basic is a Pascal format file that is located within the DOS volume area of the drive (see figure 3.1). If this file is present when you boot into DOS its contents are loaded into the Apple Language card. This will allow you to have access to one language on the mother board and another language in the Language Card.

The D(osvol option of the Corvus Vinit program, initializes the Warm Boot Area with a copy of the file Basics3.data (or Basics3.Omni).

The following contain instruction on how to add a DOS volume area to your Pascal initialized drive, how to rewrite the Warm Boot Area and how to create System.Basic on the Corvus' drive.

To create DOS volumes, execute the following steps. Make sure you still have a diskette drive hooked up to your computer.

1. The DOS volumes area is stored in a Pascal volume called DOS1 (or DOS2 for a DOS area on drive 2), located at the end of the drive.

WARNING

YOU CANNOT EASILY CHANGE THE NUMBER OF DOS VOLUMES ONCE THEY HAVE BEEN CREATED. YOU SHOULD CAREFULLY CONSIDER HOW MANY VOLUMES YOU WANT BEFORE CONTINUING WITH THESE INSTRUCTIONS.

To create DOS1, use the D(osvol option of the Corvus Vinit program. From the Pascal command level press X, for X(ecute. Type VINIT <return>.

```
EXECUTE WHAT FILE:? VINIT <return>
```

```
VINIT : I(NIT D(OSVOL Q D <return>
```

Press D for D(sovol. D(osvol asks if you want to create DOS volumes on drive 1 (D(osvol defaults to drive 2 only after DOS volumes have been created on drive 1). Press Y, for Yes.

After pressing Y, for Yes, the program will ask you to specify the number of volumes you want on drive 1. Included in this prompt is the maximum number of volumes that can be created.

- **A DOS VOLUME AREA MUST BE CREATED ON DRIVE 1 BEFORE A DOS AREA CAN BE CREATED ON DRIVE 2. ALSO, THE NUMBER OF DOS VOLUMES CREATED ON DRIVE 1 WILL BE THE MAXIMUM NUMBER ALLOWED ON DRIVE 2.**

In the example shown below, we create 20 DOS volumes. You may create more or less if you wish by typing in another valid number of volumes.

```
CREATE DOS 3.3 VOLUMES ON DRIVE 1? Y <return>
ENTER # OF DOS VOLUMES (MAX=63): 20 <return>
```

Vinit then creates DOS1, automatically allocating 24 blocks for System.Basic. The process takes about one minute for 20 DOS volumes, during which the screen displays the following:

```
MOUNTING DOS1: ON #9:
OPENING BASICS.DATA
WRITING DOS1: DOS VOLUMES
.....
ZEROING DOS1: DOS VOLUMES
.....
UNMOUNTING DOS1
```

Vinit creates and mounts the volume DOS1 on unit #9. It copies the file Basics3.data (or Basics3.Omni) to DOS1 and creates a file called Dos Volumes on DOS1. It then zeroes the DOS volumes and unmounts DOS1.

- Next, you must mount DOS1 on unit #10. To do this you will need to use the Corvus Volume Manager (for additional details on the function and use of the Volume Manager see the section, 'Drive Management for Single User Systems' found in this chapter).

From the Pascal command level press X, for X(ecute. Type VMGR <return>. A menu displays on the top of you screen. Press M for M(ount. Type DOS1 <return> to the prompt to mount which volume. To the prompt for which unit number type 10 <return>.

```
EXECUTE WHAT FILE ? VMGR <return>
MOUNT WHICH VOLUME: DOS1 <return>
```

```
MOUNT DOS1: ON UNIT #11 10 <return>
DOS1: MOUNTED
```

DOS1 does not need to be mounted to be accessible for a BASICs user. Under normal use, DOS1 remains unmounted. However, the next step calls for a Pascal Transfer which requires the two volumes involved in the transfer be mounted.

While still in Vmgr press Q, for quit. A prompt displays asking if you want to change the default. Pressing N, for No, will leave DOS1 mounted only until the next time you boot the system.

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

3. After mounting DOS1, you then need to create the System.Basic file. When you bought your Apple Pascal Language System, you received a diskette called, BASICs Integer and Applesoft II. Place this diskette in your diskette drive. If you list the volumes on line from the Filer, this diskette's volume name is Basics. Use this name when making transfers from this diskette.

Decide how you want your BASICs system to boot. This will depend on how your Apple is equipped and which BASIC, Applesoft or Integer, you want running when you boot BASICs.

If you have Apple II with Integer BASIC on the mother board, you most likely want Applesoft in the Language card. Use the Pascal Filer to transfer the file Fpbas.data from Basics to DOS1:System.Basic. From the Filer, press T for T(ansfer. Type BASICS:FPBAS.DATA, DOS1:SYSTEM.BASIC <return>.

```
TRANSFER ? BASICS:FPBAS.DATA,DOS1:SYSTEM.BASIC
<return>
```

If you have an Apple II Plus with Applesoft BASIC on the mother board, you most likely want to put Integer BASIC in the language card. Using the Filer's transfer command type, BASICS:INTBAS.DATA,DOS1:SYSTEM.BASIC <return>.

```
TRANSFER ? BASICS:INTBAS.DATA,DOS1:SYSTEM.BASIC
<return>
```

After you have transferred the appropriate BASICs file to the Corvus drive, you must initialize the DOS volumes.

4. To continue, press Q to quit the Filer mode. You must then switch from Pascal to BASICs. To do this, Press X for X(ecute and type BASICS <return>.

EXECUTE WHAT FILE ?

BASICS <return>

After a few seconds, the Corvus header displays on the screen followed by an Applesoft prompt (I). In order to continue, you must type FP <return> after you are in the Applesoft BASICS environment. Doing this clears the part of the Apple's memory, so that you will not get a memory error when you run the Corvus programs.

5. Once you finish the above steps, everytime you cold boot the system you will come up with Pascal running. If you would rather cold boot up with BASICs running instead of Pascal, you can execute the Corvus Pascal Setboot program.

This program allows you to select which operating system the Corvus disk system automatically boots up with when your Apple is powered on or rebooted.

Before running Setboot, you must initialize the DOS volumes, after which Setboot can either be executed from Pascal or run from BASICs. Instructions on initializing your drive for BASICs can be found under the heading, 'Initializing for BASICs' in the BASICs section of this chapter.

If you would like to have the system boot to remain for Pascal you should continue to the heading, 'Initializing for BASICs' in the BASICs section of this chapter, and continue with the steps for initializing a BASICs system. Complete all the steps detailed in that section with the exception of step 3.

If you are configuring your Pascal-BASICs system with Constellation software, continue to the heading, 'Initializing for BASICs' found in the BASICs section of this chapter. Carry out all the steps outlined for initializing a BASICs system except for step 3.

6. After you initialize your DOS volumes and if you wish to set the boot to BASICs for a single user system, proceed as follows:

From the Pascal command level press X, for X)ecute. Type Setboot <return>. The screen displays two boot selections.

CORVUS BOOT SELECT PROGRAM**P)ASCAL B)ASICS <ESC>**

To make your disk system automatically boot to BASICs when powered on press B, for B)ASICS. The screen will then display the following:

SETTING BOOT FOR BASICS...**OPENING BOOT DATA...****CORVUS BOOT NOW SET TO BASICS**

chap3

When the program is finished the Pascal command line reappears on the screen.



Drive Management for Single User Systems

The information presented under this heading deals with the Pascal utility that is called by the abbreviation Vmgr, which means Volume Manager. This utility allows you to create volumes, write protect volumes, remove volumes and mount volumes for Pascal.

Also detailed under this heading are the utilities Backup and Restore. Backup is used to transfer a volume larger than a standard mini-diskette from the Corvus drive to a standard mini-diskette. Restore is used to restore files larger than a standard mini-diskette, that were backed up by the Backup utility, from the mini-diskettes back to the Corvus drive.

Vmgr

Your individual Corvus drive can consist of 11,220 to 38,460 blocks of user accessible data storage area, depending on which disk system you have. There are eight blocks on the disk that are not accessible. These eight blocks are used for booting the system and for storing the volume directory and related information (see figure 3.1). The data can be divided into as many as 63 volumes for each drive.

A Pascal volume is like an imaginary diskette. Like a diskette, it has a name (such as Sys or Apple1). Up to six volumes can be mounted at one time on Pascal I/O units #4, 5, 9, 10, 11 or 12.

Pascal format diskettes are 280 blocks long. Corvus volumes under Pascal must be in multiples of eight blocks but can be any length. You can divide the disk space in many ways. You might create one huge volume, the size of a virtual ten megabyte drive, or up to 63 volumes of the same or different lengths. You can make the last volume on the disk a special DOS volume that contains DOS format volumes (see the subheading, 'Adding DOS to Pascal,' under the heading, 'Initialization for Pascal or Pascal-BASICs.').

Pascal volumes are manipulated by the Corvus Volume Manager (Vmgr). The files in each volume are handled by the standard Pascal Filer, described in the APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL in Chapter Three.

If you have installed your system according to the procedures under the heading, 'Initialization for Pascal or Pascal-BASICs,' you will have one volume called SYS on the Corvus drive. You may also have volumes mounted in your diskette drives. The utility Vmgr is found in the volume Sys of the Corvus drive.

► IN VMGR, YOU DO NOT NEED TO TYPE A COLON AFTER THE VOLUME NAMES.

To bring up this utility press X, for X(ecute, from the Pascal command level. Type VMGR <return>. The screen displays the following options for Vmgr.

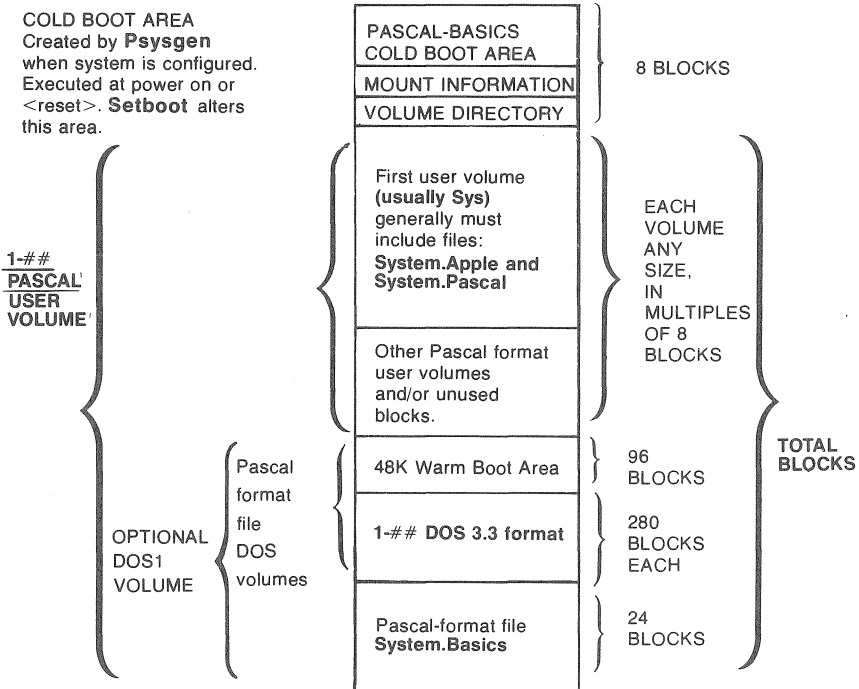
VMGR: Q L)IST N)EW R)EMOVE W)PROT M)NT U)NMNT

If you have a 40 character screen, press <ctrl>A and you will see the rest of the line.

U(NMOUNT:

Press <ctrl> A to get back to the left side of the screen.

FIGURE 3.1 PASCAL OR PASCAL-BASICS DISK STRUCTURE



Quit

If you have made no changes in your volume table pressing Q, for Quit ends the Vmgr program and returns you to the Pascal command level. If you have made changes, before it returns you to the command level, Quit asks the question:

CHANGE DEFAULT MOUNT TABLE (Y/N) ?

If you press N, for No, any changes you just made in the volume table will temporarily stay the way you set them. When the system is rebooted, the changes you have made will revert to their original setting.

If you press Y for Yes, the changes you have made will become permanent and remain in effect until you change them again. Rebooting will not affect these changes.

L)ist

Pressing L, for L)ist, brings up a directory of all the accessible volumes online. This option shows the user the length of each volume, the block address and which drive the volume is on. If a volume is write protected, an asterisk appears next to the volume name in the WP column. Additionally, if a volume is mounted, the mounted unit number is shown in the UNIT column.

If no volumes have been added since the drive was initialized, only the initialization volume is found mounted on unit four in the directory. Below is an example of newly initialized 20 megabyte drive volume listing.

CORVUS VOLUME DIRECTORY					
WP	NAME	LENGTH	ADDR	DRV#	UNIT
	SYS	1024	8	1	#4
	<UNUSED>	18206	1032	1	
	<UNUSED>	19230	8	2	

The NAME column of the above listing tells you that SYS is the only volume defined. It also shows the unused portion of the Corvus drives.

▶ THE CORVUS CONTROLLER HANDLES A TWENTY MEGABYTE DRIVE AS TWO VIRTUAL DRIVES OF TEN MEGABYTES EACH.

The length column gives the actual length of each volume in blocks. 2000 blocks is roughly equal to 1 megabyte. Using this rule of thumb, you'll see that the 1024 blocks of SYS is about half a megabyte.

The ADDR column gives the block address of the volume—i.e. tells where each volume physically begins on the disk.

The first 8 blocks on each virtual drive are reserved for system use and are unavailable for user access.

The DRIVE column refers to the physical or virtual drives connected or online. The last column, UNIT, refers to Pascal unit number a volume is mounted on. The unit numbers a volume can be mounted on are 4, 5 and 9 thru 12.

WP, in the first column, is a space reserved to indicate if a volume is write-protected. If a volume has been write-protected by the option W)prot, an asterisk will appear in the WP column. If a volume has not been write-protected, no asterisk will appear in this column.

► **CHECKING YOUR WORK IS A GOOD HABIT TO DEVELOP. IF YOU USE THE L)IST COMMAND AFTER EACH VMGR TRANSACTION, ANY LITTLE MISTAKES YOU MAKE CAN BE SPOTTED AND CORRECTED IMMEDIATELY.**

When you use Vmgr's L)ist option, only the volumes on the hard disk drive are listed and not diskette volumes. The Pascal Filer's V(ols command, however, will show the mounted unit # of a diskette.

N)ew

When you wish to create a new volume you will need to use the N)ew option of Vmgr. Press N, for N)ew, at the Vmgr command level. The first prompt requests the name of the new volume to be created. Key in the name and press <return>.

► **EACH VOLUME NAME MUST COMPLY WITH THE APPLE PASCAL SPECIFICATION OF A DISKETTE VOLUME NAME, AS FOUND IN CHAPTER THREE OF THE APPLE II APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL.**

After the prompt for the name, the program prompts you for the drive number. Specify which Corvus drive the volume is to be on by entering the appropriate number and pressing <return>. The program defaults to drive one if you just press <return>.

Next, a prompt for the volume length, in blocks, appears along with a default value. The length is rounded up to the next multiple of eight blocks (e.g. 280, 560, 1024...). You can accept the default value displayed, or you can specify a new length by keying in a new value.

Following the prompt for the volume length, a prompt for the starting block address for the new volume appears. The address defaulted by the program always places the new volume in the next available space that can contain the new volume. A volume can be placed elsewhere by keying a specific block address. The block address is also rounded up to the next multiple of eight.

If a new address overlaps an existing volume, a message indicating the error appears. Also, the program returns you to the Vmgr option level without affecting any of the data on the drive.

Follow our example in creating a new volume. In our example we are creating the volume Fangled that is 560 blocks long.

```

NEW VOLUME: ENTER VOLUME NAME: FANGLED <return>
ENTER LENGTH (BLOCKS): 1024          560 <return>
ENTER CORVUS DRIVE # (1..4) : 1      <return>
ENTER ADDRESS (BLOCKS): 1032         <return>

```

Press L for L(ist to see the new Fangled volume in the listing.

```

CORVUS VOLUME DIRECTORY
WP  NAME           LENGTH  ADDR  DRV#  UNIT
   SYS             1024    8    1    #4
   FANGLED         560    1032  1
   <UNUSED>       17646   1592  1
   <UNUSED>       19230    8    2

```

Notice the volume Fangled has no unit number assigned to it because it has not been mounted.

M)nt and U)nmnt

The M)nt option assigns a volume to a specific Pascal unit number. It is analogous to placing a diskette in diskette drive that is connected to slot 4, 5 or 6. Apple Pascal restricts volumes to units #4, 5, 9, 10, 11 and 12; therefore, only six volumes can be mounted at any time.

WARNING

THE VOLUME MOUNTED ON UNIT #4 MUST CONTAIN THE FILES SYSTEM.PASCAL AND SYSTEM.MISCINFO, OR YOU WILL NOT BE ABLE TO BOOT.

To mount a volume press M, for M)nt, at the Vmgr command level. Two prompts appear. The first is for the volume name. Reply with volume name and press <return>. The second prompt is regarding the unit the volume is to be mounted on.

A default value of an unmounted unit number displays. To accept the default value press <return>. To mount a volume on another volume number, just key in the number and press <return>.

Follow the example below for mounting the volume Fangled on unit #11. To mount it, first press M then answer as shown below.

```

MOUNT WHICH VOLUME: FANGLED <return>
MOUNT FANGLED: ON UNIT #9      11 <return>
FANGLED: MOUNTED

```

Press L for L(ist to see the result.

CORVUS VOLUME DIRECTORY					
WP	NAME	LENGTH	ADDR	DRV#	UNIT
	SYS	1024	8	1	#4
	FANGLED	560	1032	1	#11
	UNUSED	17646	1592	1	
	UNUSED	19230	8	2	

A mounted Corvus volume has priority over a diskette volume. If a diskette is placed into diskette drive one plugged into slot 4, it would be mounted on unit #9. If a Corvus volume is subsequently mounted on unit #9, the diskette would not be accessible and any references to unit #9 would refer to the Corvus volume.

To access the diskette again, after the mount for the Corvus volume had been changed permanently, you can either mount the Corvus volume with a different unit number or you can unmount the Corvus volume.

If you mount the Corvus volume to a different unit number the program will display a note that the volume is already mounted. To remount it, simply disregard the message and proceed as before.

Unmount disassociates a volume from the unit on which it is mounted. It is comparable to removing a diskette from a diskette drive.

WARNING

WHEN YOU TURN ON YOUR APPLE, IT BOOTS FROM THE FILES ON THE DISK. IF YOU UNMOUNT THE VOLUME THAT CONTAINS THE BOOT FILES NAMED SYSTEM.PASCAL AND SYSTEM.MISCINFO, YOU WILL BE UNABLE TO BOOT FROM THE DISK. THE VOLUME THAT CONTAINS THE BOOT FILES MUST ALWAYS BE MOUNTED ON UNIT #4. IF YOU ATTEMPT TO UNMOUNT THIS VOLUME, VMGR WILL WARN YOU OF THE DANGER AND GIVE YOU A CHANCE TO CHANGE YOUR MIND.

To unmount a volume simply press U, for U)nmnt, from the Vmgr command level. A prompt displays that requests the volume name or the unit number of the volume to be unmounted. Key in the reply and press <return>. Follow the example below, after pressing U, for unmount.

```
UNMOUNT: VOLUME NAME OR "UNIT #": FANGLED
FANGLED UNMOUNTED
```

W)prot

At times it may be desired to protect a volume from someone who may accidentally or intentionally write to the volume and possibly destroy data. To protect a volume from such a situation the W)prot can be used. When a volume is write-protected, it cannot be edited. This option is analogous to putting a write protect sticker on a diskette. However, files in that volume can be read and programs in it can be executed. In addition, W)prot protects a volume from being removed from the directory.

To write-protect a volume press W, for W)prot, from the Vmgr command level. A prompt for the volume name to be write-protected displays. Key in the name and <return>.

```
PROTECT: ENTER VOLUME NAME:      SYS <return>
SYS: NOW WRITE PROTECTED  "*"'
```

Use the Volume Manager to list the Corvus volume directory. When you do, you will see an asterisk in the WP column adjacent to the name Sys.

CORVUS VOLUME DIRECTORY					
WP	NAME	LENGTH	ADDR	DRV#	UNIT
*	SYS	1024	8	1	#4
	FANGLED	560	1032	1	
	<UNUSED>	17646	1592	1	
	<UNUSED>	19230	8	2	

This option is a flip-flop (or toggle) type command. If you repeat it after you have protected a volume, it will unprotect the volume. If a volume is not protected, W)prot protects it.

R)emove

In addition to creating volumes, Vmgr can also be used to purge volumes. The R)emove option is used to remove a specified volume. Removing the volume removes the volume name from the Corvus volume directory.

To use this option press R, for R)emove. This option gives you a chance to change your mind before it removes the volume. The first question R)emove asks you is, if it's o.k. to destroy the specified volume. If you respond with a Y, for Yes, the remove is carried out. An N, for No, aborts the attempt.

Press R for R(emove. Type FANGLED <return>.

ENTER VOLUME NAME:

FANGLED <return>

OK TO DESTROY FANGLED:?

Y

You must press Y to confirm the destruction of Fangled. If you press N for No, the Vmgr aborts the remove attempt. This acts as a safety that may spare you the agony of delete.

Press L for L(ist to see that Fangled has been removed. R(emove is smart enough to unmount Fangled, then remove it, if it was mounted. A write protected volume must be unprotected before it can be removed.

Backup

At times it may be necessary to back up volumes from the Corvus disk drive to mini diskettes. To do this, the transfer option of the Apple filer could be used. Yet if the volume to be transferred is larger than a standard 280 block mini-diskette, the transfer option may be cumbersome since it was designed to transfer individual files.

For this reason the Corvus Pascal utilities include a utility titled Backup. With the Backup utility, whole volumes larger than a standard 280 block mini-diskette can be transferred to multiple diskettes. Each diskette is given the volume name BAKUP in addition to being numbered. This allows for the volumes to be restored in proper sequence.

Later, if the user wants to re-establish the backed up diskettes to the Corvus drive, the transfer option of the filer can be used. Using wild cards, as explained in the APPLE PASCAL OPERATING SYSTEM REFERENCE MANUAL under the heading, 'T(ransfer,' can make the transfer with one series of instructions.

In some cases an individual file, most likely a data file, may be larger than a diskette. Backup handles such a file by dividing it, then appending a period to the end of the file name in the directory. Since the Transfer option would prove ineffective in re-integrating a divided file, Corvus provides a utility that restores files fractured by Backup. This utility is explained further in the next section.

- ▶ **BEFORE RUNNING THE BACKUP UTILITY, A FORMATTED DISKETTE SHOULD BE IN A MOUNTED DISKETTE DRIVE IN ADDITION YOU MUST HAVE A SUFFICIENT NUMBER OF FORMATTED DISKETTES TO CONTAIN THE VOLUME.**

To store a whole volume on diskettes, execute Backup. When the program comes up it displays the heading along with a prompt for the source unit number. The source unit number which is requested is the mounted Corvus volume unit number that is to be transferred to diskettes. Key in the number and <return>.

After pressing <return> the program begins to load the volume in the Apple computer's memory. When the memory is full the screen displays the prompt to mount Backup1. The name Backup1 refers to what the program names the blank diskette when it copies the volume. Each diskette is named Backup in addition to being numbered. When the prompt says to MOUNT BAKUP1, it is simply reminding the user to that a diskette drive with a diskette should already be mounted on a unit number.

Following the prompt to mount Backup1, the program asks for the destination of the volume. Generally a diskette drive is connected to slot four of the Apple, making it unit number nine. Yet a diskette drive can be on any mountable unit number, depending on which slot it is in.

Key in the appropriate unit number of the diskette drive containing the formatted blank diskette, and <return>.

Continue by following the example below, after executing Backup. In our example the volume to be transferred to diskettes is named Sink and is mounted on unit #11. The volume is 480 blocks long.

CORVUS BACKUP UTILITY

ENTER SOURCE UNIT #(4,5,9..12):

11 <return>

BACKING UP SINK:...

MOUNT BAKUP1:

ENTER DESTINATION UNIT #(4,5,9..12):

9 <return>

Once the destination is specified the program displays a warning that it has found the blank diskette. The program gives this warning if it finds any volume name other than Backup1 (or whatever number it is on).

After the warning the user must select one of the command options presented. Pressing the <space> key allows the program to continue with the parameters already specified. Pressing the <esc> key terminates the program and returns the user to command level.

If all is well the user should press the <space> key. The program continues copying the files in the volume until the output is full or the backup is completed. If more diskettes are needed the screen displays the prompt to mount Backup2, this refers to the next diskette. Continue as before.


```

WARNING: FOUND BLANK
<SPACE> TO CONTINUE
<ESC> TERMINATES
R TO REMOUNT
  COPYING THISFILE.TEXT...
  COPYING THATFILE.TEXT...
  COPYING ANYFILE.CODE...
  COPYING WHICHFILE.DATA...
  BACKUP FINISHED0

```

<space>

When Backup has completed the screen is returned to the command level.

Restore

Restore is to be used in connection with the Backup utility. It's function is to re-integrate files that have been fractured by Backup.

Normally the Backup utility will fill a diskette as much as possible without dividing files. Yet if an individual file is too large to fit on a standard 280 block diskette, it is fractured and a period is appended at the end of the file name in the directory.

For example if a data file named Toobig was 320 blocks long, Backup would have split the file to fit on two diskettes. If a listing of the diskette containing the first half of Toobig was displayed, the file name would look like this:

```
TOOBIG.DATA.
```

No dot would be appended after the word code for the last diskette containing Toobig.

► **BEFORE RUNNING THIS UTILITY BE SURE TO HAVE A DISKETTE DRIVE MOUNTED.**

To run this utility, execute Restore. The screen displays the following heading.

```
CORVUS FILE RESTORE UTILITY
```

After the heading, the screen displays the prompt for the destination unit number. This prompt is answered by the user keying the

volume unit number of where the file is to be re-integrated. Key the number and <return>. A prompt then displays asking for the file name that is to be restored. Key in the name and <return>. The program then processes the information. This is indicated when the screen displays, COPYING.

When the information is processed a prompt requests that a diskette be mounted and asks you to specify which unit number it is mounted on. Keying zero at this point exits the program and returns the user to the command level.

In the following example the data file Toobig is stored on diskettes, Backup3 and Backup4. It is to be restored to volume on unit 12 of the Corvus drive. Continue with the example.

```

ENTER DESTINATION UNIT #(4,5,9..12): 12 <return>
ENTER FILE NAME: TOOBIG.DATA <return>
COPYING TOOBIG.DATA...
MOUNT BACKUP VOLUME
AND ENTER UNIT #(4,5,9..12)
OR ZERO AFTER LAST VOLUME: 9 <return>

```

After pressing <return> the program continues with copying the diskette. It prompts for the destination number again if there is still more of the file to be transferred. When the transfer is complete the screen displays the command level.



BASICs

The BASICs portion of this chapter deals with the utilities found on the diskettes labeled, 'Corvus Systems AP Utilities BASIC DOS.' There are 15 utilities on this Corvus diskette. The utilities can be classed into three categories: drive initialization, file manipulation and drive maintenance.

In addition to providing set services, some of the utilities can also be used as guides to aid you in creating programs tailored for your specific needs.

Drive initialization utilities are those needed to initialize or set up your Corvus drive to operate with DOS. The utilities in this category are Bsysgen, Bringup, Copy3, Volume Init, Applesoft Boot Prep and Boot Prep.

The section of this chapter entitled, 'Initialization Utilities,' considers the utilities used to initialize your Corvus drive. That section should be read before configuring your drive, since it gives an explanation of the initialization utilities which may clear up any questions that may arise during initialization.

'Drive Management for Single User Systems,' is the section of this chapter that discusses the utilities File Finder, File Mover, Unlock Volume, Volume Updater and CATV99.

The Mirror utility is described in Chapter four, 'Using Your Corvus Mirror.'

In Chapter Five you will find information on the Diagnostic utility as well as information on drive trouble shooting. That section covers the options of the Diagnostic utility that allow you to examine and change certain parameters of Corvus drive as well as the procedures on how to perform various updates and integrity checks on the drive.

► **THE TERMS DOS AND BASIC ARE USED INTERCHANGEABLY IN THIS MANUAL.**

Description of Initialization Utilities

This section discusses the initialization utilities found on the Corvus BASIC diskette. This section is designed to familiarize you with the initialization utilities before you begin the actual initialization procedures as detailed under the heading, 'Initialization Procedures for BASICs.' It can also be read after you have completed the initialization process as a review or for further insight.

Bsysgen is the first utility you use to initialize your Corvus drive for a BASICs only system. This program generates the BASICs system and divides the Corvus drive into the fixed sized DOS volumes.

The next utility you need to run is Bringup. The function of this program is to put a patch in DOS to access the Corvus drive.

Applesoft Boot Prep and Boot Prep allow you to boot up with either Applesoft BASIC or Integer BASIC, provided your computer is equipped with the proper hardware and software.

Volume Init is used to initialize a given range of volumes on the Corvus drive. This program initializes volumes, making them ready for use. It is similar to the Init command of DOS performed on a diskette.

Copy3 copies a complete volume from the Corvus drive or from a diskette drive to a specified volume on the Corvus drive or to another diskette drive. For initialization, this program is used to transfer the Corvus utilities from a diskette to the Corvus drive which configures your first volume.

Bsysgen

Bsysgen is used to initialize the Corvus drive for a DOS only configuration and should be run before running any of the other utilities.

If you are initializing your drive for a Pascal-BASICs system, you do not run this utility. Your drive has already been initialized by the Psysgen utility executed under Pascal. This utility performs two system generation tasks. The first is it writes the BASIC boot code on the Corvus drive. This allows the drive to boot automatically to BASIC, after the Applesoft Boot Prep or Integer Boot Prep program has been run.

The second function of this program performs is to divide the Corvus drive into the fixed sized images of DOS volumes, in addition to zeroing the directories of each volume.

WARNING

BSYSGEN DESTROYS DATA ON YOUR DISK. DO NOT USE THIS PROGRAM UNLESS YOU ARE INITIALIZING OR REFORMATTING YOUR DRIVE.

To use Bsysgen, you'll need a diskette drive connected to slot #4 with the Corvus BASICs utilities in it. You then load and run Bsysgen from the diskette drive connected to slot #4. The Corvus interface card must be connected to slot #6.

- ▶ **BE SURE TO POWER OFF ALL CORVUS DEVICES CONNECTED TO YOUR APPLE BEFORE INSERTING OR REMOVING ANY OF THE CORVUS OR APPLE CARDS.**

Before running Bsysgen, be sure all Corvus devices connected to your Apple computer are powered down. With the utilities in the diskette drive, power on your Apple. Type LOAD BSYSGEN <return>. Type RUN <return>.

```

]                               LOAD BSYSGEN <return>
]                               RUN <return>

```

The computer responds with the following:

```

VER ##.##
DISK FORMATTER-3.3 BASICS ONLY

```

When the above program header displays on the screen, power on the Corvus drive and other devices connected to the Apple.

- ▶ **IF YOU HAVE A TWENTY MEGABYTE DRIVE, THE CORVUS CONTROLLER USES IT AS TWO TEN MEGABYTE DRIVES. IN TURN YOU MUST SPECIFY WHICH DRIVE YOU ARE INITIALIZING. IF YOU HAVE A FIVE OR TEN MEGABYTE DRIVE YOU MUST KEY IN ONE.**

To run Bsysgen on drive one, key in 1 to the following prompt.

```

WHICH DRIVE DO YOU WANT FORMATTED
FOR BASICS ONLY? (1 OR 2)           1

```

The program then informs you that it destroys any data on drive one and asks if you want to continue. Typing N for No aborts the utility, without affecting the Corvus drive. Typing a Y for Yes continues the program.

```

THIS PROGRAM DESTROYS ANY DATA
ON THE DRIVE.
OK TO BSYSGEN? (Y/N)               Y

```

Next you are asked if you are setting up a five megabyte drive. Reply Y, for Yes, if you have a five megabyte drive. Reply with N, for No, if you have a ten or a twenty megabyte drive. After answering the prompt, the program continues with writing the boot tracks and zeroing the directories.

```
LOADING BSYSGEN.OBJ---  
WRITING BOOT TRACS---  
.....  
ZEROING DIRECTORIES---  
.....  
FORMAT DONE  
DRIVE IS FORMATTED  
WITH 67 BASICS VOLUMES
```

Bsysgen takes about 90 seconds to finish the system generation. If you have a five megabyte drive, Bsysgen will configure your drive with 37 instead of 67 BASICS volumes.

If you have a twenty megabyte drive, you have to run this program twice: once for virtual drive one and again for virtual drive two.

Bringup

The Bringup program must be run Bsysgen in order to access the Corvus drive. What Bringup does to allow access to the drive is put a patch in DOS so you will then be able to talk directly to the drive. This program should only have to been run once, as part of initialization.

This program should be loaded from a diskette drive containing the Corvus utilities. To load and run BRINGUP type LOAD BRINGUP,S4,D1,V0 <return>. Then type RUN <return>.

```
| LOAD BRINGUP,S4,D1,V0 <return>  
| RUN <return>
```

The program introduction states that this program works properly only if the drive is configured for Pascal-BASICs, the Bringup utility will not work properly. for drives that are DOS only (i.e, not Pascal-BASICs). If all is well proceed by keying Y, for Yes, to continue.

```
VER ###.## BRINGUP UTILITY IS FOR  
DRIVES THAT ARE DOS ONLY. IF  
THE DRIVE HAS BEEN FORMATTED  
WITH PASCAL THIS PROGRAM WILL  
NOT WORK PROPERLY.  
CONTINUE? (Y/N)
```

Y

The screen displays the configuration of the drive and displays the volume directory of drive one. Since nothing so far is on the drive the screen just displays the heading as in the example below.

```
YOU ARE CONFIGURED AS 67 VOLUMES
OF 16 SECTOR IMAGES.
VOL DIRECTORY - CORVUS AP - DRIVE 1
```

A directory listing can be displayed by typing CATALOG,V99 <return> if you are using a disk system with flat cable. If you are using a system with Omninet, you will need to type BRUN CATV99 <return>.

Applesoft Boot Prep

Applesoft Boot Prep must be run in order to enable your system to boot up and running in BASIC automatically when your drive is powered up. To enable your system to do this, Applesoft Boot Prep copies the 48K byte image of your Apple computers RAM and transfer it to the warm boot area of the Corvus drive.

If you would like to boot up Integer BASIC you must run the Boot Prep program instead of Applesoft Boot Prep. But if you would like to boot up in Applesoft BASIC, first load this program. Next, you must type CATALOG,S6,D1,V1. The catalog command sets the boot default to the Corvus drive. If you want the default to be to a different volume than volume 1, just specify a different volume when you type the catalog command. After that, type RUN <return>. Follow the example.

```
] LOAD APPLESOFT BOOT PREP <return>
] CATALOG,S6,D1,V1 <return>
] RUN <return>
```

After typing RUN and pressing <return>, the screen displays what is shown when you boot system.

```
><-----><
><
>< CORVUS AP ><
>< DOS 3.3 ><
><-----><
```

This program or Boot Prep, must be run as part of the initialization of your Corvus drive. If you have only run Bsysgen and Bringup and then power off without running this program, you will not be able to boot off of the Corvus drive. In turn, you will have to boot from a diskette drive again.

Boot Prep

This program puts a boot image in the warm boot area of the Corvus drive, like the Applesoft Boot Prep program.

It is different however, because it brings up the Integer basic boot image and not the Applesoft boot image. In order for this utility to function, you must have the the necessary Integer hardware and Integer boot information.

If the above requirements have been met, load Boot Prep the same way Applesoft Boot Prep is loaded and run. After the program is run, the screen displays the following:

```
>< ----- ><
><          ><
><  CORVUS AP  ><
><          ><
>< ----- ><
```

```
>
```

You will notice the prompt is not the Applesoft prompt (I), but is the integer prompt (>).

This program not only displays the integer boot message, but also boots your system to Integer BASIC.

Copy3

COPY3 copies the contents of any volume to another volume. It cannot copy over write-protected volumes. Copy3 is also equipped with error detection, which reports the number of errors found during copy.

A error indicates that a portion of the data was not copied. If there was a serious media defect, the program would terminate with an error message.

To copy the contents of a diskette to the Corvus drive, follow the model below, after which the screen displays the header for the copy utility.

```
I LOAD COPY3,S4 <return>
I RUN <return>

VER ###.## CORVUS SYSTEMS C O P Y 3
ONLY DOS 3.3 VOLUMES CAN BE
SUCCESSFULLY COPIED.
```

After the header you receive the prompt, FROM SLOT (4): ?, this asks if the copy is coming from a device connected to slot 4. If it is,

press <return>. If not, type the appropriate slot number and <return>. Answer the next prompt FROM DRIVE (1) by keying in the appropriate drive number and <return>. Do the same for the last FROM? prompt which is FROM VOLUME (0).

► **COPY3 REQUIRES THAT YOU SPECIFY VOLUME 0 FOR A DISKETTE.**

If you have the Corvus BASICs utilities in the diskette drive, the following example puts a copy of them into volume one of the Corvus drive.

```
FROM SLOT (4): ? <return>
FROM DRIVE (1): ? <return>
FROM VOLUME (0): ? <return>
```

After the FROM? prompts, you receive a series of TO? prompts. These ask where you want the copy to be transferred. Answer the prompts with <return> or the correct numbers and <return>, as you did with the FROM prompts. Following our example puts a copy of the Corvus utilities in volume one of the Corvus drive.

```
TO SLOT (6): ? <return>
TO DRIVE (1): ? <return>
TO VOLUME (1): ? <return>
```

The Copy3 program re-displays your selections and asks if it is all right to copy. If all is well type Y, for Yes. Copying takes from one to four minutes.

```
OK TO COPY? Y
```

When the copy is completed the program reports back the number of errors detected during copying. It also asks if you would like to copy again. Keying N, for No, ends the program. If you key Y, for Yes, the program asks if you would like to change the copy parameters.

```
0 ERRORS DURING COPY
COPY AGAIN? N
CHANGE COPY PARAMETERS?
```

If you press N, for No, to this question the program will copy again with the previous instructions. Keying Y, for Yes, returns the

program at the FROM? prompts, allowing you to re-enter your parameters.

Volume Init

Like a diskette, each volume on the Corvus drive must be initialized before it can be used. Volume Init is analogous to the Init command of DOS. (See the Apple DOS Manual for an explanation of the Init command.)

The difference between Volume Init and the Init command of DOS is that Volume Init will initialize a given range of volumes as opposed to just one at a time.

It is generally easier to initialize all the volumes at one time, even though individual volumes can be initialized as they are needed.

If you have copied the Corvus utilities to volume one of your Corvus drive, then there is no need to initialize that volume. Any volume that you have copied an initialized diskette to is initialized automatically. In fact, you should not run Volume Init on these volumes since it will destroy the data on them.

To run Volume Init from the diskette drive, type LOAD VOLUME INIT <return>. Then type RUN <return>.

After the introduction, you receive a series of questions to answer in order to continue the volume initialization.

Volume Init's first question asks you which drive you want initialized. Enter the desired selection and continue according to the example.

WHICH DRIVE (1 OR 2)?

1 <return>

The next prompt asks for the first volume to be initialized. Press the volume number desired and <return>. Since volume one has the Corvus utilities start with volume two.

After responding to the first prompt, you receive a prompt for the last volume to be initialized. Enter the desired number and <return>. Follow the example given.

FIRST VOLUME (1 TO 67)?

2 <return>

LAST VOLUME (1 TO 67)?

67 <return>

After this, a question is asked to reconfirm your selection and to ask if you are sure of your choices. The reason for this confirmation is that volume initialization wipes out all the data in the volumes initialized once you key Y, for Yes.

Volume Init takes several minutes to complete initialization.

```
INITIALIZE VOLS 1 THRU 67
ON DRIVE 1
ARE YOU SURE?
INITIALIZING VOLUME 2.
VOLUME 2 INITIALIZED.
VOLUME 67 INITIALIZED.
VOLUME 2 THRU 67 ARE INITIALIZED.
```

The volumes are now ready to store data.

Initialization Procedures for BASICS

This section describes the procedures used to initialize your Corvus drive for a Basics only system. It also contains the procedures you will need to carry out in order to complete the initialization of a Pascal-BASICS system. It is to your best advantage to read the entire procedure before beginning, since doing so decreases the number of questions that may arise during the actual initialization process.

- ▶ **THE CORVUS UTILITIES CAN ONLY BE RUN UNDER DOS 3.3 APPLESOFT BASICS. YOU NEED TO HAVE EITHER AN APPLE II PLUS, AN APPLESOFT ROM CARD WITH THE APPROPRIATE CONTROL ROMS OR APPLE LANGUAGE CARD WITH APPLESOFT LOADED INTO IT IN ORDER TO USE THE CORVUS UTILITIES.**

At this point we presume you are familiar with how your Apple BASIC and the DOS operating system work. You are allowed 67 volumes per virtual or physical ten megabyte drive. For a five megabyte drive, you are allowed 37 volumes. These numbers are the maximum you can have with a BASICS only system. If you have a Pascal-BASICS system, the amount will be less.

- ▶ **IF YOU ARE NOT FAMILIAR WITH THE DOS OPERATIONS LOAD, RUN, AND CATALOG, PLEASE REFER TO CHAPTER 2 AND 3 OF THE APPLE II DOS MANUAL.**

The following is a checklist of the procedures you will perform in order to initialize the Corvus drive.

- For a Pascal-BASICS system:
 - 1) Complete the initialization procedures for Pascal, as outlined in the Pascal section of this chapter.
 - 2) After executing the Pascal program Basics, to get the BASICS environment, type FP <return>. This will clear part of the memory and reset some of the pointers so you can continue without receiving an out memory range error.
 - 3) Read steps 1 and 2, then follow the instructions from step 5 on. Step 5 tells you to run the Corvus BASICS program, Applesoft Boot Prep.
 - 4) After step 5, run the Corvus program Copy3, to copy the Corvus BASICS utilities to the first volume on the Corvus drive.

- 5) Once the utilities are copied, run the Corvus program Volume Init to initialize all the volumes on the Corvus drive. Do not initialize volume one, the volume that the Corvus utilities.
- 6) If you want to configure a Pascal-BASICs with Constellation software, go to the Pascal section of Chapter Six of the Corvus Network Software section. If you do not want Constellation software in effect, go to the section headings, 'Drive Management for Single User Systems' in both the Pascal and BASICs section of this chapter.

- For a BASICs only system:

- 1) Be sure to have the Corvus BASICs diskette. Power down all devices and connect the Corvus interface card to slot 6 of the Apple and a diskette controller card to slot 4.
- 2) With the Corvus BASICs utility diskette in the diskette drive, power on the Apple. After the BASICs is booted from the Corvus diskette, power on all the Corvus devices connected to the Apple.
- 3) Run the Corvus program Bsysgen. If you have more than one Corvus drive, run Bsysgen again and specify that the second drive is to be initialized.
- 4) After step 5, run the Corvus program Copy3, to copy the Corvus BASICs utilities to the first volume on the Corvus drive.
- 5) Once the utilities are copied, run the Corvus program Volume Init to initialize all the volumes on the Corvus drive. Do not initialize volume one, the volume that contains the Corvus utilities.
- 6) If you want to configure a BASICs only system with Constellation software, continue to the BASICs section of Chapter Six in the Corvus Network Software section. If you do not want Constellation software in effect, continue to the heading, 'Drive Management for Single User Systems' in the BASICs section of this chapter.

Bringing Up DOS

The Apple computer cannot boot from the Corvus drive until a system has been generated on the drive. If you have initialized your drive with Pascal and are continuing with the procedures to add

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DOS, your system at this point boots to Pascal. If you are initializing your system for BASICs only, you must boot DOS from a diskette drive with a system master diskette or the Corvus utilities diskette.

Additionally, when you receive your drive it is empty—there is no information on the disk. You must put some special programs on the drive to make the system useful. This is called configuring the system.

If you are configuring a Pascal-BASICs system, you will find that you'll have less than the number of DOS format volumes given in these examples. Additionally, you must be aware that you will not need to generate DOS by the Bsysgen utility since the equivalent has been done by the Corvus Pascal Vinit utility. Additionally, you will not need to run the BASIC program Bringup.

WARNING

INITIALIZING THE CORVUS DRIVE EFFECTIVELY REMOVES ALL DATA FROM IT. TO AVOID LOSS OF DATA, YOU MUST BACKUP THE DATA ON THE DRIVE BEFORE YOU REINITIALIZE IT.

1. Before beginning, be sure your Apple computer and all Corvus devices are powered down. Next, insert the Corvus interface card in slot 6 and a diskette controller card in slot 4.

If you are continuing the initialization procedures for a Pascal-BASICs system, you do not need to power down your devices. With the exception of steps 3 and 4, continue to follow all the instructions detailed under this heading.

POWER OFF

Also, be sure to have all the Apple BASICs diskettes and the Corvus BASICs utilities diskette.

2. Insert the Corvus BASICs utilities diskette into the diskette drive and power on the Apple. Remember, no matter what your boot default is for, DOS 3.3 Applesoft BASICs must be in operation in order to run the Corvus utilities.

If you are configuring a Pascal-BASICs system, your drive should already be running and the screen should display the Applesoft prompt. If this is not the case, you should review the procedures in the Pascal section under the subheading, 'Adding DOS to Pascal,' to see if you missed any steps. If all is well, continue to step 5 under this subheading.

If your Apple is equipped with an auto boot ROM, after powering on the computer to boot the system, the screen dis-

plays the header of the Corvus BASICs utilities along with a list of the utilities contained on the diskette.

If your Apple is not equipped with an auto boot ROM or if your system is already running, you must boot the Corvus diskette by typing either 4<ctrl>P <return> when the monitor prompt (*) appears, or PR#4 <return> when the Applesoft prompt (]) or the Integer prompt (>) appears.

If you have trouble with booting the system, refer to the section titled, 'Bootting DOS' in Chapter 2 of the APPLE II DOS MANUAL.

When the system is up and running, the Corvus diskette directory is on the screen and the Applesoft prompt is also on the display, you are then ready to power on all the Corvus devices connected to your Apple.

- The drive will make a chirping noise, which will dissolve to a whirring purr in approximately 40 seconds. The whirring purr is the normal sound of a properly functioning 10 or 20 megabyte drive. A 5 megabyte drive comes ready in about 30 seconds and makes a humming noise while running.

When the ready light on the front panel of the Corvus drive is the only light on, type LOAD BSYSGEN,S4,D1,V0 <return>. Then type RUN <return>.

```

] LOAD BSYSGEN <return>
]
] RUN <return>

```

The screen displays the utility header along with a prompt for which drive is to be Bsysgened. Type 1 in response to which drive you want formatted. After you have run Bsysgen on drive 1, if you have a 20 megabyte or a second physical drive, run Bsysgen again to generate the BASICs system on the additional drive. Bsysgen is run the same way you did for the first drive, with one exception; when Bsysgen asks which drive to format, answer with the drive number 2.

► THE CORVUS CONTROLLER USES A TWENTY MEGABYTE DRIVE AS TWO VIRTUAL TEN MEGABYTE DRIVES.

```

VERSION ##.##
DISK FORMATTER-3.3 BASICS ONLY
WHICH DRIVE DO YOU WANT FORMATTED FOR
'BASICS ONLY' ?

```

1

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Once you specify which drive is to be initialized, the program displays a question asking if it is all right to continue. If you press N, for No, the program is aborted without affecting the drive. If all is well press Y, for Yes.

After that, the program questions whether you are formatting a five megabyte drive or not. Answer Y, for Yes if you are and N, for No, if you are not.

Initialization takes approximately 90 seconds, during which the screen displays the following:

```
LOADING BSYSGEN.OBJ---
WRITING BOOT TRACKS - - -
.....
ZEROING DIRECTORIES - - -
.....
FORMAT DONE
DRIVE IS WITH 67 BASIC VOLUMES
```

- 4. The program you just ran, Bsysgen, generated the BASICS system by formatting the disk with the fixed sized volumes of DOS. Now you must run a program that connects Apple's standard DOS to the Corvus drive firmware.

With the Corvus BASICS utilities diskette still in the diskette drive, type LOAD BRINGUP <return>. Type RUN <return>.

```
LOAD BRINGUP <return>
h
RUN <return>
```

If all is well press Y, for Yes, when the program asks if you wish to continue. The screen displays the following.

```
VER ##.##
BRINGUP UTILITY - DOS ONLY

THIS PROGRAM IS FOR A DRIVES THAT ARE DOS
ONLY. IF THE DRIVE HAS BEEN FORMATTED WITH
PASCAL THIS PROGRAM WILL NOT WORK PROPERLY.

CONTINUE ?
```

Y

The screen displays the configuration of the drive followed by a volume directory—but since there are no volumes on the Corvus drive yet, the directory will not be very interesting. If you have a five megabyte drive, your system configuration is 37 instead of 67.

**YOU ARE CONFIGURED AS 67 VOLUMES
OF 16-SECTOR IMAGES.**

VOL DIRECTORY - CORVUS AP - DRIVE 1

The screen will then display the Applesoft BASIC prompt (]). A directory listing can be displayed by typing CATALOG,V99 <return> if you are using a disk system with flat cable. If you are using a disk system with OMNINET, you will need to type BRUN CATV99 <return>.

Bsysgen formats the Corvus drive and Bringup connects DOS to the Corvus firmware. Bringup puts a 3-byte patch in DOS's RWTS (Read or Write a Track and Sector) to refer all disk references to the Corvus firmware. For further information on the RWTS subroutine see the heading, 'The RWTS Subroutine' in Chapter 9 of the APPLE II DOS MANUAL.

5. Next, setup the Warm Boot Area on the Corvus drive so that when you boot BASICs, you will have Applesoft running. Your Apple should be displaying the Applesoft prompt (]). With the Corvus BASICs Utilities diskette in your diskette drive, type LOAD APPLESOFT BOOT PREP,S4 <return>. Type CATALOG,S6,D1,V1 <return>.

■]■ LOAD APPLESOFT BOOT PREP,S4 <return>

■]■ CATALOG,S6,D1,V1 <return>

■]■ R <return>.

This will load the Applesoft Boot Prep program from the diskette and run it. The program will copy all the data in your Apple's RAM into the Warm Boot Area of the disk. Then when you boot from the disk, the data will be copied from the Warm Boot Area back into your Apple's RAM and you will be up and running with Applesoft.

- ▶ **AN APPLE II THAT HAS AN APPLESOFT CARD WITH AN AUTO BOOT ROM AND HAS INTEGER ROM ON THE MOTHERBOARD WILL NOT PROPERLY BOOT USING THE APPLESOFT BOOT PREP. THE SYSTEM MUST BE BOOTED IN INTEGER EVEN THOUGH THE SWITCH ON THE APPLESOFT CARD IS SET FOR APPLESOFT.**

If you wish to boot up with Integer instead of Applesoft, run the program Boot Prep instead of Applesoft Boot Prep, following the instructions above.

- With the Corvus BASICs Utiliie diskette still in the diskette drive, copy it to volume one on the disk. Use the program Copy3 to do this.

Type LOAD COPY3,S4 <return>. Type RUN <return>. Answer the TO and FROM prompts as in the example below. When the program asks if it is ok to copy press Y, for Yes.

```

ONLY DOS 3.3 VOLUMES CAN BE
SUCCESSFULLY COPIED

FROM:

SLOT (6):?                4 <return>
DRIVE ():?                1 <return>
VOLUME (1):?              0 <return>

TO:

SLOT (4):?                6 <return>
DRIVE (1):?               1 <return>
VOLUME (0):?              1 <return>

OK TO COPY ?                Y
    
```

Copy3 copies all the files on the diskette (slot 4, Drive 1, Volume 0) to the Corvus drive (Slot 6, Drive 1, Volume 1). Volume 0 indicates a diskette. The copying takes a couple of minutes. After it is done, the program will give you a chance to copy other volumes. Press N for No.

Type CATALOG,V1,S6 <return> to list the files on volume one of the Corvus drive. You should see all the files you just copied from the diskette to volume one.

- Before the Corvus drive can be used, each individual volume must be initialized. Even though the 37 or 67 volumes on the drive were zeroed by Bsysgen they must still be initialized. You can initialize each volume when you want to use it by transferring an initialized diskette to it, but it is easier to use the Corvus program Volume Init to initialize all the volumes at once. The program takes about four or five seconds per volume (approximately six minutes for 67 volumes).

If you have copied the Corvus utilities to volume 1, do not run Volume Init on that volume. Only run Volume Init on volumes that have not been initialized by copying an initialized volume to it.

To run this program type LOAD VOLUME INIT,S6,V1 <return>. Type RUN <return>. The screen displays the pro-

gram header along with prompts pertaining to the volumes to be initialized. To these prompts, key the first volume to be initialized and <return> then key in the last volume and <return>. Follow the example below.

```
VER ###.###
```

```
BULK VOLUME INITIALIZATION PROGRAM  
INITIALIZES A GIVEN RANGE OF VOLUMES.
```

```
WHICH DRIVE ? 1 <return>
```

```
ENTER FIRST VOLUME NUMBER: 2 <return>
```

```
ENTER LAST VOLUME NUMBER: 67 <return>
```

After about six minutes, all 67 volumes will be initialized and ready for storing data. The following message will appear.

```
VOLUME 2 THRU 67 ARE INITIALIZED
```

For the second half of the DOS volumes on a 20 megabyte drive or on an add on drive, you must initialize it the same way you did for the first drive. After you have initialized all of the drives you will never have to run Volume Init again (unless you zero the disk for some reason).

Your Corvus drive is ready for BASICs-only or Pascal-BASICs operation. The rest of this chapter describes how to use your BASICs portion of the drive, including how to manipulate all the volumes and a technical discussion of how the disk is organized.

- If you have a Pascal-BASICs system, you can boot BASICs from Pascal using the X(ecute command to execute the program Basics. Or you can use the Setboot utility to set the boot to BASICs (see the heading, 'Drive Management for Single User Systems' in this portion of Chapter Three). "If you wish to go back to the Pascal environment, run the Corvus BASICs program Pascal."
- If you decide to configure your drive as a BASICs only system with Constellation software then proceed to the BASICs section of Chapter 6 of the Corvus Network Software section.
If you have a Pascal-BASICs system and you would like to configure it with Constellation software, go to the Pascal section of Chapter 6 of this manual.

Drive Management for Single User Systems

This section deals with the utilities that are categorized as Drive Management Utilities. These utilities range from a function that catalogs all the DOS volumes on the drive to a utility that provides a means to update individual volumes to function as Master diskettes.

The utilities considered in this section are Catalog,V99, CatV99, File Finder, File Mover, Setboot, Unlock Volume and Volume Updater. It is presumed from this section onward that these utilities have been copied to the first volume on the Corvus drive.

Catalog,V99 and CatV99

At times it may be necessary to list a volume directory of the volumes you have placed on the drive. To list the contents of an individual diskette, Apple provides the Catalog command. This command lists the names, length and types of files on a volume.

This command can also be used to list individual volumes of the Corvus drive. To do this type CATALOG followed by the slot number, drive number and volume number of the Corvus volume you want to see. This catalog command will cause the first 18 files to be listed. When you are ready to examine the remaining files, press the space bar. Follow the example below.

```
1 CATALOG,S#,D#,V# <return>
```

If you wanted to get a listing of all the volumes you have placed on the drive, they can be listed by a similar catalog command. When you list all the DOS volumes on the drive, only the first file of the volumes display. This listing should give you an idea of what is in each volume.

To list a volume directory type, CATALOG,V99 if you are using a system over flat cable or BRUN CATV99 if you are using a system with Omninet. For both systems you must specify which drive you want to catalog. Follow the examples below.

- ▶ **IT IS GOOD PRACTICE TO BEGIN EACH VOLUME WITH AN EXPLANATORY TITLE FILE SO THAT CATALOG,V99 WILL TELL YOU WHAT IS IN EACH VOLUME.**

With flat cable,

```
1 CATALOG,V99,D1 <return>
```

With Omninet or flat cable,

```
BRUN CATV99 <return>
```

```
CATALOG,D1 <return>
```

The resulting directory will be the same for either method. If the first file on a volume is not type A (Applesoft) or I (Integer BASIC), the volume will not be listed by the Catalog,V99 command.

You can hide a volume by making the first file on it B or T. Hidden volumes are useful for storing large amounts of data that span several volumes.

Hidden volumes may be locked and unlocked (see subheading Unlock Volume in this section.)

File Finder

File Finder helps you locate the whereabouts of a specified file on your drive. For example, this utility comes in handy when you've forgotten what volume a certain file is in or how many copies are on the disk.

Finding files is easy with the help of this utility. Just type LOAD FILE FINDER,S6,D1,V1 <return>. Type RUN <return>. The screen then displays the following.

```
VER ###.## CORVUS FILE FINDER
THIS PROGRAM FINDS THE GIVEN FILE
AND REPORTS WHICH VOLUME IT IS IN.
```

You are greeted with a brief explanation of what this program does. It continues with the prompt, FILE NAME?. Reply with the file name you are looking for. Let's say the file you want to locate is POGO. Type POGO and <return>.

```
FILE NAME? POGO <return>
FILE IS ON VOLUME: 1
```

File Finder tells you the first volume POGO is in. It asks if you would like to continue looking for additional occurrences of POGO on other volumes. Pressing Y for Yes continues the search.

```
CONTINUE? (Y/N): Y
FILE IS ON VOLUME: 2
CONTINUE? (Y/N): Y
FILE IS ON VOLUME: 9
CONTINUE? (Y/N): Y
<END-OF-DISK>
```

When there are no more occurrences of the specified file, the screen display reads <END-OF-DISK>. If you want to run File Finder again, type RUN <return>. This starts the program again so you can continue using the File Finder.

► **IF YOU HAVE TWO DRIVES, FILE FINDER CAN BE USED TO FIND A FILE ON DRIVE TWO. LOAD FILE FINDER AS PREVIOUSLY INSTRUCTED. THEN TYPE CATALOG,D2 <RETURN>. THIS SETS THE DRIVE DEFAULT TO DRIVE TWO.**

After this, type RUN <return> and proceed as described above.

If you wish to tailor this program to your own needs, it would be best for you to review the BASIC programming manuals from Apple. In addition, you can list this program to get an idea of how it works.

To list this program simply type LOAD FILE FINDER <return>. Instead of typing RUN type LIST <return>.

File Mover

File Mover is a special utility that allows you to transfer a copy of a single file from one volume to another volume on your Corvus disk system. File Mover only transfers copies of text files, one file at a time, to other volumes on the same drive.

To run File Mover, type LOAD FILE MOVER <return>. Type RUN <return>. An explanation of the File Mover utility and a warning that goes with it is displayed on the screen.

**THIS PROGRAM MOVES TEXT FILES
BETWEEN VOLUMES ON THE CORVUS
HARD DISK.
WARNING: USE DIFFERENT FILE NAMES**

The FROM VOLUME number and text FILE NAME are requested by the program. Entering the desired volume number and <return> brings up the next prompt. Type the desired name and <return>.

Our example below uses a file named Boot Info.

ENTER FROM VOLUME: 1 <return>
ENTER FILE NAME: BOOT INFO <return>

Now the destination information is requested. Enter the volume number you want the file moved to and press <return>.

A different file name must be specified to avoid confusion as to the content of the two files. A similar name can be used, to remind you what is in the new file.

ENTER TO VOLUME:

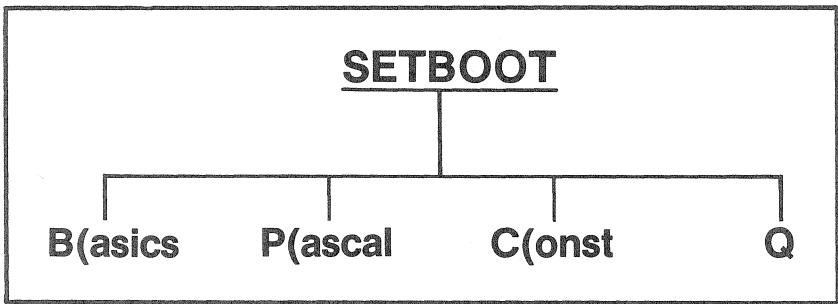
19 <return>

ENTER FILE NAME:

BOOTE **E** <return>

Remember, this program only transfers text files and only on the same drive. Files cannot be moved from one drive to another with this program.

If you would like to tailor this program to your needs, then follow the same procedure for adapting a program as described at the end of the section describing File Finder.



Setboot

Setboot sets your system to boot up in the BASICs, Pascal, or Constellation environment. Normally, you do not need to run this utility unless you are installing Constellation software or you have a Pascal/BASICs system.

To run this program type `LOAD SETBOOT,S6,D1,V1 <return>` and type `RUN <return>`, after which the screen displays the following selections.

VER ###.### CORVUS BOOT SELECTION PROGRAM

P(ASCAL B(ASICS C(ONST Q:

WARNING

IF YOU HAVE BROUGHT UP YOUR CORVUS DRIVE AS A BASICS SINGLE USER ONLY DO NOT KEY P(ASCAL OR C(ONST. KEYING ANY KEY OTHER THAN B)ASICS WILL PREVENT THE SYSTEM FROM BOOTING.

Keying B sets your drive to boot up with BASICs. Remember, if you have used Bsysgen for BASICs, only key B.


```
P(ASCAL B(ASICS C(ONST Q:
LOADING SETBOOT.OBJ 2.....
CORVUS BOOT NOW SET UP TO BASICS
```

If you inadvertently set the boot to the wrong environment, you can boot from a diskette and run Setboot again to set the boot back to BASICS.

For information about setting the boot for the Constellation environment, see Chapter six in the Corvus Network Software section.

Unlock Volume

When the write protect notch on a diskette is covered, no one can write on that diskette. Each volume on the Corvus drive can be write protected by locking the file on the volume.

To do this you should use the Apple Lock command. For Apple users, this command might mean that just an individual file is protected. Yet, Corvus interprets this command to protect a whole volume.

To lock a volume, you must catalog the volume to be protected then type LOCK and the name of the first file in the volume. The screen will then display that the volume is write-protected. For Omninet users, you must reboot the system for the lock to take effect. For flat cable users, the lock takes effect immediately. Once a volume is locked you will be unable to write or copy to it.

To unlock a volume, you must run the Corvus program Unlock Volume. After typing LOAD UNLOCK VOLUME <return> and RUN <return>, the screen displays the following:

```
UNLOCK CORVUS VOLUME UTILITY
THIS UTILITY UNLOCKS THE FIRST FILE
ON A CORVUS VOLUME
```

To unlock the volume simply key in the appropriate responses to the prompts for which drive and which volume. After you do that, the program asks if you would like to unlock another volume. If you would like to, press Y for Yes, after which you should answer the prompts in the same manner as in the example below. If you do not wish to unlock any other volumes, just press N, for No.

```
DRIVE (1-2) 1 <return>
VOLUME (1-#) 1 <return>
UNLOCK ANOTHER VOLUME (Y/N) N
```

After locking or unlocking a volume, if you are using Omninet, you should reboot your system to finalize the transaction. If you are using flat cable, the transaction is finalized immediately.

Volume Updater

Volume Updater is used in conjunction with a multi-user system. This program is similar to the Apple Master Create program. Both programs are used to put a DOS system master image on an individual volume. Volume Updater is a little more flexible, while providing the same functions.

► SEE THE APPLE II DOS MANUAL FOR INFORMATION ON MASTER CREATE.

Running this program makes an individual Corvus Disk volume bootable, provided the Constellation software is in effect. It can also be used to update a hello program on a diskette.

If the requirements have been met, insert a DOS 3.3 System Master diskette, provided by Apple, in a diskette drive connected to slot four of your Apple computer.

Once this is done, type LOAD VOLUME UPDATER <return>. Type RUN <return>. The Volume Updater program prompts you for the location of where the DOS System Master image is located. Answer the prompts with the location of the diskette drive. Follow the example below.

```

****VOLUME [DOS] UPDATE PROGRAM****
=> FROM VOLUME TO UPDATE DOS IMAGE <--
SLOT (E.G.6):                               4 <return>
DRIVE (E.G.1):                               1 <return>
[[USE VOLUME 0 FOR FLOPPY]]
VOLUME (E.G.1):                             0 <return>
FETCHING DOS IMAGE FROM VOLUME...
THAT VOLUME IS A DOS 3.3 IMAGE

```

You are informed the image is DOS 3.3 and the program asks if you would like to use it. Reply with Y for Yes.

Keep in mind that the program informs only that a DOS 3.3 image has been found but does not tell you if it is master image or a slave. A master image is needed in order to boot the system.

```

USE IT (Y/N)? Y
THE CURRENT 'HELLO' PROGRAM IS : HELLO

```

Volume Updater continues by listing the name of the current hello program. You are asked if you would like to change it. If you do change it, you should have an alternate program to replace it with or else when you boot to that volume the screen will display, 'File Not Found.'

```

TYPE NEW NAME (OR CR TO NOT CHANGE)
NEW: <CR>
TO VOLUME TO UPDATE DOS IMAGE

```

Request the program to place the new image on the volume in slot six, drive one, and volume one, by responding as shown below or request the program to place the image in a volume of your choice.

```

SLOT (E.G.6): 6 <return>
DRIVE (E.G.1): 1 <return>
||USE VOLUME 0 FOR FLOPPY
VOLUME (E.G.1): 1 <return>
VOLUME 1 UPDATED.

```

If you do not wish to continue type N for No to the prompt asking if you want to update another volume. If you wish to continue then key Y for Yes and proceed as before.

```

UPDATE ANOTHER VOLUME (Y/N)? N <return>
END OF PROGRAM

```

Mirror

Chapter Four

The Corvus Mirror Utility

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Checklist

This chapter covers the operation of the Mirror utility.

- For general information, read the first two sections titled 'About Images' and 'Mirror Utility Options.'
- For application programming read the section titled 'Software Interface.'
- For examples on how to use the Pascal, BASICs, or Remote Option versions of the Mirror utility read the section titled 'Using the Mirror Utility.'

About Images

The Mirror may be connected to an existing Corvus Disk System. Your disk system must be up and running before you install a Mirror. You should already be familiar with the operation of your computer and its operating system.

PLEASE READ THIS ENTIRE CHAPTER BEFORE TRYING TO OPERATE YOUR MIRROR.

If the release date of your Corvus Drive Utilities floppy is earlier than 5-28-80, copy the Mirror Utility program, from the floppy that came with your Mirror to a volume on the disk drive. If your interface ROM is A2.4, copy the Mirror OLD 11A program. If your interface ROM is A3.0 or later (A4.2, A4.7), copy the Mirror program.

With the Mirror, you can make a video tape copy of an entire disk or portions of a disk corresponding to a volume.

When the Corvus Mirror makes a copy of data from the Corvus drive, it makes redundant copies of each block of data. Copying data in this manner reduces the chances unrecoverable errors. As the data is being copied back to the drive, the Mirror uses the multiple blocks to restore a good block of data.

This method generally produces a few soft errors during the restore process. An error may occur in one block of a multiple set of blocks. But by combining the multiple copies of a block, a single good block is created by the restore process.

Studies on the error rates of this method of data storage have not been completed. However, it appears that errors are mainly a function of the quality of the video cassette tape. Certified VCR tape is not presently available. But, through the use of redundancy and CRC error checking, the data recovery rates projected in the use of the Mirror system meet or exceed those of competing tape cartridge systems and they far exceed the rates for floppy disk media.

WARNING

WHEN MAKING A BACKUP, YOUR VIDEO TAPE RECORDER MUST BE SET TO ITS FASTEST SPEED, BETA 1 (FOR BETA FORMAT) OR SP (FOR VHS FORMAT). IF NOT, THE DATA ERROR RATE MAY BE GREATLY INCREASED.

Mirror Utility Options

Quit

Quit exits the Mirror utility.

Backup

Backup creates a Mirror image of an entire drive or a portion of the volumes on a Corvus Drive.

Backup adds information to the image regarding its size and system source. Users may also add information to label the image for future identification.

Restore

Restore reads an image from the tape and places it on the disk in a volume of equivalent size, but not necessarily the same position. If the video image is of the entire disk, the entire disk must be Restored.

As each block is read from the tape, it is checked for recording errors with a CRC. If the CRC is bad, a soft error is counted and the second image of the block is read. If this also fails, the third and fourth images are tried. If all four fail, a retry error is counted.

Error correction for blocks that cannot be recovered through simple redundancy is done on a secondary pass (retry) of the image. The Mirror utility program displays an error status following a restore. If unrecovered blocks remain after the first pass, the program will request that you rewind the tape to the starting position for a second pass.

During a retry pass an error recovery scheme rebuilds blocks that fail the CRC check in the initial restore. Corvus controller firmware reads the multiple copies of the blocks and finds the error locations. It pieces together a good block from the redundant copies by using the CRC check to determine the accuracy of this recovered data.

This recovery method tolerates many more classes of errors than systems limited to short burst error correction. However, because of its complexity, a second pass consumes a great deal of processing time in relation to the operations being performed during the first pass of a restore.

Verify

Verify allows you to check the accuracy of the data recorded as a video image. Verify is similar to the Restore, however, it does not write the stored data back to the disk. After reading the image, it reports the status of errors encountered and indicates whether retry passes will be needed when data is restored to the drive. If you wish to ensure data accuracy when blocks cannot be recovered in one pass, it is possible to do one or more retry passes following a restore.

By using the error status reports given when you use the Verify function, you can evaluate the quality of different video tapes and tape recorders.

When you transport tapes from one place to another, you may need to use a VCR other than the one you used for the backup. A Verify pass of a short image reveals how closely the tracking alignment between the two decks is adjusted. This tells you if it is possible to Restore data using the different VCR.

Identify

Identify reads then displays the image header that is included when an image is created. It is used to determine to which image the tape has been positioned.

An image header contains information such as the image size, the host computer system that produced the image, and the information you supply when you record an image.

Software Interface to the Mirror

Corvus disk controller firmware controls the Mirror operations. A host computer sends commands to the disk controller through the Mirror utility program. These commands perform the Mirror operations.

MIRROR SOFTWARE OPERATES PROPERLY ONLY WHEN A TAPE IS ACTUALLY IN THE RECORDER.

Commands are sent to the Mirror through the data port (or memory mapped location) to the drive. Status is sensed through the status port. The results of these operations are returned through the data port.

Summary of Commands

An image header, that includes the source and length information as well as the level of redundancy, is stored at the beginning of the stored data. Each image can be assigned a number from 1 to 255, while 0 is reserved for directory usage.

Image headers can be read by using the Identify command. A check for the proper image ID can be made or the next image header encountered can be read.

The following is a list of the commands used by the Mirror.

- Backup
- Identify
- Restore
- Restore Retry
- Verify
- Verify Retry
- Report Errors

Return Code Explanations

The following command information is invisible to the user. It is included for those of you wishing to do application rewriting.

Following most commands to the disk controller, one byte that defines the status of the operation is returned to the host computer. This is referred to as the return code.

Error explanation

Three of the most common errors that you may encounter during the use of the Mirror deal with tape timeout.

If you do not correctly position the cassette when you start the tape, the IMAGE NOT FOUND error displays. The control program searches for the start of an image for about one minute. If no image is found within that time, it gives up the search.

If a Restore is being done and the size of the image on the tape does not match the size of the area being restored to, the IMAGE SIZE MISMATCH error displays. The Identify option can be used to determine the size (in blocks) of the video image.

Another error indicates that the tape you are trying to read has been partially erased. This can occur if you are recording more than one image on a video cassette and you fail to properly position the tape prior to recording. This error is called tape timeout during playback operation.

The following is a list of the Mirror errors.

Hexadecimal number	Error
1	image ID mismatch
2	illegal restore command (checksum error usually)
3	illegal retry command (retry not enabled or checksum error)
4	image size mismatch (image size does not match restore specifications)
5	illegal opcode
86	tape timeout during playback operation (5 second timeout)
7	image not found (60 second timeout)

Command Details

(see figures 4.1 through 4.4)

BACKUP

SENDS 520 BYTES

COMMAND CODE

SOURCE DRIVE (1..4)

ASSIGNED BY THE USER (1..254)

LENGTH (in 512 byte blocks) OF DISK
AREA TO BE RECORDED
(least significant byte first)

STARTING ADDRESS (512 byte block)
OF AREA TO BE RECORDED
(least significant byte first)

0 = DUAL,
1 = QUAD REDUNDANCY

8
DRIVE #
FILE I.D.
LENGTH (LSB)
LENGTH (MSB)
SOURCE (LSB)
SOURCE (MSB)
FORMAT
FILE HEADER (512 BYTES)

RECEIVES 1 OR 2 BYTES

DISK ERROR
- UNABLE TO CONTINUE

MIRROR ERROR

NORMAL
NUMBER OF DISK READ ERRORS

RETURN CODE
OR
FF (hex)
ERROR CODE
OR
0
OF READ ERRORS

Figure 4.1

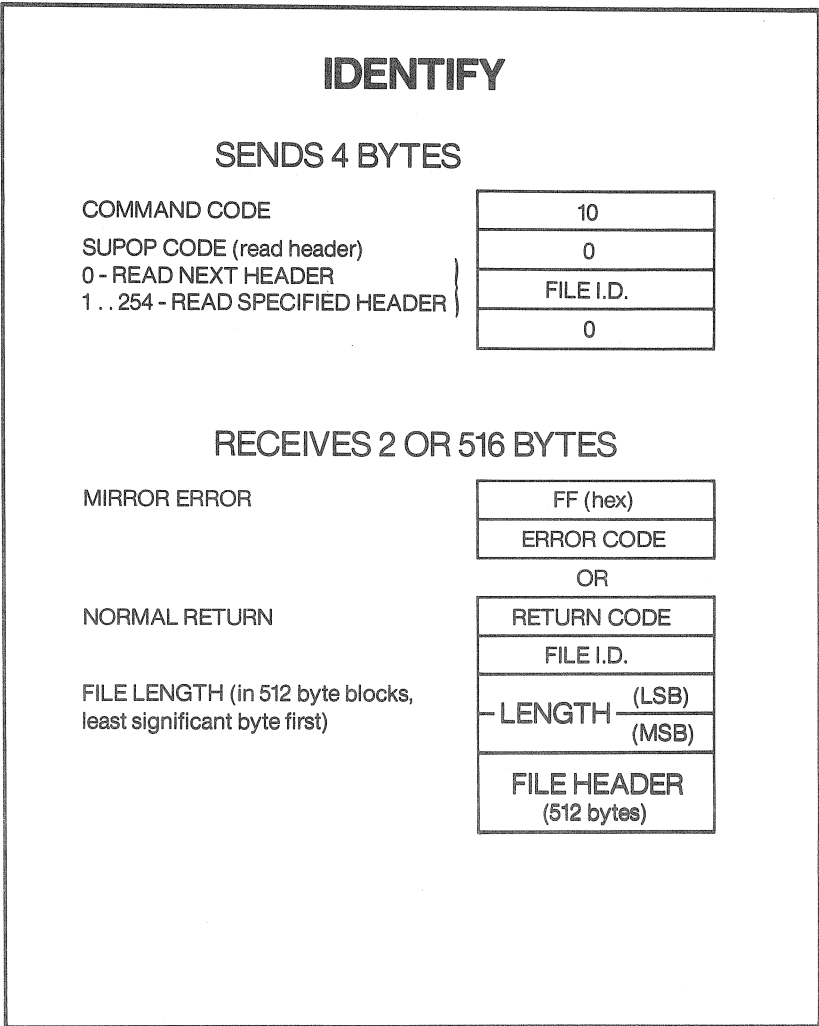


Figure 4.2

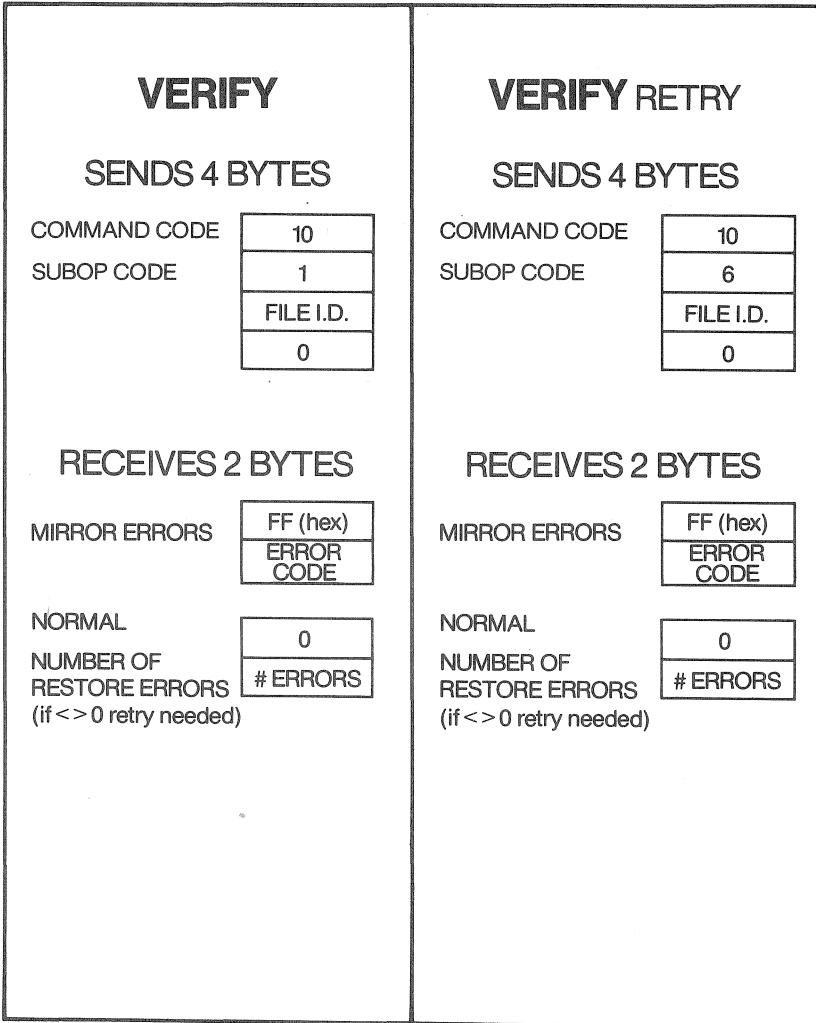


Figure 4.3

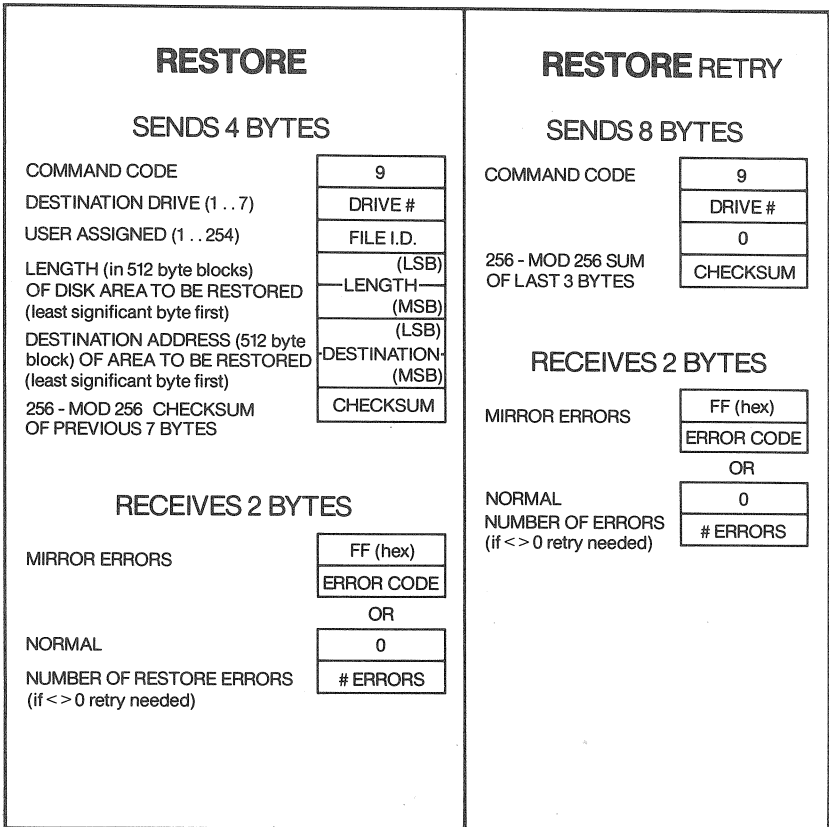


Figure 4.4

Using the Mirror Utility

Pascal

After the Mirror utility has been copied onto the system volume, you are ready to use your Mirror.

Press X for X(ecute, then type MIRROR <return>.

```
EXECUTE WHAT FILE ? MIRROR <return>
```

```
MIRROR : B(ACKUP V(ERIFY I(DENT R(ESTORE  
Q ? [x.x] :
```

In Pascal an image may correspond to one volume or an entire drive. Volumes may be any size, but the length must be a multiple of eight blocks. If two volumes are the same size, it is possible to restore an image of one volume to another.

▶ WHEN YOU RESTORE AN IMAGE OF A VOLUME, ALL THE ATTRIBUTES OF THAT IMAGE ARE PLACED ON THE DISK, INCLUDING THE NAME OF THE VOLUME AS IT WAS STORED IN THAT IMAGE (i.e. the volume directory is copied along with the files).

Q(uit

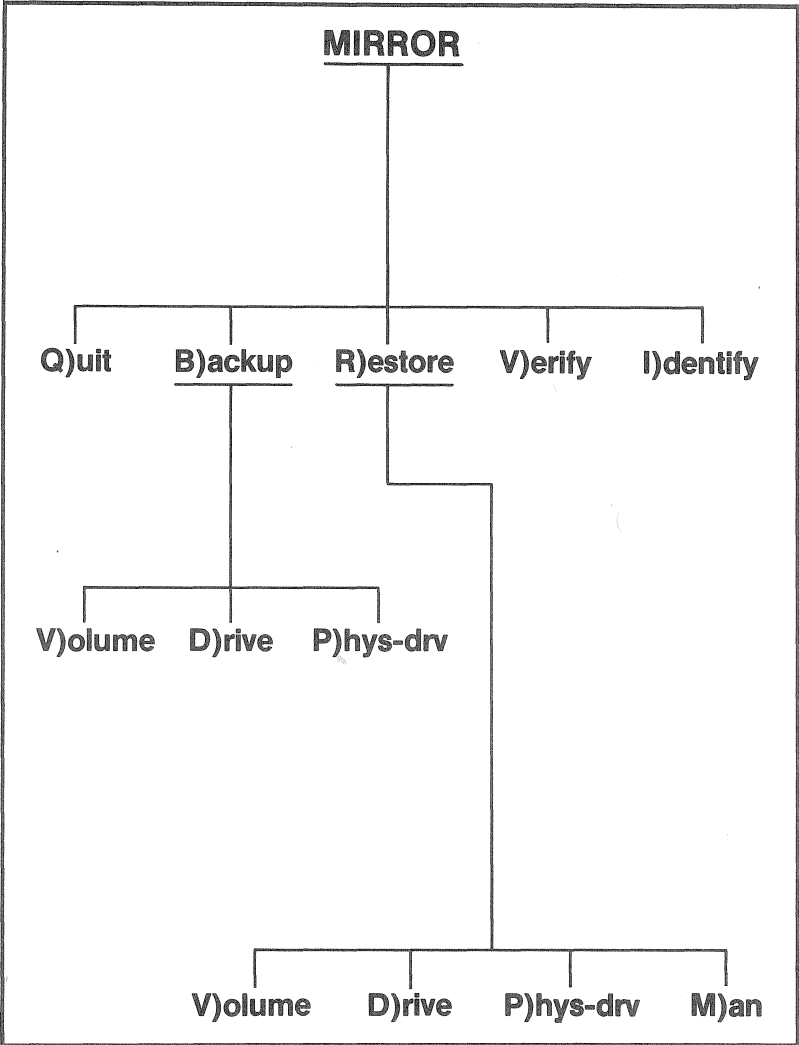
Pressing Q for Q(uit, exits the Mirror program. To quit a particular option of the Mirror program, press <esc> <return>, which returns you to the main Mirror menu.

B(ackup

Press B for Backup. You are asked if you want to backup a volume, a virtual drive, or a physical drive.

To backup a single volume, press V for V(olume and type in the name of the volume when you are prompted. If you want to backup a virtual drive (e.g. half of a 20 megabyte drive), press D for D(rive and enter the number of the drive (1..4). If you want to backup a physical drive (e.g. the whole drive: 5, 10, or 20 megabyte), press P for P(hys-drv and enter the drive number (1..4).

Next you are prompted for header information, which includes the date, time, name, and a comment.



EXAMPLE:

```

BACKUP A: V(OLUME D(RIVE P(HYS-DRV ?      D
ENTER CORVUS DRIVE NUMBER :              1
ENTER DATE :                             6/2/83 <return>
ENTER TIME :                             1:00 A.M. <return>
ENTER NAME :                             JOE'S GARAGE <return>
ENTER COMMENT :                          ACT II <return>
START RECORDER AND PRESS: <RETURN>        <return>
  
```

When the Backup is done,

```
BACKUP FINISHED
```

displays. If errors occurred during the backup, an error message will display.

Backing up a single volume is the same as backing up an entire disk, except you are prompted for a volume name instead of a disk number.

V(erify

Press V for Verify.

EXAMPLE:

```

POSITION TAPE AND START PLAYBACK
VERIFYING IMAGE . . .
14 SOFT ERRORS
0 DISK ERRORS
0 BLOCKS NEEDING RETRY
  
```

When the Verify pass is finished,

```
ALL DATA RECEIVED
```

displays. If there are blocks needing a retry,

```
NO BLOCKS NEEDING RETRY
```

displays.

I(dentify

Press I for Identify.

EXAMPLE:

```
START TAPE AND PRESS <return>
SEARCHING FOR IMAGE HEADER ...

      IMAGE ID   : 1
          SIZE   : 19040
GENERATED ON    : XXAP (PASCAL)
      ENTER DATE : 6/2/83
          ENTER TIME : 1:00 A.M.
      ENTER NAME  : JOE'S GARAGE
ENTER COMMENT   : ACT II
```

R(estore

Press R for Restore. You are asked if you want to restore a volume, virtual drive, a physical drive, or do a manual restore. If you want to restore a single volume, press V for V(olume and type in the volume name. To restore a virtual drive (e.g. half of a 20 megabyte drive), press D for D(rive and enter the drive number (1..4). To restore a physical drive, press P for P(hys-drv and enter the drive number.

```
RESTORE: V(OLUME D(RIVE P(HYS-DRV M(AN : D
ENTER CORVUS DRIVE #                      1
POSITION TAPE AND START PLAYBACK
RESTORE IN PROGRESS ...
```

When the restore is finished,

```
ALL DATA RESTORED
```

displays. If there are blocks needing retries,

```
NO BLOCKS NEEDING RETRY
```

displays. Restoring a single volume is the same as restoring a physical or virtual drive, except you are prompted for a volume name instead of a disk number.

If you receive an IMAGE SIZE MISMATCH error when doing a restore or a physical or virtual drive, you may need to use the M(annual option to restore the image to the drive. This option should be used with care on a 20 megabyte drive. If the image size is longer than the drive being restored to, you may end up writing over data on the second virtual drive (i.e. the second half of the 20 MB drive).

Before you use the M(annual option, you must use the I(dentify option to get the image size. Write it down. Then press M for M(annual, type in the image size, and enter the drive number to be restored.

EXAMPLE:

```

READ HOW MANY BLOCKS : 19040
RESTORE TO DRIVE : 1
  
```

BASICs

If you received a Mirror at the same time you received a drive and you brought up your drive according to the Corvus Drive Manual, the Mirror software is on volume one of your Corvus Drive.

If you ordered a separately packaged Mirror, you may not have the Mirror software on your Corvus drive. Check to see whether or not you have the Mirror utility on volume one of the Corvus drive.

To copy the Mirror utility to the Corvus drive,



POWER OFF

power off and connect a floppy drive to your Apple.

Power on your drive and computer, then boot up in BASICs. Place the Corvus Mirror Utility diskette in the floppy drive. Type LOAD MIRROR,S4 <return>. Type SAVE MIRROR, S6,V1 <return>.

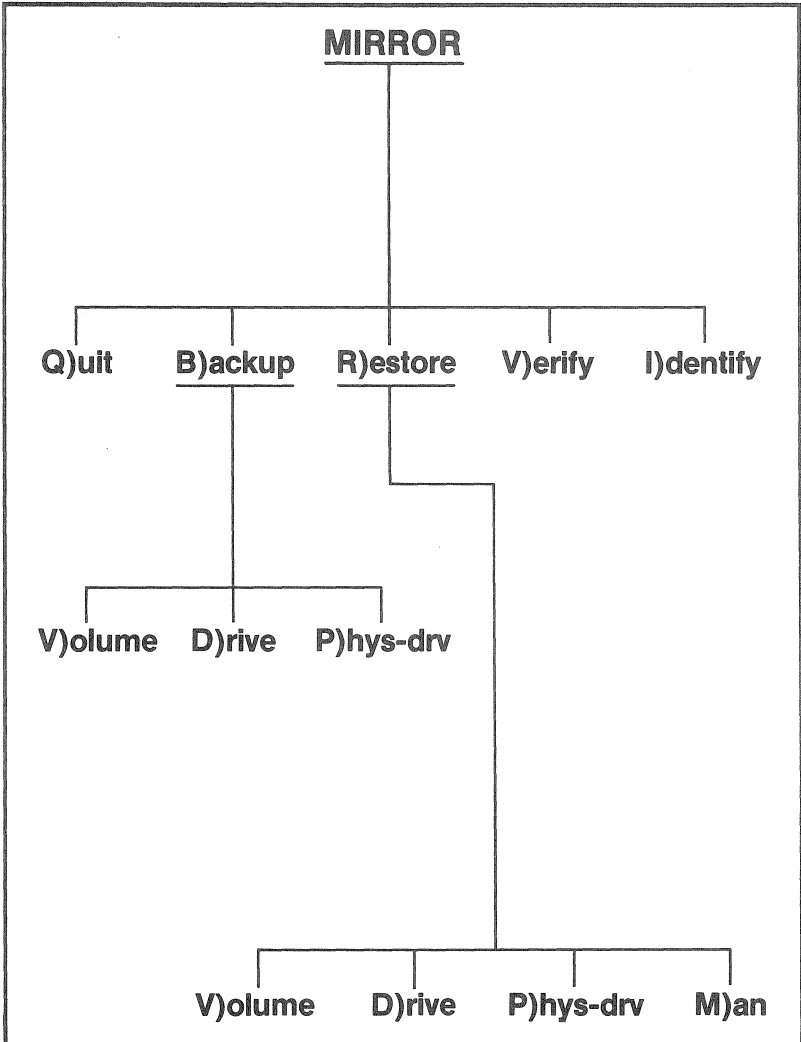
```

1 LOAD MIRROR,S4 <return>
1 SAVE MIRROR,S6,V1 <return>
  
```

When you have the Mirror utility on the Corvus drive, remove the diskette from the floppy drive. Type RUN MIRROR,V1,S6 <return>.

```

1 RUN MIRROR,V1,S6 <return>
  
```



A list of options will display on your screen.

```

VER X.X
CORVUS MIRROR
10-APR-81

MIRROR: B)ACKUP V)ERIFY I)DENTIFY R)ESTORE Q ? :
```

The cursor rests after the colon.

In Basic systems a range of volumes can be backed up or restored. It is not necessary to restore an image to the same volume numbers. On DOS 3.3 systems, you can backup and restore individual volumes.

▶ **WHEN YOU RESTORE AN IMAGE OF A VOLUME, ALL THE ATTRIBUTES OF THAT IMAGE ARE PLACED ON THE DISK, INCLUDING THE NAME OF THE VOLUME AS IT WAS STORED IN THAT IMAGE (i.e. the volume directory is copied along with the files).**

Q)uit

Pressing Q for Q(uit, exits the Mirror program. To quit a particular option of the Mirror program, press <esc> <return>, which returns you to the main Mirror menu.

B)ackup

Press B for Backup. Backup gives you the option to backup a physical drive, a virtual drive, or a range of volumes. To backup a virtual drive (e.g. half of a twenty megabyte drive), press D for D(rive and enter the drive number (1..2). If you want to backup a physical drive (e.g. the whole drive: 5, 10 or 20 megabytes), press P for P(hys-drv and enter the drive number (1..2).

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

The cursor rests after the colon.

To backup one or more volumes, use the V)olumes option. This option prompts you for the starting volume and the last volume of the range of volumes you wish to backup.

The starting volume can be any volume from one to 67 for BASICs-only drives configured under Apple DOS 3.3.

If you are running Pascal-BASICs, the starting volume can be any volume from one to the number of BASICs volumes you created when configuring your system. For Pascal-BASICs, the V)olumes option prompts you with the number of BASICs volumes on your drive.

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The last volume can be the same number as the starting volume, which backs up a single volume, or it can be any number up to the number of BASICS volumes on your drive.

If you want to backup a virtual or physical drive, the following process is the same, except you are not prompted for the starting volume or the last volume.

Press V for Volumes to backup a range of volumes. Respond with 3 <return> for the starting volume.

```
STARTING VOLUME # ( 1 - 67 ) ? 3 <return>
```

If you type a number other than one (1) for the starting volume, the last volume prompt uses the number of the starting volume in place of one (1) in the prompt message. Type 5 <return> in response to the last volume prompt.

```
LAST VOLUME # ( 3 - 67 ) ? 5 <return>
```

For the drive number, enter the number of drive you are backing up.

```
ENTER CORVUS DRIVE # 1
```

After you have specified the volumes and drive to be backed up, the Mirror program prompts you for header information. Type the date, time, name, and a comment as you are prompted.

DO NOT USE COMMAS OR SEMICOLONS IN YOUR RESPONSES.

```
ENTER DATE 6/1/83 <return>
ENTER TIME 11:00 P.M. <return>
ENTER NAME JOE'S GARAGE <return>
ENTER COMMENT ACT I <return>
START RECORDER AND PRESS <RETURN> <return>
```

After you start the recorder and press <return>,

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

displays. When the backup is finished and there are no drive errors,

```
BACKUP FINISHED—NO ERROR
```

displays. If there were drive errors, an error message displays. The menu displays, also.

I)dentify

Press I for Identify.

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

After several seconds, the image ID and length are displayed.

```
IMAGE RECORDED FROM XXAP
IMAGE ID : 1
SIZE : 18890
GENERATED ON : XXAP (BASIC)
ENTER DATE : 6/1/83
ENTER TIME : 11:45 P.M.
ENTER NAME : JOE'S GARAGE
ENTER COMMENT : ACT I
```

After an image has been identified, the option menu displays.

V)erify

Press V for Verify

```
START RECORDER AT BEGINNING OF IMAGE
VERIFYING IMAGE . . .

ERROR STATISTICS :
# SOFT ERRORS : 24
# DISK ERRORS : 0
# BLOCKS NEEDING RETRY : 0
```

If there are any blocks needing a retry,

```
RETRY NEEDED . . . <CR> TO RETRY :
```

displays. The menu displays again.

R)estore

Press R for Restore. Restore gives you the option to restore a physical drive, a virtual drive or a range of volumes that have previously been backed up.

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

The cursor rests after the colon.

Chap4

To restore a virtual drive (e.g. half of a twenty megabyte drive), press D for D(rive and enter the drive number. To restore a physical drive (e.g. the whole drive: 5, 10, or 20 megabyte), press P for P(hys-drv and enter the drive number (1..2).

To restore one or more volumes, use the V)olumes option. This option prompts you for the starting volume and last volume of the range of volumes you wish to restore.

As in Backup the starting volume can be any volume from one to the number of volumes on the drive.

The last volume can be the same number as the starting volume, which restores a single volume, or it can be any number up to the number of BASICs volumes on your drive.

If you wish to restore an entire disk, the following procedure is the same with the exception that you are not prompted for the starting volume and the last volume.

Press V for V)olumes to restore a range of volumes. Respond with 3 <return> for the starting volume.

```
ST1ARTING VOLUME # ( 1 - 67 ) ? 3 <return>
```

If you type a number other than one (1) for the starting volume, the last volume prompt uses the number of the starting volume in place of one (1) in the prompt message. Type 5 <return> in response to the last volume prompt.

```
LAST VOLUME # ( 3 - 67 ) ? 5 <return>
```

For the drive number, enter the number of the drive you are restoring.

```
ENTER CORVUS DRIVE # 1  
POSITION TAPE AND START PLAYBACK  
RESTORE IN PROGRESS . . .
```

When the Restore is finished,

```
. . . IMAGE READ FINISHED  
  
STATUS REPORT —  
# RECOVERED FAULTS : 5  
# DISK ERRORS : 0  
# BLOCKS : 0  
  
ALL DATA RECOVERED  
TYPE <RETURN> TO CONTINUE <return>
```


displays. If there are blocks needing retry,

RETRY NEEDED . . . <CR> TO RETRY

displays.

If you receive an 'IMAGE SIZE MISMATCH' error when doing a restore to a physical or virtual drive, you may need to use the M(anual option to restore the image to the drive. This option should be used with care on a 20 megabyte drive. If the image size is longer than the drive being restored to, you may end up writing over data on the second virtual drive (i.e. the second half of the 20 MB drive).

Begin by using the I(dentify option to get the image size. Write it down. Then press M for M(anual, type in the image size, and enter the drive number to be restored.

EXAMPLE:

READ HOW MANY BLOCKS :

18890

RESTORE TO DRIVE :

1

With Remote Option

If you received a Mirror with the Remote option, there are some differences in the Mirror utility you received. These differences apply to both the Pascal and BASICs utilities described in the preceding sections.

**MIRROR: I(DENT B(CKUP R(STORE V(RIFY L(ST
REW(ND F(RMAT Q:**

F(rmat

With the Remote option, each tape that is to be used must be formatted. This creates a directory at the beginning of the tape so that multiple images may be saved and recorded similar to the way the Filer utility in Pascal works.

To format a tape, put the tape in the recorder and press F for F(rmat.

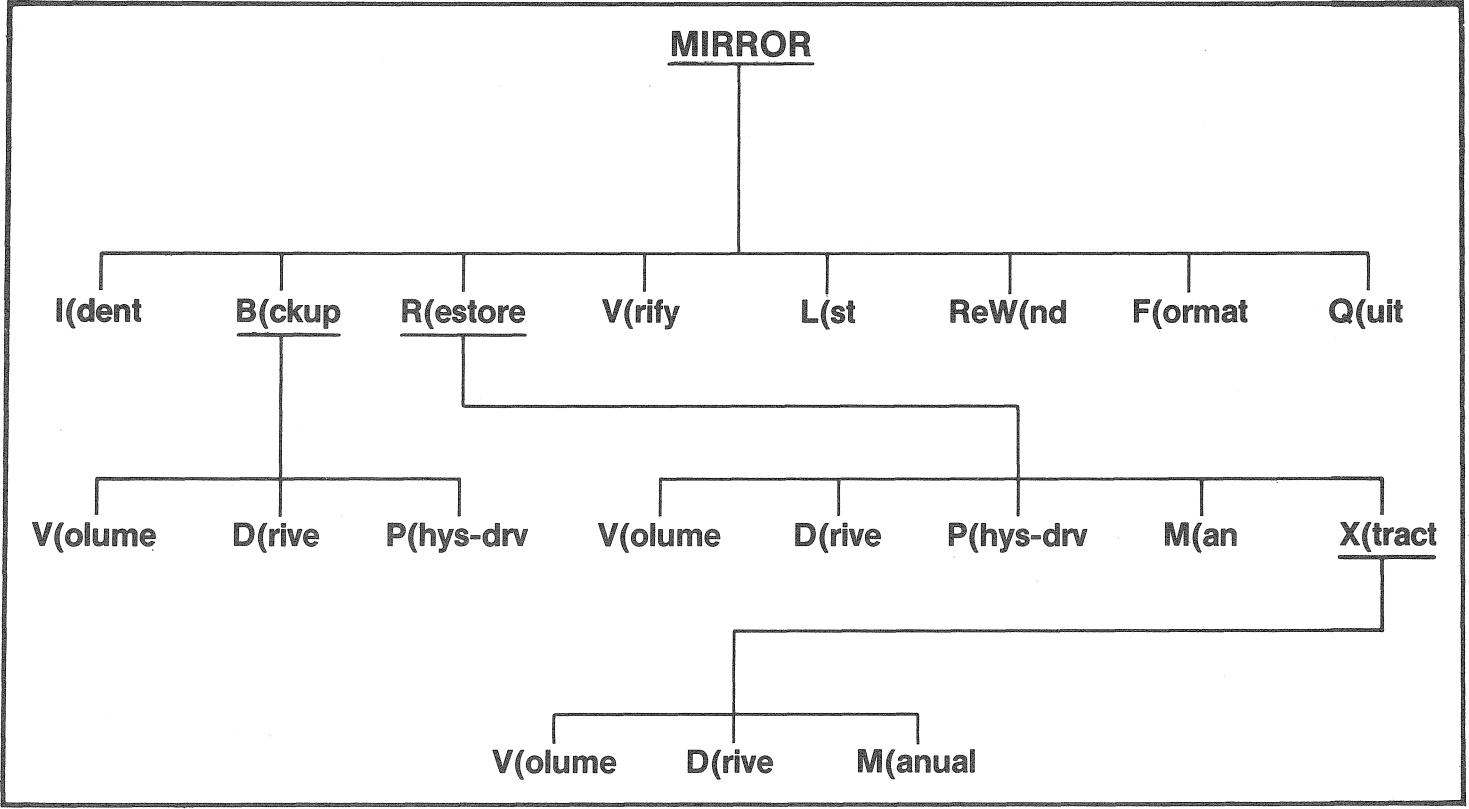
EXAMPLE :

**ERASE THIS TAPE ? N
TAPE TITLE :
TAPE LENGTH (IN MINUTES) : 30
DATE : 11-JULY-81**

Y
BACKUP
<return>
13-JULY-81

I(dent

The I(dent option here reports the same information as those described in the two previous sections. However, it asks for a specific image header to be read from the tape directory. Press I for I(dent.



EXAMPLE:

```
IDENTIFY SELECTED
READ HEADER WHICH IMAGE ? PUBLICATION-1
```

```
READING TAPE DIRECTORY
ID INFO FOR PUBS-1

IMAGE ID      : 1
SIZE          : 19040
GENERATED ON  : XXAP (PASCAL)
DATE          : 27-JUNE-81
TIME         : 12:00 A.M.
NAME          : PUBS-1
COMMENT      : UPCOMING ADS
```

B(ckup

You receive the same choice of options as you do for the regular Mirror program. The main difference is that this version automatically starts the tape player. Press B for B(ckup.

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

Press V for V(olume.

```
WHICH VOLUME ? PUBS-1
                <return>
                1:00 P.M. <return>
                PUBS-1
                UPCOMING ADS

                DATE :12-JULY-88
                TIME :
                NAME :
                COMMENT :

READING TAPE DIRECTORY
BACKUP IN PROGRESS ...

ERROR STATUS :
DISK ERRORS : 0
---ALL DATA STORED---
```

R(store

Restore has all the same options as the normal Mirror program plus one new option. This new option is called X(tract. It allows you to extract a contiguous section of blocks from a video image. Press R for R(store.

**RESTORE A : V(OLUME D(RIVE P(HYS-DRV
M(AN X(TRACT:**

As in the B(ckup option, the video recorder is automatically started by the following options. V(olume, D(rive, P(hys-drv, and M(an ask one additional question that has not been described previously. After pressing the desired key and indicating which volume or drive is to backed up, the program asks, USING WHICH IMAGE ? This refers to the number assigned to each image name stored in the tape directory. See the L(st option in this section.

To use the X(tract option, press X for X(tract.

XTRACT A V(OLUME D(RIVE M(ANUAL :

To extract a volume, press V for V(olume.

EXAMPLE:

```

          **** WARNING ****
IF EITHER YOUR VOLUME TABLE OR VIRTUAL
DRIVE OFFSET TABLE HAS CHANGED SINCE THE
TIME THIS IMAGE WAS MADE, IT MAY LEAD TO
AN ERRONEOUS EXTRACTION OF DATA.

CONTINUE ? N
FROM WHICH VOLUME ?
READING TAPE DIRECTORY ...
BACKUP IN PROGRESS ...
... IMAGE READ FINISHED
ERROR STATUS :
RECOVERED FAULTS :      7
DISK ERRORS :          0
BLOCKS :               0

ALL DATA RECOVERED
TYPE RETURN TO CONTINUE

```

V(riify

Verify asks which image to verify then sets the tape to that image. Press V for V(riify.

EXAMPLE :

```

VERIFY SELECTED
VERIFY WHICH IMAGE ?      2
READING TAPE DIRECTORY
  
```

L(st

Pressing L for L(st lists the directory recorded on the tape.

EXAMPLE :

```

READING TAPE DIRECTORY ...
DRIVE BACKUP:           (CREATED 27-JUNE-81)
PUBS-1                  19040          28-JUNE-81
PUBS-2                  19420          29-JUNE-81
PUBS-3                  19520          30-JUNE-81
PUBS-4                  18940          1-JULY-81
PUBS-5                  19110          3-JULY-81
  
```

ReW(nd

Pressing W for reW(nd rewinds the tape in the video recorder.

Q

Pressing Q for Q(uit exits the Mirror program.

Diagnostics

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Checklist

This chapter covers the Diagnostic utility and the trouble-shooting procedures that can be accomplished with this utility.

- For examples of the options of the Diagnostic program, read the first section titled 'The Diagnostic Program.'
- If you have trouble with the drive self-test described in Chapter Two, read the following section titled 'Trouble-shooting Guide.'
- To change any vital drive parameters or update the drive firmware, read and follow the instructions in the section titled 'Firmware Update or Replacement.'
- If you lose system information from the first physical volume of a Pascal system and your drive is not bootable, the section titled 'Using the V Option of Psysgen explains how to re-initialize the first volume on the drive without destroying any other volume on the drive without destroying any other volumes that may exist on the drive.

Chapter Five Diagnostics, Trouble-Shooting, and Updating

The Diagnostic Program

The Diagnostic program is used to examine the Corvus drive and to maintain or change the vital drive parameters. Please read this whole section on the Diagnostic program before attempting to use the program.

This program should be saved in a volume where the likelihood of unauthorized personnel running this program is minimized.

To run the Diagnostic program from the Pascal environment, press X for X(ecute from the command menu. Type DIAGNOSTIC <return>.

EXECUTE WHAT FILE ?

DIAGNOSTIC <return>

OR

To run the Diagnostic program from BASICS, type LOAD DIAGNOSTIC <return>. Type RUN <return>.

In either case, a menu displays.

V)RSN C)RC P(ARAMS E)XER M)NUAL

U)PDATE F)ORMAT Q? :

The Diagnostic options include: version check, Cyclical Redundancy Check, display or change vital drive parameters, exercise the heads, manual byte by byte command operation, format the drive, and quit.

Q

Pressing Q for Quit from this level, exits the diagnostic program.

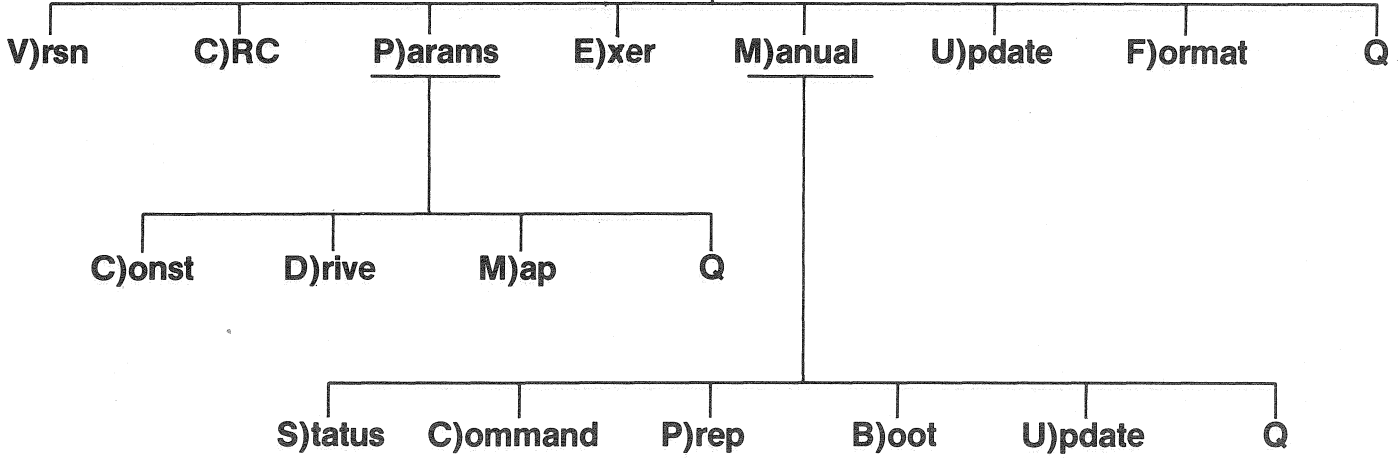
V)rsn

This option displays the number of virtual drives and the version number of the Z-80 firmware residing on each drive.

▶ **A TWENTY MEGABYTE DRIVE IS TREATED AS TWO VIRTUAL DRIVES OF TEN MEGABYTES EACH.**

Press V for V)rsn to display the version of all drives on your system.

DIAGNOSTIC



```
----VERSION CHECK----
```

```
DRV1: Vxx.x 2DRV EMULATION
```

```
DRV2: Vxx.x 2DRV EMULATION
```

One of the files that comes on the Corvus utilities diskette is called CFxx.x, where xx.x is the number of the latest version of the firmware. This number should match the one displayed when you use the V)rsn option. If not, you may need to update your firmware.

C)RC

Media defects may occur on the surface of the disk. A media defect is defined as a read error that occurs more than ten times at any one track location.

These physical defects might show up as error signals from your computer when running a valid program. Or perhaps, a valid program just won't function correctly. The user should use track re-assignment to handle defect areas.

The cyclical redundancy check function checks for bad sectors on the Corvus drive. The number of bad sectors is reported along with the sector where they were found.

To run this option press C for C)RC. When you are prompted, specify the number of the drive you want checked.

```
----CRC/FORMAT CHECK----
```

```
ENTER CORVUS DRIVE NUMBER:      1 <return>
```

```
CRC/FORMAT TAKES ABOUT 1 MINUTE  
NO BAD SECTORS FOUND
```

If a bad sector is found, the C)RC option reports its location by displaying the head number, cylinder number, and the sector number.

P)arams

Parameters of the Corvus drive include the spare track table, the interleaving specification, and the virtual drive track offset table. These parameters are a vital part of the configuration of the drive. If you want to change the parameters, the P)arams option provides the means to change them.

- ▶ **A 20 MEGABYTE DRIVE APPEARS AS TWO 10 MEGABYTE DRIVES TO YOUR COMPUTER AND OPERATING SYSTEM. HOWEVER, THE P)ARAMS OPTION IN THE DRIVE SEES AN UNDIVIDED 20 MEGABYTES.**

When you press P for P)arams, a menu displays.

```
D)RIVE M)AP C)ONST Q ?
```

Q

Pressing Q for Quit at this level exits the P)arams option and returns you to the Diagnostic menu.

D)rive

Pressing D for D)rive displays selected hardware parameters of the Corvus disk drive. Nothing can be altered with this option. The information presented when you press D differs for the five, ten, and twenty megabyte drives. In our examples, we use a twenty megabyte drive.

After pressing D, there is only one prompt. This is for which drive you want to examine.

```
ENTER DRIVE NUMBER: 1
DRIVE CONFIGURATION: DRIVE 1
CONTROLLER VERSION: 14 <-----ROM VERSION
                        NUMBER
HEAD: 5 <-----NUMBER OF
                        HEADS
SECS/TRACK: 20 <-----512 BYTES/SECTOR
CYLINDERS/DRIVE: 388
CAPACITY: 19,691,520 <-----CAPACITY
```

M)ap

Your second choice is for the M)ap option. Pressing M for M)ap runs this option. From M)ap you are able to spare out tracks, change the interleaving specification, and alter the track offset for virtual drives.

The initial prompt, after pressing M, asks for the drive number.

ENTER DRIVE NUMBER:

1

Then the program reports if any tracks are spared, what the present interleaving specification is, and the track offset for the virtual drives.

DISK MAP: DRIVE 1

**TRACKS SPARED TABLE:
NO TRACKS ARE SPARED.**

INTERLEAVING SPEC IS 9.

VIRTUAL DRIVE/TRACK OFFSET

1. 0

2. 976

Following this list, a prompt asks if you want to change any of the above parameters.

WARNING

CHANGING PARAMETERS CAN DESTROY DATA ON THE DISK. DO NOT CHANGE ANYTHING UNLESS YOU HAVE YOUR DATA BACKED UP.

If you press N for No, you return to the P)arams menu. Pressing Y for Yes displays a warning, and then offers choices to, in this order, spare tracks, change the interleaving spec, and change the virtual drive track offset.

DO YOU WANT TO CHANGE ANY?

Y

DESTROYS DATA ON DISK

**TRACKS SPARED TABLE:
NO TRACKS SPARED.**

If you do not wish to make a change in the category presented to you, press N for No, which forwards the program to next choice. If you wish to make changes, press Y for Yes.

```
DO YOU WISH TO EDIT THE
TRACKS SPARED TABLE? Y
TRACKS CURRENTLY SPARED:
NO TRACKS ARE SPARED.
```

A menu displays for the purpose of adding (sparing) a track to the spare track table or removing a track from the spare track table.

```
A(DD R(EMOVE Q:
```

If bad sectors turned up when you ran the C)RC option, any tracks with bad sectors can be spared out using this menu and the instructions found in the section of this chapter titled 'Sparing Tracks.'

Pressing Q for Quit exit this portion of the M)ap option and continues to the next portion of the M)ap option, which is for changing the interleaving specification.

```
—WARNING—
DO NOT CHANGE THE INTERLEAVING SPECIFICATION
UNLESS YOU ARE ADVISED TO DO SO BY THE CORVUS
SERVICE DEPARTMENT.
```

```
DO YOU WISH TO CHANGE
THE INLEAVING SPEC ? N
```

Always, unless otherwise instructed, respond with N for No to this prompt.

If however you are instructed to change the interleaving specification, press Y for Yes then type in the new value and <return>. To leave the number unchanged, just press <return>.

```
INTERLEAVING SPEC
ENTER NEW VALUE: <DEFAULT 9>? <return>
INTERLEAVING SPEC IS NOW 9.
```

The specified value displays. After this the program continues to the next portion of the M)ap option, which is for the virtual drive track offset.

```
VIRTUAL DRIVE/TRACK OFFSET
1. 0
2. 976
```

The values for fields 1 and 2 indicate the current track offset for the virtual drives one and two. This information is presented differently for the five and ten megabyte drives. In our example, we use a twenty megabyte drive.

WARNING
BEFORE CHANGING THE VIRTUAL DRIVE TRACK OFFSET, BE SURE ALL YOUR DATA IS BACKED UP. CHANGING THE VIRTUAL DRIVE TRACK OFFSET MAY DESTROY DATA.

Pressing N for No returns you to the P)arams menu.

Press Y for Yes and the program continues with instructions of how the track offset is to be set for a ten megabyte drive and a twenty megabyte drive. If you have a five megabyte drive, use the values you would for a ten megabyte drive.

```
DO YOU WISH TO MODIFY THE
VIRTUAL DRIVE/TRACK OFFSET TABLE?  Y

IF YOU HAVE A 10MB DRIVE,
USE 0 FOR VIRTUAL DRIVE 1,
USE -1 FOR VIRTUAL DRIVE 2.

IF YOU HAVE A 20MB DRIVE,
USE 0 FOR VIRTUAL DRIVE 1
USE 976 FOR VIRTUAL DRIVE 2,
USE -1 FOR VIRTUAL DRIVE 3.
```

You may change the values from the selection shown to new values by typing in the desired number and <return>, or you can leave the displayed values unchanged by pressing <return> in response to selections offered.

If you adjust the value from what is displayed, data stored may be destroyed.

```
ENTER TRACK OFFSET FOR  
VIRTUAL DRIVE 1?          0 <return>  
VIRTUAL DRIVE 2?          976 <return>  
VIRTUAL DRIVE 3?          -1 <return>  
YOU ARE ABOUT TO DESTROY  
DATA ON THE DISK.
```

When you are finished entering the offset values, a prompt asks if you want to continue. If you press N for No, the changes you have made are ignored. Press Y for Yes to set your changes.

```
DO YOU WISH TO CONTINUE  
WRITING DATA ON DISK    Y
```

After this option is run, the program returns you to the P)arams menu.

C(onst

Before connecting a Master Multiplexer to a Multiplexer network, you must X(ecute the program Cmgr and update the Constellation table. By updating this table you tell the disk controller what is attached to each port of the Master Multiplexer. This is necessary only when a Master Multiplexer is attached to the system.

This option also allows you to change the polling parameters. The polling parameters are reserved for future use. We recommend that you do not change the polling parameters.

```
CONSTELLATION:  
  
MUX-MUX CONFIGURATION  
  
M      M  
M      M  
M      M  
M      M  
X  
POLLING PARAMETERS: 180, 16, 32, 0
```

Press Y for Yes in response to the following two questions.

DO YOU WISH TO MODIFY ANY OF THESE ? N Y

CHANGE MUX-MUX CONFIGURATION ? Y

**ENTER N(OTHING M(UX C(OMPUTER L(SI-11
FOR EACH SLOT:**

```

5      4
6      3
7      2
8      1
      X
    
```

The program presents you with a numbered representation of the slots of a Master Multiplexer. Note the order of the numbers. The X indicates the slot that connects to the cable from the drive.

As you are prompted for each slot, enter the appropriate option for that slot. If there is nothing connected to a particular slot, press N for N(othing. If there is a multiplexer connected to the slot, press M for M(ux. It is also alright to specify M for a slot to which nothing is connected. If there is a computer, other than an LSI-11, connected to the slot, press C for C(omputer. If there is an LSI-11 connected to the slot, press L for L(si-11. If there is an Omninet Disk Server, press C for C(omputer.

Since each Multiplexer network can have any combination of computers and multiplexers, the following is an example of a typical response:

```

SLOT 1?
SLOT 2?
SLOT 3?
SLOT 4?
SLOT 5?
SLOT 6?
SLOT 7?
SLOT 8?
    
```

```

M
N
N
C
C
N
M
C
    
```


WARNING

CHECK THESE VALUES CAREFULLY BEFORE CONTINUING. ENTERING INCORRECT VALUES MAY CAUSE YOUR MUX TO NOT RECOGNIZE YOUR COMPUTER. IF THIS HAPPENS, YOU MAY HAVE TO DISMANTLE YOUR HARDWARE.

After you have finished answering the slot prompts, you are asked if you want to change the polling parameters. Press N for No to this question.

```
CHANGE POLLING PARAMETERS ?      N
CONSTELLATION PARAMETERS UPDATED.
```

E)xer

The exercise option causes the heads to move back and forth across the platter surfaces of the disk to check if the servo mechanism is working properly.

Information returned by the E)xer option tells you if the servo firmware is working correctly and if there are any defects in the hardware. This information is presented as hard and soft errors.

To run the E)xer option, press E for E)xer from the diagnostic menu. To end the exercise option press <return>. The screen displays information similar to that shown in the example below.

```
V)RSN C)RC P)PARAMS E)XER M)NUAL      E
U)PDATE F)ORMAT Q?

EXERCISE SERVO

PUSH 'RETURN' TO END TEST

.....
.....                                <return>
```

Each dot on the screen indicates a pass of the head across the disk.

```
--EXERCISE SERVO ERROR SUMMARY--

PASSES           :48
SOFT ERRORS      :0
HARD ERROR       :0
```

M)nual

M)nual allows you to communicate with your drive one byte at a time. We recommend that you do not use the options found under M)nual unless you are under the supervision of the Corvus Service Department. The commands used with the following options can be found in the Corvus Disk Technical Manual.

► THE M)NUAL OPTION IS FOUND ONLY IN THE PASCALVERSION OF THE DIAGNOSTIC PROGRAM.

The M)nual options are: get the status of the drive, send commands to the drive, prepare to send a diagnostic command, leave the prep mode, and update the disk firmware.

When you press M for M)nual, a menu displays.

```
S)STATUS  C)OMMAND  P)REP  B)OOT
U)PDATE  Q  :
```

S)tatus

The S)tatus option tells if the drive is ready or busy. It also gives the direction of the bus. To check the drive status, press S for S)tatus.

```
DRIVE STATUS :  READY
BUS DIRECTION : => DRIVE
```

C)ommand

C)ommand allows commands to be sent to the drive byte by byte. To send a command, press C for C)ommand. You are prompted for the number of bytes to be sent, then for each byte one at a time. The following example sends a semaphore init command to the drive.

EXAMPLE:

```
1/2 OF BYTES TO SEND TO DRIVE : 5
BYTE 1 = 26
BYTE 2 = 16
BYTE 3 = 00
BYTE 4 = 00
BYTE 5 = 00
```

The bytes to be sent are echoed in hex and in ASCII, with non-printable ASCII characters displayed as periods. Next, you are asked if it is o.k. to send the command. Pressing N for No returns you to the M)nu)al menu. Press Y for Yes to continue.

```
# OF BYTES TO BE SENT : 5
1A 10 00 00 00 *.....*

OK TO SEND COMMAND ?      Y

COMMAND SENT

# OF BYTES RETURNED : 1
20 * *
```

P)rep

Pressing P for P)rep is used for setting a special mode so that drive diagnostic commands such as Format, CRC, read or write a block of Corvus firmware can be sent to the drive. The Busy light on the drive comes on when the prep mode is set.

B)oot

B)oot takes the drive out of the P)rep mode.

U)update

This option is the same as the one described in the next section.

U)update

This option of the Diagnostic program is used to write out new controller code to the drive. To run this option, press U for U)update.

```
V)RSN C)RC P)ARAMS E)XER M)NUAL
U)PDATE F)ORMAT Q?      U
```

U)update displays the title and asks the question, "Do you wish to write new firmware?"

Pressing N for No returns you to the Diagnostic menu.

If you press Y for Yes, the program prompts you with the number of a version of firmware. If the new code file name is CFxx.x, where xx.x is the latest version number found on your utilities diskette, just press <return>.

```

--UPDATE CONTROLLER CODE--
DO YOU WISH TO WRITE NEW FIRMWARE?      Y
INPUT FILE NAME   ( CFxx.x ):           <return>
UPDATING CONTROLLER CODE WITH CFxx.x
.....
CONTROLLER CODE UPDATE FINISHED

```

For more information on updating your firmware, see the following section titled 'Updating the Firmware.'

F)ORMAT

F)format is a bottom level format, which is also called platter prep, for the drive. F)format wipes out all information, including all the controller firmware and sparing information. In short EVERYTHING on the Corvus disk drive.

► THIS OPTION SHOULD BE USED ONLY AS A LAST RESORT.

Before using the F)format option, the Format switch on the front of the drive must be set to the format position. Press F for F(ormat). A warning displays.

```

--FORMAT THE DRIVE--
WARNING USE OF THIS COMMAND ERASES
ALL DATA ON CORVUS DRIVE !
FORMAT IS A LAST RESORT, USED
ONLY WHEN ALL ELSE FAILS ! CONTACT
A CORVUS SERVICE CENTER IF THERE
ARE ANY QUESTIONS.
THE FORMAT SWITCH MUST BE ON FOR FORMAT.

```

You are asked if you want to continue. Pressing N for No returns you to the Diagnostic menu. Pressing Y for Yes continues. You are asked for a password, which is HAI.

DO YOU WISH TO CONTINUE ? Y

ENTER THE PASSWORD TO CONTINUE : HAI <return>

You are asked if you are formatting a Rev B drive. A default of Y for Yes displays. If you have a Rev B drive, press <return>. If not, press N for No. You are also asked which drive is being formatted. Respond with the number of the drive you are formatting.

IS THIS A REV B DRIVE ? Y

<return>

ENTER CORVUS DRIVE NUMBER :
 FORMAT IN PROGRESS
 (TAKES ABOUT 1 MINUTE)

1

As soon as the format is finished, the U)date option automatically runs. At this point you must update your firmware as described in the previous section titled 'U)date.'

Trouble-Shooting Guide

When you receive your Corvus drive you must check it to make sure the firmware is intact and working properly.

- 1) Be sure the drive fuse is the proper value. Place all switches under the lights on the front panel to the left position. Then connect the ac cord, provided with the drive, to your drive and to a wall socket.
- 2) Power on the drive and wait for it to come ready (about 40 seconds). When all the lights on the front panel go off and the Ready light stays on, the drive is ready and all should be well. Go to the following section titled "Checking the Firmware Version."
- 3) If the Corvus disk system fails to become ready, try the following procedures:
 - Insure all cables are properly connected and switches are in the correct position for the operating configuration.
 - Reset the drive manually using the Reset switch on the front panel.
 - Power down



POWER OFF

the disk system and initiate the power up sequence again.

- If the power up cycle does not complete, remove the cover from the Corvus disk system and carefully tilt the disk to see if the heads are still floating.
- 4) If your drive still does not come ready, power down



POWER OFF

your drive and switch the Format switch to the right. This is the third switch to the right, under the indicator lights. Repeat the power up sequence. If your drive now comes ready, you need to put new firmware on your disk.

First go to the following section titled "Updating the firmware" and try to update your firmware. If the update takes, then your drive should be alright.

If the update is interrupted by an error #144, #167, or a fatal error, you need to format the drive according to the following section titled "Formatting the drive and replacing the firmware."

- 5) You may also need to spare tracks or update the virtual drive table. If so, see the appropriate following sections.
- 6) If none of the previous suggestions work, contact the nearest Corvus Systems Service Center for assistance.

Firmware Update or Replacement

If you need to check your firmware version, you should follow the procedures described in the following sections to update your firmware version, to format your drive, or to verify and change the Virtual Drive/Track Offset table. These procedures require that you have the latest version of the Corvus Utilities diskette and a floppy drive connected to your computer.

Checking Firmware Version

1. Checking the firmware version is done by using the Diagnostic program that is found on the Corvus utilities floppy.

For BASICS:

Boot from the floppy labeled CORVUS AP UTILITIES, BASICS. Run the program Diagnostic. A menu displays. Go to step 2.

For Pascal:

You must first create a Diagnostic floppy according to the following two steps.

- a) Copy the all the files, except System.Compiler, from the Apple floppy named APPLE1 to a blank floppy. Change the name of the blank floppy to DIAG.
- b) Copy the files Diagnostic.Code, CFxx.x.Data, and Diag.Data from the floppy labeled CORVUSAP UTILITIES FOR PASCAL, vol 1 onto the DIAG floppy.

Power down your computer and drive. Place the floppy drive controller card in slot six of your Apple and place the Corvus interface card in slot two of your Apple.

With the Corvus drive in slot two, boot from the DIAG floppy. Press X for X(ecute to run the Diagnostic program. Press S for the Slot option, and enter 2 as the slot number. This tells the diagnostic that the Corvus drive is in slot two.

2. For BASICs or Pascal, press V for V(ersion once you are running the Diagnostic program. The number should match the version on your Corvus diskette. If it doesn't, continue to the next section.
 - To use the Mirror, you must have V2.0 or greater.
 - To use Pipes, you must have V12.6 or greater.
 - To use Omninet, you must have V16.0 or greater.
 - To use the Remote Mirror, you must have V16.0 or greater.

Updating the Firmware

For BASICs:

Boot from the floppy labeled CORVUSAP UTILITIES, BASICs. Run the program Diagnostic. A menu displays.

For Pascal:

Create a Diagnostic diskette as described under 'Checking Firmware Version' and set the slot option to 2.

Run the Diagnostic program. Press U for the U(pdate option.

When the program prompts you with " Do you wish to write new firmware?", press Y for Yes. After this, the program asks for the drive number, type 1 for drive number one. You are prompted for an input file name.

In response to the input file name prompt, press <return> to use the default value.

When the file name has been entered, "Updating Controller Code" is displayed and a dot appears each time a block of code is written. When all blocks have been written, "Controller Code Update Finished" will be displayed and the Diagnostic menu returns.

In BASICs, updating your firmware uses the files CFxx.x, CFxx.xA, CFxx.xB, and Diag.Obj.xx.x, which are found on the same floppy as the Diagnostic program. In Pascal, the files Diag.Data and CFxx.x.Data are used.

- ▶ **THE FORMAT OF THE FIRMWARE FILES HAS CHANGED WITH VERSION 12.6. THE DIAGNOSTIC PROGRAM, DATED 13-MAR-81 OR LATER, MAY NOT BE USED WITH ANY PREVIOUS FIRMWARE FILES, SUCH AS CF12.4, CF12.5, OR CF9.7. SIMILARLY, PREVIOUS VERSIONS OF THE DIAGNOSTIC PROGRAM MAY NOT BE USED WITH THE FIRMWARE FILES, CF12.6 OR LATER.**

You may verify that it has worked correctly by pressing V for Version. The number following the V should match the number in the firmware file name.

Formatting the Drive and Replacing the Firmware

Formatting a drive is a drastic measure and should only be performed under extreme circumstances. If, however, it does become necessary to reformat the drive (due to inability to write firmware, bad tracks, etc.), some precautions should be taken. If important data is on the disk, some attempt should be made to recover it, as the reformatting process destroys it. If possible, the spare track table should be written down as this may contain some difficult to locate media errors which will cause trouble later if they are not caught by the CRC/Format check.

The process of formatting is quite simple and is accomplished through the diagnostic program. First, turn the Format switch on and power-up the drive.

- ▶ **FOR 10 AND 20 MEGABYTE DRIVES, YOU MUST MAKE SURE THE HEAD RE-ZEROES AND THE DRIVE IS READY. ON 5 MEGABYTE DRIVES THE HEADS MAY NOT RE-ZERO UNTIL YOU BEGIN FORMATTING.**

Run the Diagnostic program and press F for Format. The program will now issue a warning about destroying data on the drive. Press Y for Yes to continue. The program asks for a password. Type HAI (the Japanese word for yes). The program then asks you for the drive number. Type 1 for drive number one. At this point, the drive should take off and begin the format process. The fault and ready lights go off, while the busy light comes on and blinks rapidly. If the lights do anything else, there is a problem and you should make a second attempt by starting over at the beginning of this section.

After some time, the computer should prompt you for the version of controller firmware you wish to write to the disk. You should respond with the appropriate firmware version number. The computer should begin loading in the code from the floppy and writing it to the drive. For each block of code it writes to the disk, it prints one

chap5

dot on the screen. When it has finished, the program asks you to power-down the drive, turn off the format switch, and power-up the drive. The drive should re-zero and become ready (allow 30 to 90 seconds). If it does, you have successfully formatted the drive. If the process fails at any point, you should start again, checking all connections carefully before proceeding.

If you have successfully formatted the drive, the next step is to write the spare track table. If you salvaged the original spare track table, just write the new tracks on using the P(arams option of the Diagnostic program. If you could not retrieve the table, you must use the CRC/Format check to find any errors and spare them out. In either case, you should run at least one pass of the CRC/Format check to ensure there are no other errors. See the next section for more information.

WARNING

A BAD SECTOR MAY ONLY SHOW UP IN THE FIRST CRC AND NOT IN ANY SUCCESSIVE CRC'S. ANY THAT SHOW UP SHOULD BE NOTED AND WRITTEN DOWN IMMEDIATELY.

Sparing Tracks

The Rev B Corvus drives contain a total of seven extra tracks outside the user area. These tracks can be used in place of tracks in the user area if a user track is found to be defective. Corvus provides a diagnostic program to users which makes the process very simple.

WARNING

BACKUP YOUR DRIVE BEFORE SPARING TRACKS OUT. FAILURE TO DO SO WILL RESULT IN THE LOSS OF ALL DATA BEYOND THE SPARED TRACK. YOU WILL HAVE TO RESTORE FROM A MIRROR BACKUP OR RE-INITIALIZE YOUR SYSTEM.

There are several possible ways of discovering bad tracks. You may get I/O errors during normal operation. The bad spots may show up in a CRC/Format check.

If the drive returns I/O errors in the same spot consistently, you probably have a bad track. Calculating the physical location of the bad track from the information available to you is nearly impossible. The best thing to do is run the Diagnostic program and select the CRC/Format check from the menu. In almost all cases, the error will show up in this diagnostic routine.

If the CRC/Format check returns any errors in the form: cylinder number, head number, and sector number. You can calculate the physical location from the head and cylinder number. The formulas are as follows:

For 5 MB drives:

$$(\text{track no.}) = ((\text{cylinder no.}) \times 4) + (\text{head no.})$$

For 10 MB drives:

$$(\text{track no.}) = ((\text{cylinder no.}) \times 3) + (\text{head no.})$$

For 20 MB drives:

$$(\text{track no.}) = ((\text{cylinder no.}) \times 5) + (\text{head no.})$$

Calculate the track number of each of the errors, cancel any duplicates and note them on a piece of paper. Now select the P(arams option by pressing P.

D)RIVE M)AP C)ONST Q:

Press M for M)ap and press 1 for the drive number. About half-way down the screen you should see a heading entitled "Disk Map." Under this heading is one of two things: either "No Tracks Are Spared" or list of tracks that have been spared out.

You should attach a piece of paper to the drive or write in a note book the spared out tracks. If you ever have to reformat your drive, you will want to spare these tracks again.

```

ENTER DRIVE NUMBER
DISK MAP: DRIVE 1
TRACKS SPARED TABLE:
  NO TRACKS ARE SPARED.

INTERLEAVING SPEC IS 9.

VIRTUAL DRIVE/TRACK OFFSET
  1.  0
  2.  976

```

1

Following this, a prompt asks if you want to change any of the items that were presented.

Compare your list against the spared track list. Cross off any tracks in your list that appear in the spared track list. Any remaining on your list must be spared out. Press Y for Yes in response to the prompt asking if you want to change anything.

DO WISH TO CHANGE ANY?

Y

DESTROYS DATA ON DISK

TRACKS SPARED TABLE:
NO TRACKS SPARED.

If you do not want to alter the selection presented to you, press N for No. Press Y for Yes to the prompt asking if you wish to edit the tracks spared table.

DO YOU WISH TO EDIT THE
TRACKS SPARED TABLE?

Y

TRACK CURRENTLY SPARED:
NO TRACKS ARE SPARED.

A menu displays.

A(DD, R(EMOVE, Q :

The computer displays the current spare track list and the prompt menu. To add a track to the list, press A for A(dd. The program prompts you for the track number. If you enter the wrong track number, you can press R for R(emove to remove it, then A for A(dd to enter the correct one. When you have finished editing the spare track list, press Q to Quit.

The Diagnostic program should prompt you with "Enter Interleave Spec." The interleave spec should always be set at 9. Since the default value displayed is 9, press <return>.

Press N for No in response to the next question about changing the virtual drive/track offset.

The following prompt is "This will destroy data on the disk", "Do you wish to continue?". Enter Y for Yes and the computer will write the edited spare track table to the disk. You have completed the spare track procedure and are ready to restore the data.

Checking the Virtual Drive/Track Offset Table (for 20 MB drives only)

You should still be in the Diagnostic program. Press P for the P(arams option. Press M for the M(ap option and enter 1 for the drive

number. In about 10 seconds, you should see a table that looks similar to the one below.

```

DISK MAP          DRIVE 1
NO TRACKS SPARED

TRACKS SPARED TABLE

INTERLEAVING SPEC IS 9.

VIRTUAL DRIVE/TRACK OFFSET

      1.    0
      2.   947
  
```

If you are using a BASICs-only system, the number for drive 2 should be 976. If you are using Pascal/BASICs, or Pascal-only, the number for drive 2 should be 947.

If the number for drive 2 is incorrect, you must change it. Because changing the Virtual Drive/Track Offset table destroys any data on the drive, you must backup all data that is currently on the drive before you change any parameters in the Virtual Drive/Track Offset table.

Updating the Virtual Drive Table (for 20 MB drives only)

— WARNING —
EXECUTING THIS OPTION WILL DESTROY DATA ON THE DRIVE. DO NOT PROCEED UNLESS YOU HAVE BACKED UP ALL DATA ON THE DRIVE.

You should still be running the Diagnostic program. Press P for the P(arams option. Press M for the M(ap option and enter 1 for the drive number. In about 10 seconds you see a display similar to the one below.

```

DISK MAP          DRIVE 1
TRACKS SPARED TABLE:

INTERLEAVING SPEC IS 9

VIRTUAL DRIVE/TRACK OFFSET

      1.    0
      2.   947

DO YOU WISH TO CHANGE ANY?
  
```

You need to change the Virtual drive/Track Offset information, so answer Y to the question. You receive a warning about destroying data on the disk.

Answer N to the question about changing the track spared table.

Press <return> in response to the question about the interleaving spec, which leaves it unchanged.

Answer Y to the question about changing the virtual drive/track offset table. You are then prompted to enter a track offset for each drive. Since you want to set up the drive for two drive emulation, you enter 0 as the track offset for drive one, and either 947 or 976 as the track offset for drive two. Use 976 for BASICs-only systems, and 947 for Pascal-BASICs or Pascal-only systems. Enter -1 for the track offset for drive three. Negative one says that this is the end of the table.

WARNING

BE SURE AND USE THE CORRECT NUMBER AS THE TRACK OFFSET OF THE SECOND DRIVE. WHILE USE OF ANOTHER NUMBER MAY WORK FOR A WHILE, EVENTUALLY THINGS MAY START TO OVERWRITE ONE ANOTHER, ESPECIALLY IF YOU ARE USING PIPES.

To finish the update, you must answer Y to the questions about really changing things. If all goes well, you should see the message "Parameters updated", then the Parameters menu again. Press Q to exit the Parameters option, and press V for the version option. Your table should look like the following.

```
DRV 1: Vxx.x ALL DRIVES  VV/YY/ZZ
DRV 2: Vxx.x ALL DRIVES  VV/YY/ZZ
```

Using the V Option of Psysgen

If for some reason the system volume (the first physical volume on the drive) is destroyed, the program Psysgen has an invisible option that allows you to restore and format the first volume on the drive without formatting the whole drive. Any data in the first volume will be lost, but other data on the drive will be intact, assuming the first volume is at least 1024 blocks long. In such a case, you need to use the BRINGUP diskette you created for the purpose of bringing up your drive.

There are two requirements: 1) the diskette controller must be connected to slot six of the Apple, 2) the Corvus interface card must be connected to slot two of the Apple.

- 1) Boot from the Apple diskette, then insert the BRINGUP floppy into the diskette drive.
- 2) From the command level, press X for X(ecute and type PSYSGEN <return>. When you are asked to destroy data in an alternate slot, press V when prompted to destroy data in an alternate slot.

```
PSYSGEN UTILITY...VER XX.XX
```

```
OK TO DESTROY ALL DATA
```

```
ON DISK IN ALTERNATE SLOT (Y/N)
```

V

During the initialization process, data in the first physical Pascal volume on the drive is destroyed and the directories are reconstructed. The display is the same as the ordinary Psysgen procedure, except that the message OLD VOLUME TABLE RETAINED is displayed.

CORVUS NETWORK SOFTWARE

For Apple II Computers

 **CORVUS SYSTEMS**

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Chapter Six

Network Initialization and Management Software

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Checklist

Checklist

- Your system must have been initialized as described in Chapter Three.
- Update the drive firmware as described in Chapter Five if necessary.
- If you are upgrading an existing system to Omninet, replace all the utilities according to either the section titled 'Replacing the Pascal Utilities' or the section titled 'Replacing the BASiCs Utilities.' Then reset the Boot to C(onst from the program Setboot.
- For Pascal or Pascal-BASiCs networks:
 1. Pascal-BASiCs users read the entire Chapter Six. Pascal users read pages 6-1 to 6-47.
 2. Initialize the drive for Constellation software; pages 6-8 to 6-16.
 3. Add Pipes if desired pages; 6-16 to 6-17.
 4. Add Semaphore if desired; pages 6-17 to 6-18.
- For BASiCs-only networks:
 1. Read pages 6-48 to 6-78 of Chapter Six.
 2. Initialize the drive for Constellation software; pages 6-51 to 6-59.
 3. Add Pipes if desired; page 6-59.
 4. Add Semaphore if desired; pages 6-59 to 6-60.

Pascal

Network Initialization Utilities

This section describes the Corvus Constellation Pascal initialization utilities and replacing old utilities. It is not an initialization procedure.

Vinit

The Vinit program has six options: initialize a second drive (physical or virtual) from a previously initialized drive, create DOS BASICs volumes on the drive, initialize drives for Constellation software, initialize a semaphore table, initialize a disk area and table for pipes, and exit the program.

To run this program, press X for X(ecute and type VINIT <return>. A menu displays.

EXAMPLE :

```
EXECUTE WHAT FILE ? VINIT <return>
```

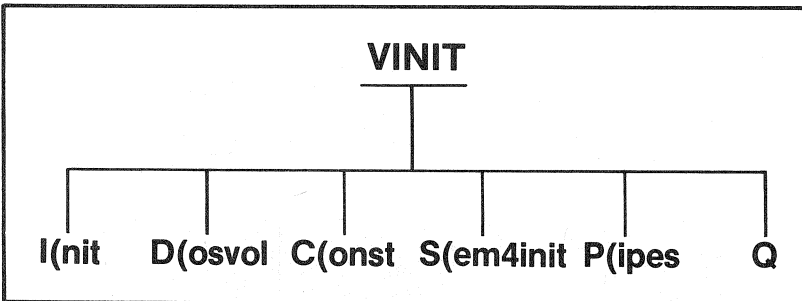
```
VINIT: I)NIT D)OSVOL C(ONST S(EM4INIT P(IPES Q :
```

I)nit

I)nit is used to initialize the second, third, and fourth drives in a system for Pascal. A more complete explanation of this option can be found in Chapter Three in the section titled 'Initialization Utilities'.

D(osvol

D(osvol is used to create an area for BASICs volumes in a Pascal-BASICs system. Only drives one and two may have BASICs volumes. A more complete explanation of this option can be found in Chapter Three in the section titled 'Initialization Utilities'.



C(onst

Pressing C for the C(onst option allows you to initialize Pascal volumes for Constellation software. This option creates a file called System.Constusr, which contains the system supervisory information.

The first prompt asks which drive should be set up and indicates in parenthesis how many drives are in your system. A default of 1 is presented. You respond with the number of the drive you are presently setting up.

WHICH DRIVE SHOULD BE SET UP (1..x)? 1

Next, a brief description of what this option does is displayed followed by a prompt asking if you want to continue.

**THIS PROGRAM WILL
—GIVE THE USER WHOSE ID IS #1 FULL
ACCESS TO THE SYSTEM
—SET ITS ID TO SMGR WITH NO PASSWORD
—GIVE ALL OTHER USERS NO PASCAL ACCESS
THE FMGR P(REFIX MUST BE SET TO THE FIRST
VOLUME ON THE CORVUS DRIVE (1..x)**

If you press N for No, the program returns you to the Vinit menu. If you press Y for Yes, the program continues and a second question prompts you with a default of N for No. This is a safety precaution. You must type Y over the N when configuring the first drive in your network. When configuring any other drives in your network, press <return>.

CONTINUE (Y/N) ?
.....
.....
**DONE THE CONSTELLATION USER TABLE IS NOW
INITIALIZED CONFIRM ZERO USER TABLE: N**
.....
.....

Y

Y

S(ema4init

S(ema4init creates and initializes a Semaphore table. This option is explained in the section of this chapter titled 'Installing Semaphores For Pascal.'

THE SEMAPHORE TABLE IS SUPERVISED FROM THE CMGR PROGRAM DESCRIBED AT THE END OF THIS CHAPTER.

P(ipes

P(ipes creates an area on the disk for Pipes and initializes a Pipe table. This option is explained in the section of this chapter titled 'Installing Pipes for Pascal.'

THE SEMAPHORE TABLE IS SUPERVISED FROM THE CMGR PROGRAM DESCRIBED AT THE END OF THIS CHAPTER.

Setboot

Setboot allows you to choose which mode—BASIC, Pascal, or Constellation—the Corvus disk system automatically boots up in when powered on. This utility needs to be run if you have a Pascal-BASICs system and you desire to boot up with BASICs instead of Pascal, or if you are initializing a system for Constellation software.

WHEN USING THE SETBOOT PROGRAM FROM THE PASCAL ENVIRONMENT, THE DEFAULT (FILER) PREFIX VOLUME MUST BE SET TO THE VOLUME CONTAINING THE FILE BOOT.DATA.

When configuring a system with Constellation software, the boot mode must be set for Constellation software. This is done by X(ecuting the Setboot program.

Press X for X(ecute and type SETBOOT <return>. A small menu displays, press C for C(onst. Then press Q for Quit.

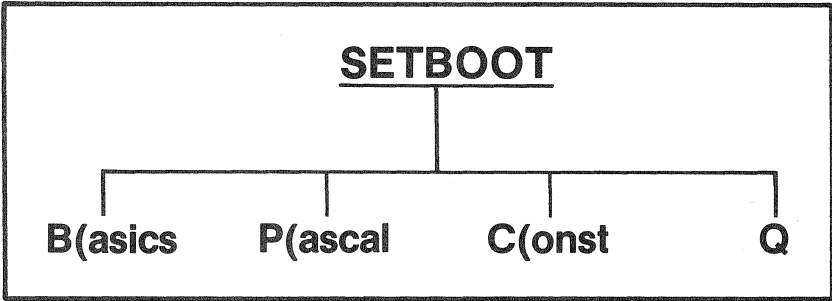
EXAMPLE:

```
EXECUTE WHAT FILE ? SETBOOT <return>
```

```
VER 4.1 CORVUS BOOT SELECTION PROGRAM
```

```
P(PASCAL B(BASICS C(CONST Q: -
```

C



When you are running Constellation software, the C(onst and Q options are the only choices you should specify unless you are explicitly instructed to do otherwise. The other two choices, P(ascal and B(asics, are for single user systems where the boot is either Pascal or BASICs, not both. By specifying the C(onst option both operating systems can be used; some designated users may boot up in Pascal while others may boot up in BASICs.

Replacing the Pascal Utilities

All Omninet users must have the latest version of all Corvus utility programs. If you are upgrading a single user or Constellation system to Omninet, you must replace all your old utilities with the new utilities provided with the Omninet Disk Server.

If you are upgrading an existing single user system, follow the directions in the following section titled 'Replacing the Single User Utilities.'

If you are upgrading an existing Constellation system, follow the directions in the following section titled 'Replacing the Constellation Utilities.'

Replacing the Single User Utilities

If you have configured your disk system according to the Corvus Disk System Instruction Manual and User Guide,' the old version of the Pascal utilities will be in either a volume named Corvus1 or Sys. If the volume is named Corvus1, change it to Sys. To do this use the C(hange option of the Filer. After you have pressed C, for C(hange, the computer prompts you to change a file. You reply with CORVUS1 <return>. The program then prompts you for the name you are changing to. You reply with SYS: <return>. Follow the example below.

```

CHANGE WHAT FILE ?   CORVUS1: <return>
TO WHAT ?           SYS: <return>
CORVUS1:  ---> SYS:
  
```


Once the volume name has been changed, transfer the new Corvus utilities to Sys. The new utilities are contained on two diskettes labeled 'Corvus AP Utilities Pascal Vol1' and 'Vol2..' The Pascal volume name of the Vol1 diskette is Corvus1 and the Pascal volume of the Vol2 diskette is Corvus2. After pressing T, for T(ransfer, use the dialog shown in the example below to transfer the files from these two diskettes to the Corvus drive.

TRANSFER WHAT FILE ? CORVUS1:=,SYS:\$<return>

To transfer CORVUS2 type:

TRANSFER WHAT FILE ? CORVUS2:=,SYS:\$<return>

When the filer encounters a file that is already on the drive, it asks you if you want to transfer the new one. Always reply with Y, for Yes.

To make room for the new Constellation utilities you should remove the following files. Pformat.code, Psysgen,Code, and CFxx.x.Data if they are in the Sys volume.

The procedure to remove files is as follows. From the Filer press R, for R(emove. Next, type in the file name such as SYS:PFORMAT.CODE <return> in response to the prompt REMOVE WHAT FILE? or REMOVE?. When the program prompts you to update the directory, respond with Y, for Yes. Repeat the procedure for the files Psysgen. Code and CFxx.x.Data. The actual file name is not CFxx.x.Data but this specified all files that start with CF and end with .Data which are the names of the Corvus firmware files.

Removing files leaves spaces in your volume, so to utilize the total volume space properly you will have to Krunch the volume. To do this, type K, for K(runch, while in the Filer. The program will ask you to Krunch which volume. Reply with SYS: <return>. The program will then ask you if you want to Krunch 1024 blocks. Reply with Y, for Yes.

In about 20 seconds your volume will be properly arranged to be able to accommodate the Constellation utilities.

Replacing the Pascal Utilities

The old version of the Pascal Constellation utilities should be in a volume named Sys. If the volume is not named Sys change it to Sys. To do this use the C(hange option of the Filer. After you have pressed C, for C(hange, the computer prompts you to change a file. You reply with the old volume name. The program then prompts you for the name you are changing to? You reply with SYS: <return>. Follow the example below.

```
CHANGE WHAT FILE ? CORVUS1: <return>
TO WHAT ?          SYS: <return>
CORVUS1:  --- > SYS:
```

Once the volume name is Sys proceed by transferring the new Corvus Constellation utilities to SYS. The new utilities are contained on one diskette labeled 'Corvus Constellation utilities Pascal'. The Pascal volume name of the diskette is Const. After pressing T, for T(ransfer, use the dialog shown in the example below to transfer the files from the diskette to the

```
TRANSFER WHAT FILE ? CONST:=,SYS:$<return>
```

When the filer encounter a file that is already on the drive it will ask you if you want to transfer the new one. Always reply with Y, for Yes.

Initializing for Pascal or Pascal-BASICs

The Constellation software may be installed on an existing single user Corvus system with Apple Pascal without deleting any existing user files. You should already have Pascal on your Corvus drive as outlined in Chapter Three of this manual before beginning the following instructions.

To prevent a power interruption from destroying the ability to boot the system during the conversion process, perform the following operations in the order shown. Read this entire chapter before you begin the following process.

This section covers bringing up Pascal or Pascal-BASICS Constellation software for 5, 10 or 20 MB drives. This section also covers bringing up existing multiple drive systems under Constellation software.

SINCE CORVUS SOFTWARE HANDLES A 20 MEGABYTE DRIVE AS TWO VIRTUAL 10 MEGABYTE DRIVES, A 20 MB DRIVE IS CONSIDERED TO BE MULTIPLE DRIVES. FOLLOW THE INSTRUCTIONS IN THIS SECTION ACCORDINGLY.

The bringup procedure includes the following fundamental operations:

- Bring up the drive according to the appropriate section(s) in Chapter Three of this manual.
- Connect a floppy drive to your Apple and boot from the Corvus drive.
- Change the name of first volume on the first Corvus drive to Sys.
- Create a volume for only the System Manager, and create one Sys volume on each drive in multiple drive systems.
- Transfer the Constellation utilities from floppy to disk drive.
- X(ecute the program Vinit and specify the C(onst option. For multiple drive systems, this must be done for each drive.
- X(ecute the program Setboot and specify the C(onst option.
- Re-boot the system and log-on as Smgr.
- X(ecute Vmgr.
- Create additional volumes if you have a new Corvus disk system.
- Create users.
- Configure access tables.
- Re-check what you've done.
- Exit Vmgr.
- For Pascal-BASICs, X(ecute the program BASICs and turn to the section of this chapter titled 'BASICS'.
- Install Pipes or Semaphores or both if desired.

Because of the different amounts of data space available on the Corvus 5, 10, and 20 MB drives, some of your responses to the prompts in the programs in this section may not be the ones shown. There are 11220 blocks of available data space on a 5 MB drive, 21220 on a 10 MB drive, and 38460 on a 20 MB drive. There is a maximum of 35 BASICs volumes on a 5 MB Pascal-BASICs drive, 65 on a 10 MB Pascal-BASICs drive, and 65 per 10 megabytes on a 20 MB Pascal-BASICs drive.

The following directions show you how to set up your Constellation software for two Pascal users and the system manager. In the examples, we call the users John and Mary and let Smgr represent the system manager. If you wish, you can use other names in place of John and Mary. The name Smgr automatically comes up as user number one. If you wish to use a different name for the system manager, follow the instructions outlined in this section, then read the section titled 'VMGR—Adding and Deleting Users'. The user in the number one position of the user table always has the system manager capabilities.

WARNING

**PLEASE TAKE CARE TO FOLLOW THESE INSTRUCTIONS
IN THE EXACT ORDER LISTED.**

1.



POWER OFF

Hook up a floppy drive to the number four slot in your computer. After you have successfully connected a floppy drive to your system, power up the system. The system should be booted from the Corvus drive. You should come up in Pascal with the outer command level commands printed across your screen.

2. Create a volume on the Corvus drive and call this volume Private, because only the System Manager will have access to it. Make this volume 1024 blocks in length.

Press X for X(ecute and type VMGR <return>. Press N for N(ew.

ENTER VOLUME NAME :
ENTER LENGTH (BLOCKS) :1024
ENTER CORVUS DRIVE # (1..2) :1
ENTER ADDRESS (BLOCKS):1032

PRIVATE <return>
 1024 <return>
 <return>
 <return>

Press M for M(ount. Mount Private on unit #12 so that it doesn't get in the way later on in this section.

MOUNT : ENTER VOLUME NAME :
MOUNT PRIVATE ON UNIT #9
PRIVATE : MOUNTED

PRIVATE <return>
 12 <return>

If you are bringing up more than one drive (or a 20 megabyte drive) under Constellation software, you must create a new volume on each virtual drive in your system. Each of these volumes must be 136 blocks in length and must be the first physical volume on the drive (starting address 8). Name the Volumes Sys2 for drive two, Sys3 for drive three, Sys4 for drive four. You must also mount these volumes on units #5, #10, and #11. Later, after step seven in this section, these volumes need not be mounted.

3. Press the F key for the F(ile command. F is used here to enter the Pascal Filer.

Press the C key for the C(hange command. You are going to change the name of the first volume on the first Corvus drive to Sys. The computer understands that *: means the first volume on the disk.

```
CHANGE ?
CHANGE TO WHAT ?
CORVUS _____ SYS:
```

```
*: return
SYS: <return>
```

If the first volume is already titled Sys,

```
VOL ALREADY ON LINE
```

displays.

4. You are still in the Filer. Transfer the following files to Private, then remove them from Sys:

```
Vinit.Code
Setboot.Code
Boot.Data
Diagnostic.Code
CFxx.xData
Psysgen.Code
Basics3.Data
Basics3.Omni
```

Press T for T(ransfer and type #4:?,#12:\$ <return>.

```
TRANSFER ? #4:?,#12:$ <return>
```

Press Y for Yes for the files listed above and No for No to all the rest.

Once these files are in the volume called Private, you must remove them from Sys in order to make room for the Constellation files.

Press R for R(emove and type SYS:? <return>.

```
REMOVE WHAT FILE ? SYS:? <return>
```

Press Y for Yes for the files listed above and N for No for all other files.

Place the Constellation Pascal Utilities diskette in your floppy drive. You must transfer some of these utilities to Sys and some to Private. Press T for the T(ransfer command. To transfer the Constellation utilities from the floppy diskette to the Corvus disk volume mounted on #4, which we have named Sys, type #9:?,Sys:\$ <return>.

```
TRANSFER ? #9:?,SYS:$ <return>
```

Transfer all the files on the floppy, except for the following four, to Sys:

Corvus.Library

Vinit.Code

Setboot.Code

Next, transfer the above three files to Private. Press T for T(ransfer. Type #9:?,Private:\$ <return> and press Y for Yes to the questions asking if you want to remove old system utilities. Answering Y removes the old utility and replaces it with the new utility.

```
TRANSFER ? #9:?,PRIVATE:$ <return>
```

Now, K(runch Sys and make sure there are 126 unused blocks. If not, use T(ransfer to move any other files from Sys to Private.

5. Press Q for the Q(uit command to leave the Filer. This returns you to the outer command level. Press X for X(ecute, then type PRIVATE:VINIT <return>.

```
EXECUTE WHAT FILE ? PRIVATE:VINIT <return>
```

```
VINIT: I(NIT D(OSVOL C(ONST S(EM4INIT P(IPES Q:
```

Press C for the C(onst option. When you are asked which drive to set up, press <return>.

```
WHICH DRIVE SHOULD BE SET UP (1..2)? 1 <return>
```

```
THIS PROGRAM WILL  
—GIVE THE USER WHOSE ID IS #1 FULL  
ACCESS TO THE SYSTEM  
—SET ITS ID TO SMGR WITH NO PASSWORD  
—GIVE ALL OTHER USERS NO PASCAL ACCESS  
THE FMGR P(PREFIX MUST BE SET TO THE FIRST  
VOLUME ON THE CORVUS DRIVE (1..2)
```

Type Y for the Yes answer to both of the following questions. The second question prompts you with an N answer. This is only a safety precaution. You must type Y over the N when configuring your network.

CONTINUE (Y/N) ?

Y

**DONE THE CONSTELLATION USER TABLE IS NOW
INITIALIZED CONFIRM ZERO USER TABLE: N**

Y

Press Q for Quit.

You have transferred the Constellation software to your drive and initialized the Constellation multiple users tables on virtual drive one. The procedure described above creates the file System.Constusr. There must be at least 126 contiguous free blocks in the default volume when this option is run.

If you have multiple drives (20 MB drives included), you must now execute the Vinit program again, individually for each drive in your system. However, the first physical volume (Sys2, Sys3, or Sys4) on each drive must be prefixed by the Pascal Filer's P(refix option).

From the Command level menu, press F for F(iler, then press P for P(refix).

PREFIX TITLES BY ?

SYS2:

PREFIX IS SYS2:

Press Q for Q(uit to leave the Filer. Press X for X(ecute and type Private: VINIT <return>. Follow the example above, except when the second question asks to zero the user table respond with N for No.

For multiple drive systems, repeat this procedure for each drive in your system; a 20 MB drive counts as two drives. When you are done, press Q to quit the Vinit program..

6. After you have run the program Vinit for each drive in your system, you can set the boot to the C(onstellation mode.

Press X for X(ecute, then type SETBOOT <return>.

EXECUTE WHAT FILE ?

SETBOOT <return>

In this step, all you need to do is press C for the C(constellation option).

```

CORVUS BOOT SELECTION PROGRAM [x.x]:
P(ASCAL B(ASICS C(ONST <esc> :
SETTING BOOT FOR PASCAL 1.1
OPENING BOOT.DATA . . .
CORVUS BOOT NOW SET TO CONSTELLATION
  
```

C

The Setboot program returns you to the outer command level after you press C.

Your system can now run Pascal-BASICs or Pascal-only. But before your system is fully operable, you must add users and configure their access tables, which means you must finish the rest of these steps.

7. With the outer command level displayed, press H for the H(alt command. This reboots the system. You can also power off, then power on the system, to reboot.

In either case, the system prints a log-on message asking for your name. Reply with Smgr—the user configured as the system manager.

You may have volumes other than Sys on your drive. If you have a new system, you probably have only one volume and it is named Sys. The following directions presume you have only Sys volumes and need to add some new volumes for other users in your system. If you don't need to create any new volumes, skip step number eight and continue with step number nine.

8. This step illustrates how to create volumes with the Constellation software. It shows how to create four new volumes. These volumes are named John, Mary, Scores, and Reports. If you want, you may use other names.

Press X for X(ecute, then type VMGR <return>. Press N for the N(ew command, then type JOHN <return> when you are prompted for the volume name.

The program prompts you for the correct volume size, drive number, and address for the volumes. You need only press <return> for these options.

```

ENTER VOLUME NAME:          JOHN <return>
ENTER LENGTH (BLOCKS): 1024 <return>
ENTER CORVUS DRIVE # (1..4): 1 <return>
ENTER ADDRESS (BLOCKS) : 10552 <return>
  
```

Use this same method to add volumes Mary, Scores and Reports.

9. This step illustrates how to configure the System Manager's access table. If you already have volumes in your system and you skipped step eight, you are still at the Pascal command level and must press X for X(ecute, then type VMGR <return>.

Press S for S(upervise option. Type in SMGR <return> to supervise the System Manager.

```
ENTER USER ID : SMGR <return>
```

Press I for I(nit to include all volumes in the Smgr's access table.

Press L for L(ist and make sure Sys is mounted on unit #4. Then press M for M(ount to mount the volume John for Smgr. Type JOHN <return>. Type 10 <return>.

```
MOUNT : ENTER VOLUME NAME : JOHN <return>
MOUNT SYS ON UNIT #9
SYS : MOUNTED
```

Your floppy drive is mounted on unit #9. These unit numbers are only suggestions. As in the case of adding volumes, the program intelligently prompts you with a unit number. You need only press <return> if the number prompted is the one desired.

A user cannot transfer a file unless the volume containing the file to be transferred and the volume being transferred to are both mounted for that user, which is why we mounted these volumes for the Smgr.

10. After you mount the volumes for the Smgr, press Q for Q(uit to leave the supervise level. You are now at the Vmgr level. Press Q for Q(uit to leave the Vmgr level.

You are now back at the Pascal command level. In order for the volumes John and Mary to be bootable they must contain copies of the files System.Miscinfo, System.Library, and System.Pascal. Press F for F(ile, then press T for the T(ransfer command to copy System.Miscinfo and System.Pascal to the volumes named John and Mary.

```
TRANSFER WHAT FILE ? SYS:SYSTEM.MISCINFO <return>
TO WHERE ? JOHN:$ <return>
SYS:SYSTEM.MISCINFO
-->JOHN:SYSTEM.MISCINFO

TRANSFER WHAT FILE ? SYS:SYSTEM.PASCAL <return>
TO WHERE ? JOHN:$ <return>
SYS:SYSTEM.PASCAL
-->JOHN:SYSTEM.PASCAL
```

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Press L for L(ist, then type JOHN: <return> to verify that the transfer worked.

Repeat the above sequence for the volume Mary.

Press Q for Q(uit to leave the Filer. You are now at the Pascal command level.

We are going to make the user have the same name as the Pascal default boot volume, which is the volume mounted on unit #4. Thus when an individual logs-on with his user name, he boots up in a volume with the same name. Remember, John and Mary are names of volumes as well as user names.

11. This step shows how to create new users. Press X for X(ecute, then type VMGR <return>. This time press U for the U(ser command.

Press A for A(dd and type JOHN <return>. The BASIC home volume can be any BASIC volume you choose, 0 meaning no BASIC access. When we create user John, he is not given a password. However, you can assign him a password if you choose to do so.

```
ENTER USER ID : JOHN <return>
ENTER PASSWORD (2 CHARS MAX)
OR TYPE <RETURN> FOR NO PASSWORD: <return>
ENTER BASICS HOME VOLUME (0 . . . 67) : 1 <return>
DEFAULT : P(ASCAL OR B(ASICS ? P
```

Repeat the sequence for Mary. After Mary is added, press L for L(ist to verify that John and Mary are in the users table.

12. After creating users, you need to set up their access tables.

Press S for the S(upervise command to set up John's access table. When the computer prompts for a name, type JOHN <return>.

```
ENTER USER ID : JOHN <return>
```

Press A for A(dd and one by one add volumes John, Scores, and Sys by typing in the volume name when prompted.

```
NEW VOLUME : ENTER VOLUME NAME : JOHN <return>
```

After John, Scores, and Sys have been added to user John's access table press L for L(ist to make sure the volumes have been added.

Press M for M(ount to mount the volumes. You MUST mount volume John on unit #4. When you try to mount a volume on unit #4 a warning message displays on the screen. This message informs you that you must have System.Miscinfo and System.Pascal in the volume mounted on unit #4. You have already transferred these files to volumes John and Mary.

After the warning displays, the program asks you if you want to continue. Press Y for Yes in response to this question.

Next mount Sys on unit #5 and Scores on unit #10.

To write-protect Sys from John, press W for W(Prot, then type SYS <return>.

```
ENTER VOLUME NAME : SYS <return>
SYS: NOW WRITE PROTECTED: *
```

Press L for L(ist to review your work.

Press Q for Q(uit.

Mary's volumes are Mary, Sys, and Reports. Press S for S(upervise and repeat step 11 for user Mary. Mount volume Mary on unit #4, Sys on unit #5, and Reports on unit #10. Write-protect Sys.

After you have done this, press Q for Q(uit twice to return to the outer command level. Your system is configured in Pascal for Smgr, John and Mary.

13. Check out your Pascal system to make sure it is working properly. Press H to reboot your system. Try logging on as each user, one at a time, to make sure the users boot up in their own volumes.

14. To run a Pascal-BASICs system, you must now set up your BASICs volumes to operate under the Constellation software. This is done by pressing X for X(ecute, then typing SYS:BASICS <return> (turn to the section titled 'Initializing for BASICs' to continue). You must have created DOS volumes as described in Chapter Three.

Installing Pipes For Pascal

Programs to allow the user to set the size and location of the Pipe work area or check the status of the active Pipes are provided on the Constellation Utilities diskette.

In the Pascal program VINIT, found on the Constellation Utilities diskette for Pascal, there is a P(ipes option. It creates and initializes a special volume called Pipes.

Log-on as the System Manager. To initialize a pipe area, press X for X(ecute, type PRIVATE:VINIT <return> and press P for P(ipes.

```
EXECUTE WHAT FILE ? PRIVATE:VINIT <return>
VINIT: I(NIT D(OSVOL C(ONST S(EM4INIT P(IPES Q: P
```

After you X(ecute the program VINIT and press P for P(ipes, the program prompts you for the length (in blocks) of the special Pipes volume.

```
ENTER PIPES VOLUME LENGTH : 400
```

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A default value displays. Press <return> if the default value displayed is the desired value.

The program responds with:

```
PIPES INITIALIZED
```

If a Pipes volume already exists, the program tells you so. If you choose a Pipes volume length that is larger than the default length and larger than the largest space available, the program responds with the maximum amount of space available. Then the program tells you to use VMGR to make more space. You can create additional free space by removing other volumes.

THE PIPES AREA CAN ONLY BE ON DRIVE ONE. IF YOU ARE RUNNING PASCAL-BASICS, THE PIPES AREA MUST BE IN THE PASCAL AREA OF THE DISK.

The Corvus CMGR program allows the System Manager to check the status of the Pipes and purge one or all Pipes. Similar functions are provided by the PIPE DIAGNOSTIC program in BASICS.

Installing Semaphores For Pascal

To use the Semaphores, you must initialize the semaphore table by running the program Vinit and using the S(em option.

Log-on as the System Manager. To initialize semaphores, press X for X(ecute then type PRIVATE:VINIT <return>.

```
EXECUTE WHAT FILE ? PRIVATE:VINIT <return>
```

```
VINIT: I(NIT D(OSVOL C(ONST S(EM4INIT P(IPES Q: S
```

When the Vinit menu appears, press S for the S(em4init option. You are prompted with a default response of N for No. To initialize the semaphore table, press Y for Yes instead of using the default and then press <return>.

```
OK TO CLEAR TABLE OF SEMAPHORE KEYS ? N Y  
SEMAPHORE KEYS INITIALIZED
```

After completing this simple task, the semaphore table is ready for use.

Adding Drive To A Corvus Network System

The procedure is the same for adding on a 10 MB drive, adding on a 5 MB drive, or adding on a 20 MB drive.

This section covers adding on a drive to an existing Corvus network system that is already running under Constellation software. This procedure covers the following basic operations:

- Set the boot to P(ascal. You must boot up as a single user to initialize an add-on drive.
- Use the program Vinit to initialize the volume table of the add-on drive.
- Create and mount Sys2, Sys3, or Sys4 as the case may be.
- Set the prefix to Sys2 (Sys3 or Sys4), X(ecute the program Vinit and use the C(onst option.
- For Pascal-BASICs, run the program Volume Init.
- For Pascal-BASICs, run the program Constcreate.
- Set the boot back to C(onst.
- Re-boot your system and log-on as system manager.

FOLLOW THESE INSTRUCTIONS IN THE EXACT ORDER PRESENTED.

1. Because the Vmgr program won't work until the add-on drive is initialized, you must temporarily set the boot to a single user mode.

After properly connecting the drive and related hardware, X(ecute the program Setboot and press P for the P(ascal option.

```
VER x.x CORVUS BOOT SELECTION PROGRAM
```

```
P(ASCAL B(ASICS C(ONST Q :
```

```
P
```

Now the boot is set to the single user Pascal mode. However, you must reboot the system before this change takes effect. Press Q to quit the Setboot program. To re-boot the system



POWER OFF

power off then power on the system.

2. You must initialize the volume table of your add-on drive. Run the program Vinit by pressing X for X(ecute and typing PRIVATE:VINIT <return>. Press I for I(nit.

VINIT: I(NIT D(OSVOLS C(ONST S(EMA4INIT P(IPES Q: |

Repeat the above procedure for each add-on drive. Remember, a 20 megabyte drive counts as two drives.

ONLY DRIVES ONE AND TWO CAN HAVE DOS VOLUMES ON THEM. THE VOLUME CONTAINING BASICS3.DATA OR BASICS3.OMNI MUST BE THE PREFIXED VOLUME.

To creat DOS volumes, press D for the D(osvols option before leaving the Vinit program. Answer the prompts with the appropriate responses for your system.

3. Create a volume at the beginning of the add-on drive. This volume must be the first physical volume on the add-on drive. Its volume disk address must be 8. If your add-on drive is your second drive, call this volume Sys2. If it is your third drive, call this volume Sys3. If it is your fourth drive, call this volume Sys4. Remember, a 20 megabyte drive counts as two drives.

Press X for X(ecute and Type VMGR <return>.

EXECUTE WHAT FILE ? VMGR <return>

Press L for L(ist. If there is a volume called DOSONLY on drive two, you must remove it before you create SYS2.

From the VMGR commands, press N for N(ew. Type SYS2 <return>. Type 136 <return>. Type 2 <return>. Type 8 <return>.

ENTER VOLUME NAME :	SYS2 <return>
ENTER LENGTH (BLOCKS) : 1024	136 <return>
ENTER CORVUS DRIVE # (1..4) : 1	2 <return>
ENTER ADDRESS (BLOCKS) : 1032	8 <return>

Follow the above procedure to create a Sys (Sys2, Sys3, Sys4) volume for each add-on drive, carefully entering the appropriate responses.

4. Mount SYS2 on unit #5.

Press M for M(ount. Type SYS2 <return>. Type 5 <return> in response to the unit number.

```
MOUNT WHICH VOLUME :
MOUNT SYS2 ON UNIT #10
SYS2 : MOUNTED
```

```
SYS2 <return>
5 <return>
```

If you have Sys3 and Sys4, follow the above procedure to mount Sys3 on unit #10, and mount Sys4 on unit #11.

Press Q to Quit the VMGR. When you are asked to change the default mount table, respond with Y for Yes.

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

5. Use the P(refix command to set the prefix to SYS2. From the command level, press F for the F(iler. Press P for P(refix.

```
PREFIX TITLES BY WHAT VOL ? SYS2: <return>
```

Initialize the System.Constusr file for the second drive (or third, as the case may be).

Press Q for Q(uit to leave the F(iler. Press X for X(ecute. Type PRIVATE:VINIT <return>.

```
EXECUTE WHAT FILE ? PRIVATE:VINIT <return>
```

Press C for C(onst. When the program asks which drive to set up, respond with the appropriate drive number (1..4). Press Y for Yes when you are asked if you want to continue. Press N for No when the program prompts you to zero the user table.

```
VINIT: I(NIT D(OSVOLS C(CONST S(EMA4INIT P(IPES Q: C
WHICH DRIVE SHOULD BE SET UP (1..4) ? 2
```

```
THIS PROGRAM WILL
—GIVE THE USER WHOSE ID IS #1 FULL
ACCESS TO THE SYSTEM
—SET ITS ID TO SMGR WITH NO PASSWORD
—GIVE ALL OTHER USERS NO PASCAL ACCESS
THE FMGR P(PREFIX MUST BE SET TO THE FIRST
VOLUME ON THE CORVUS DRIVE (1..x)
```

```

CONTINUE (Y/N) ?
.....
.....
DONE THE CONSTELLATION USER TABLE IS NOW
INITIALIZED CONFIRM ZERO USER TABLE: N
.....
.....

```

Y
N

Press Q to Q(uit the Vinit program.

Repeat this step individually for each add-on drive; for drive three, set the prefix to Sys3; for drive four, set the prefix to Sys4.

6. If you are running Pascal-BASICs, you must run the program VOLUME INIT for the second drive.

Press X for X(ecute. Type SYS:BASICS <return>.

Type LOAD VOLUME INIT <return>.

```

1 LOAD VOLUME INIT <return>
1 RUN <return>

```

```

VERSION x.x
BULK VOLUME INIT PROGRAM
9 / 15 / 80

```

```

WHICH DRIVE ? : 2 <return>
ENTER FIRST VOLUME NUMBER 1 <return>
ENTER LAST VOLUME NUMBER 20 <return>

```

If you are running Pascal-BASICs, you must also run the program CONSTCREATE.

Type RUN CONSTCREATE,V2,D1,S6 <return>. Respond to the prompts with a Y for Yes, the drive number, and the number of volumes you created when you brought up the second half of your drive as a single user drive.


```

BASICs VOLUME PREPARATION PROGRAM
THIS PROGRAM WILL MAKE A GROUP OF BASICs
VOLUMES PROTECTED AGAINST ALL
CONSTELLATION USERS EXCEPT USER NUMBER
ONE, WHO WILL BE GIVEN WRITE ACCESS TO
ALL VOLUMES.

```

```

CONTINUE (Y/N) ?      Y
DRIVE (1 OR 2) :     2
STARTING VOLUME (1 . . . 59) : 1
ENDING VOLUME (1 . . . 59) : 20
INITIALIZING VOLUMES . . .
END OF PROGRAM

```

To return to Pascal, type RUN PASCAL,V1,D1,S6 <return>.

1 RUN PASCAL,V1,D1,S6 <return>

7. Now you must set the boot back to the C(onst setting.
 When the Pascal command menu appears across your screen, press
 X for X(ecute and type SETBOOT return. Press C for the C(onst option.

```

VER 4.1 CORVUS BOOT SELECTION PROGRAM

```

```

P(ASCAL B(ASICS C(ONST Q :      C

```

You can now manage Pascal volumes with the program Vmgr and
 BASICs volumes with the program Access Manager.

Network Management

The Corvus Apple Pascal Constellation software is designed to allow multiple users to share the Corvus disk system.

A single Corvus drive consists of 11220 blocks (5 MB drive), 21220 blocks (10 MB drive), or 38460 (20 MB drive) blocks of user accessible data storage area. Of these, eight blocks are reserved for the system. These eight blocks are used for booting the system and for storing the volume directory and related information.

The drive is divided into multiple volumes, each of which is similar a diskette. Like on a diskette, a volume has a name and size. Generally, Apple Pascal format floppies are 280 blocks long. Corvus Constellation software, however, allows a Pascal volume to be any length (up to 32,768 blocks) in multiples of eight blocks.

Constellation software for Pascal includes a volume manager program (Vmgr) that allows up to 63 Pascal volumes to be defined on each Corvus disk drive. Files within the volumes are handled by the standard Pascal Filer program as described in the Apple Pascal Manuals.

The Constellation software controls the access to the Corvus disk volumes through the Vmgr program, which manipulates three groups of information.

- Volume Information
- User's Table
- Access Tables and Mount Information

Volume Information

The volume information includes the size of each volume and where each volume is physically located on the disk. This information includes the following elements:

- WP — A flag that indicates if a volume is write-protected. An asterisk printed in the WP column indicates the volume is write-protected and can only be read.
- NAME — The alphanumeric name of the Pascal volume. This name must be seven characters or less in length. The volume name is actually contained in the Pascal directory of the volume.
- ADDR — The block address of the volume. This must be a multiple of eight.
- LENGTH — The length of the volume in blocks of 512 bytes. This must also be a multiple of eight.
- ADDRESS — The block number indicating where the volume starts.
- DRIVE — The disk drive number, indicating on which drive the volume is located.

Through the use of the Vmgr program, the volume information can be manipulated. This volume manipulation includes the following actions:

- List volume information
- Remove a volume
- Create a new volume
- Write-protect a volume

User Table

A user table is utilized to keep track of the valid system users. The user table contains a log-on name, an optional password, and information about the default system boot: BASICs or Pascal. A single user table exists for both Pascal and BASICs and can be updated from either operating system. The user table includes the following elements:

USER # — The user ID number is a sequential table entry number. ID #1 is significant; user number one is known as the System Manager and has special access rights.

LOG-ON — The Log-on ID is a four Character ID. To gain access to the Constellation system, a user must type in his Log-on ID.

PASSWORD — The password is an optional two character field. To gain system access if a password is specified, the user must type in the two character password after typing in the Log-on ID.

DEFAULT SYSTEM — The Default System defines which operating system, Pascal or BASICs, a user is booted to once he has logged on.

BASICs VOLUME — The BASICs volume number is the volume the user is booted to after log-on if the default system is BASICs or if the program BASICS is executed from Pascal.

Constellation software for Pascal allows the user table to be manipulated through the use of the U(ser option of the VMGR program. The U(ser option includes functions to perform the following:

- Add a new user
- Remove an existing user
- List the user table

Access Tables and Mount Information

Access Tables are used to maintain information pertaining to which volumes a user can access. These tables also contain information that indicates which volumes are currently on-line or mounted for the user.

Chap6

A user access table exists for each Pascal user and includes the following information:

VOLUME NAME — Names of the volumes this user can access.

VOLUME LENGH — The length of the volume in blocks.

UNIT NUMBER — Unit number of mounted volumes. Pascal allows up to six (6) volumes to be mounted at one time (unit numbers 4, 5, 9, 10, 11, and 12). No unit number is displayed for volumes that are not mounted. Only volumes that are mounted can be accessed by UCSD Pascal.

WRITE-PROTECT — An asterisk (write-protect flag) next to a volume name indicates that that particular volume is read-only for the user.

The Constellation software allows the access information to be manipulated through the use of the S(upervise option of the Vmgr program. The S(upervise option includes functions to perform the following:

- Mount a Pascal volume
- Unmount a Pascal volume
- Write-protect a volume for the user
- Add a volume to the user's access table
- Include all volumes in the user's access table
- Zero the user's access table
- Remove a volume from the user's access table

VMGR — Partitioning the Disk

Partitioning the disk for Pascal is done with the Corvus Vmgr program. It is presumed that you have logged on as user #1 in the following examples. Only user #1 has access to the entire volume directory.

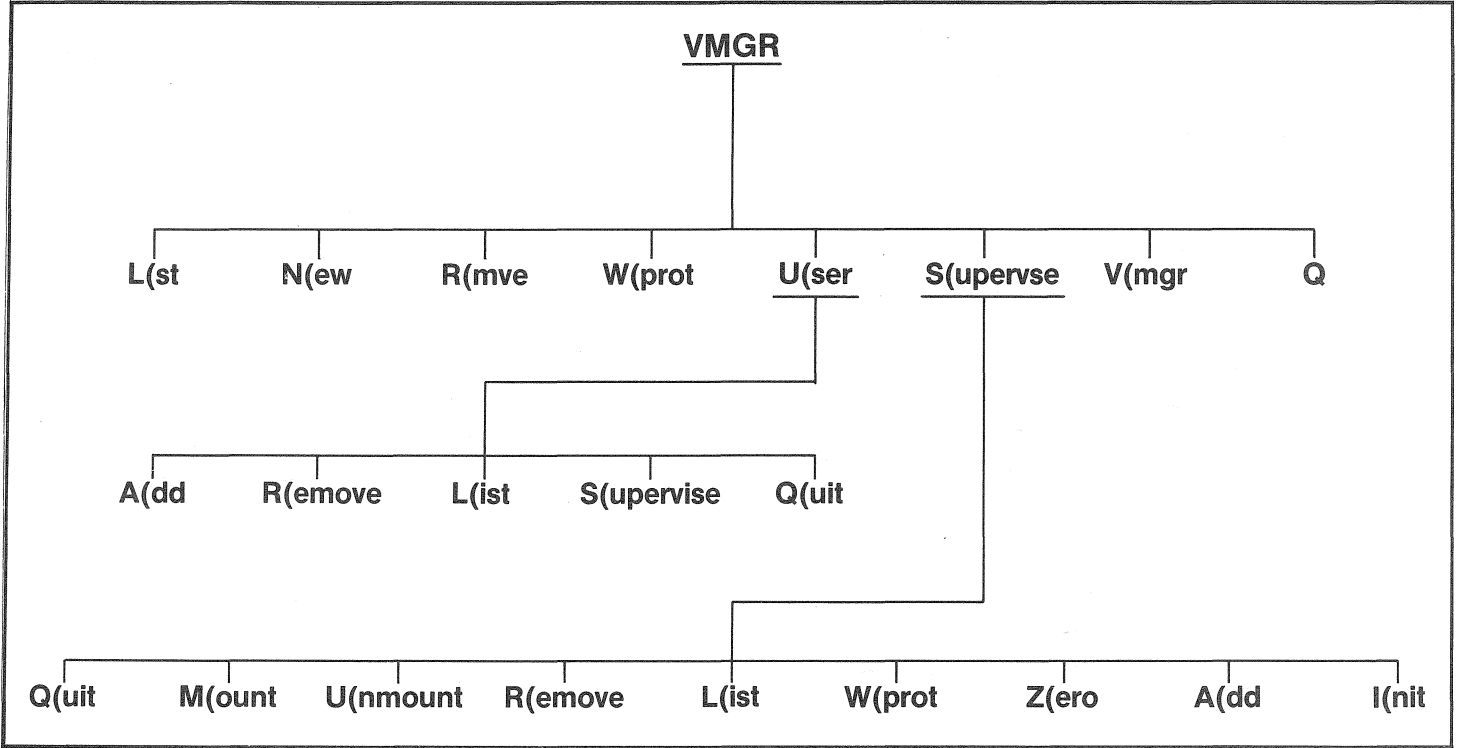
To run Vmgr, press X for X(ecute from the Command level and type VMGR <return>.

```
EXECUTE WHAT FILE ? VMGR <return>
```

Shortly, the Vmgr menu displays.

```
R(MVE L(IST N(EW W(PROT S(UPERVISE U(SER V(MGR Q:
```

The outer Vmgr level gives the system manager these options: list, new, write-protect, remove, supervise, user, volume manager and quit. Because just reading about these options is not enough to really understand them, please try these options in order to become familiar with them.



L(st

Pressing L for L(st lists the volume table for the entire Pascal system.

EXAMPLE:

CORVUS VOLUME DIRECTORY				
WP	NAME	LENGTH	ADDR	DRV
*	SYS	1024	8	1
	WDPROC1	328	1032	1
	WDPROC2	256	1360	1
	POSTMAN	1024	1616	1
	PASTMAN	800	2640	1
	<UNUSED>	9772	3440	1
	DOS1	5728	13212	1
	SYS2	256	8	2
	BOBBY	360	264	2
	PCTEXT	528	624	2
	<UNUSED>	12060	1152	2
	DOS2	5728	13212	2

The example above shows the volume directory of a 20 MB drive, which is treated as two virtual 10 MB drives. DOS1 and DOS2 were created by using the Vinit program. Sys, the volume with all system information and programs, is write-protected (read-only) for all users.

N(ew

Pressing N for N(ew creates a new volume in a formerly unused space on the drive. You are prompted to enter the address of an empty space, the drive number, and the length of the volume. If the default given is suitable, just press <return>. If you wish to place a volume in a particular unused location on the drive, type in the desired designations over the prompted values.

You can determine which locations are unused by using the L(st option described above. The unused locations are designated with name <unused>.

EXAMPLE:

```

ENTER VOLUME NAME : HITLIST <return>
ENTER LENGTH (BLOCKS) : 1024 <return>
ENTER CORVUS DRIVE #(1..4) : 1 <return>
ENTER ADDRESS (BLOCKS) : 3440 <return>

```

W(Prot

Pressing W for W(Prot write-protects a volume. When a volume is write-protected, it cannot be written to by any user. This command is a flip-flop or toggle type command. If a volume is unprotected, W(Prot protects it. If it is protected, W(Prot removes the protection.

EXAMPLE:

```
ENTER VOLUME NAME          HITLIST <return>
JACK : NOW WRITE PROTECTED : '*'
```

It is a good idea to write-protect every volume and unprotect only the volume for the particular users who need to write to it.

R(mve

Pressing R for R(mve destroys the volume, permanently removing all user access to it. Pressing N for No to either question, "OK to Destroy Jack ?" or "OK to Remove Jack ?", aborts the R(mve attempt.

When you answer Y for Yes to the first question, the Vmgr program checks through all users to see who has access to the volume. It prints the name and user IDs of those users. It then asks if it is o.k. to remove the volume. If you answer Y for Yes to this question, the program goes back through all users and actually removes the volume from each user's access table, and finally removes it from the drive volume table.

EXAMPLE:

```
REMOVE WHAT VOLUME: ?      JACK <return>
OK TO DESTROY JACK: ?      Y
REMOVING JACK
STARTING CHECK PASS .....
.....
FRED [16] HAS ACCESS
JOE [20] HAS ACCESS
.....
.....
OK TO REMOVE JACK ?      Y
STARTING ERASE PASS
.....
.....
```

S(uper)se

Pressing S for S(uper)se allows the System Manager to alter a user's access table. (see section titled 'VMGR — Changing a User's Volume Access')

U(ser)

Pressing U for U(ser) allows the system manager to add or delete users. (see section titled 'VMGR — Adding and Deleting Users')

V(mgr)

Pressing V for V(mgr) allows the system manager to manage the access table for the System Manager's volumes. This can also be performed by using the S(uper)se option and typing in the system manager's name when you are prompted.

IF A USER IS OPERATING A COMPUTER CONNECTED TO A CORVUS NETWORK WHEN THE SYSTEM MANAGER CHANGES A USER'S ACCESS OR ATTRIBUTES, THE CHANGES WILL NOT BECOME EFFECTIVE UNTIL THE USER REBOOTS, OR EXECUTES THE VMGR PROGRAM.

Q

Pressing Q for Quit quits the program and returns the user to the Pascal command level.

VMGR — Adding and Deleting Users

User Assignments

A user name is any alphanumeric string up to four characters in length. More than four characters may be typed, but only the first four are used. Also, the user may optionally be assigned a one or two character password. Again, any alphanumeric string is valid.

The only user that has any specific significance in the Pascal environment is the user with ID #1, which is assigned system manager capabilities. If you wish to change the user name or password for the system manager you must take care to remove User #1 and immediately add a user, because this next user is assigned as user #1 and, consequently, becomes the system manager.

Each user is assigned a default BASICs boot volume, even on network systems that don't have a BASICs area. To deny a user access to BASICs or if you don't have a BASICs area, assign the user a boot volume of 0. In order for the user to have BASICs access, this default boot volume must be copied with the Copy3 program from a DOS 3.3 floppy disk that can be booted, or it must be updated with the Volume Updater program under BASICs.

Each user is assigned either a P(ascal or a B(asics default boot. A BASICs default automatically boots the user into the BASICs environment in the specified volume. A Pascal default automatically boots the user into the Pascal volume mounted on unit #4.

To add or delete a user, you must log onto the system with the System Manager's ID, which is the ID assigned to user #1.

Users may be added or removed from the user table by X(ecuting the Vmgr program from the Pascal environment and then entering the U(ser option, or running the User Manager program from the BASICs environment. Both programs perform the same function, have equivalent commands, and affect the same table.

THE U(USER OPTION OF THE VMGR PROGRAM ONLY ADDS A USER ENTRY TO THE USER TABLE—IT DOES NOT ASSIGN ANY VOLUME ACCESS.

Press X for X(ecute, type VMGR <return>. The Vmgr menu displays.

```
R(MVE L(IST N(EW W(PROT S(UPERVISE U(SER V(MGR Q:
```

Press U for U(ser. The User Manager menu displays.

```
A(DD R(EMOVE L(IST S(UPERVISE Q(UIT :
```

User Manager recognizes the following commands: add user, remove user, list all users, enter supervise mode, and quit.

A(dd

Pressing A for A(dd allows you to add a new user. If a user is to have BASICs access, he must be assigned a BASICs Home Volume number other than zero.

EXAMPLE: :

```
ENTER USER ID : MIKE <return>
ENTER PASSWORD (2 CHARS MAX)
OR TYPE RETURN FOR NO PASSWORD : P4
ENTER BASICS HOME VOLUME (0-67) : 0
DEFAULT : P(ASCAL OR B(ASICS ? P
```

A user is always added at the first unused space in the user table. If you want a particular ID number, you must add enough dummy users to fill up the table to the point where you wish to add the particular user.

R(emove

Pressing R for R(emove removes a user from the user table. If you have existing users and you remove one, you create an empty space

where that user's entry was. The next user added takes up the empty space and has the previous user's access table attributes.

EXAMPLE:

ENTER USER ID : MIKE <return>

REMOVING USER MIKE

If you wish to change a user's name, password or other attribute, you can remove him and then add him back with the changed attributes.

L(ist

Pressing L for L(ist, lists all users, their passwords, and their default boot information.

EXAMPLE

```

*** CONSTELLATION USER DIRECTORY ***
ID: 1 SMGR [TP] (PASCAL) VOL: 2
ID: 2 MIKE [ ] (BASICS) VOL: 5
ID: 3 FRAN [VO] (PASCAL) VOL: 0
ID: 4 OTTO [PU] (BASICS) VOL: 8
ID: 5 BETH [BB] (PASCAL) VOL: 6
ID: 6 MICK [ ] (PASCAL) VOL: 1
ID: 7 ALEX [ ] (PASCAL) VOL: 0
ID: 8 HANK [HA] (BASICS) VOL: 10
ID: 9 LILI [HA] (PASCAL) VOL: 0
ID: 10 REX [HA] (PASCAL) VOL: 11
ID: 11 ELMO [ ] (BASICS) VOL: 9

```

S(upervise

Pressing S for S(upervise, allows you to manage the access table of a specific user (see section titled 'Access Manager').

Q(uit

Pressing Q for Q(uit, exits the program and returns you to the system manager level.

Changing a User's Password and Boot Characteristics

To change a user's attributes, the user must be R(emoved and then A(dded again. The user's access table, however, remains unchanged.

VMGR — Changing User Volume Access

The System manager can change a user's allowed volume access with the Vmgr program. To do this, press S for S(uperwise from the Vmgr menu. Type in the name or number of the user to be supervised.

EXAMPLE:

```

ENTER USER ID :   FRAN <return>
CURRENTLY MANAGING USER FRAN [#3]
M(OUNT U(NMOUNT R(EMOVE L(IST W(ROT
A(DD I(NIT Z(ERO Q(UIT:
  
```

The supervise options are: quit, mount a volume, unmount a volume, remove a volume, list the user's volumes, write-protect a volume, zero the user's table, add volume to access table, and include all volumes in the user's access table.

Q(uit

Pressing Q for Q(uit, returns the program to the previous level, U(ser menu or Vmgr menu.

M(ount

Pressing M for M(ount, mounts a volume for the user. Mounting is similar to placing a diskette in a floppy drive; the Pascal system cannot access a volume unless that volume is mounted.

EXAMPLE:

```

MOUNT: ENTER VOLUME NAME :   JACK <return>
MOUNT JACK : ON UNIT #9      <return>
JACK : MOUNTED
  
```

In the above case, the cursor rests on the 9 prompting you with an available unit. Press <return> to continue or type in the desired number over the 9.

A VOLUME MUST HAVE BEEN ADDED TO THE USER'S ACCESS TABLE BEFORE IT CAN BE MOUNTED, UNMOUNTED, OR REMOVED.

This option is useful if you are adding a new user in place of an old one, and do not wish to use the old one's access information.

A(dd)

Pressing A for A(dd), adds a volume to a user's access table. A user may have more than six volumes at time in his access table but only six can be mounted. Only mounted volumes can be accessible to the Pascal system.

EXAMPLE:

```
NEW VOLUME : ENTER VOLUME NAME : EXTRA <return>
```

I(nit)

Pressing I for I(nclude), adds every Pascal volume listed in the volume table to a user's mount table. Selected volumes can later be R(removed from the user's access table by the system manager.

This option is useful when you are adding a user who should have access to most or all of the existing volumes. It is also useful when you are supervising user #1, and wish to make sure that he has complete access.

Managing the Pascal System Files

There is one absolute requirement that must be met in order to run the Constellation software in the Pascal environment. The requirement is that each Corvus drive must have the file System.Constusr located in the first volume on that drive. The Filer must be used to set the P(refix volume to the first volume on the drive being initialized. This file is created by X(ecuting the program VINIT and using the C(onst option for the drive.

In order to ensure a smoothly running Constellation software system, the following recommendations should be observed.

Allow only the system manager (i.e. user number one) write access to the first physical volume on each drive. This prevents an unauthorized user from destroying or modifying the system table areas. System.Apple must reside in the first volume of the first Corvus drive.

Allow only the system manager complete access to a volume with the following programs and files, which we put in a volume called Sys, in the section entitled 'Bringing Up the Constellation in Pascal'. Give other users read-only (write-protected) access to this volume.

- Spool.Code
- Share.Code
- Cmgr.Code

EXAMPLE:

CORVUS VOLUME DIRECTORY			
WP	NAME	LENGTH	UNIT
*	SYS	1024	#5
	WDPROC1	1024	#4
	WDPROC2	1024	#9
	WDPROC3	1024	
	POSTMAN	1024	#11
	PASTMAN	800	
*	BOBBY	280	
	APMENTS	280	#12
	EMPLOYEE	360	#10
	PLANS	256	

In the above example, the volumes Sys and Bobby are write-protected. The boot volume is Wdproc1 since it is mounted on unit #4. The volumes DOS1 and DOS2 need not be mounted for users to have access to the volumes in BASICS.

THE ABOVE FUNCTIONS (quit, mount, unmount, remove, and list) ARE AVAILABLE TO EVERY USER IN THE SYSTEM. USERS, OTHER THAN THE SYSTEM MANAGER, WHO EXECUTE VMGR WILL SEE A MENU WITH ONLY THESE FUNCTIONS. THE FUNCTIONS LISTED BELOW MAY BE PERFORMED ONLY BY THE SYSTEM MANAGER (i.e. THE USER WHOSE ID IS #1).

W(Prot

Pressing W for W(Prot, write-protects a volume for the user. This affects only the user being supervised. Other users may continue to write on this volume.

Z(ero

Pressing Z for Z(ero zeroes the user's access table and hence makes all volumes inaccessible for a user.

EXAMPLE:

ENTER USER NAME? ANNE <return>

OK TO CLEAR VOLUMES FOR USER [20] ? Y

Any time you mount a volume on unit #4 a warning message displays. This is followed by a question asking you if it's alright to continue. Pressing Y for Yes, mounts the volume on unit #4. Pressing N for No, leaves things the way they were.

```
*****  
*  
* WARNING — VOLUME ON *  
* #4 MUST HAVE SYSTEM.PASCAL *  
* AND SYSTEM.MISCINFO OTHERWISE *  
* IT WILL NOT BE POSSIBLE TO *  
* RESTART THE SYSTEM . . . *  
*  
*****
```

U(nmount

Pressing U for U(nmount, unmounts a volume for the user. A volume may also be unmounted by using the mount command and mounting a volume on a unit that is already occupied. This unmounts the volume on the selected unit and mounts the desired volume in its place.

EXAMPLE:

```
UNMOUNT : VOLUME NAME OR "UNIT #": 11 <return>  
11 UNMOUNTED
```

R(emove

Pressing R for R(emove, removes a volume from the user's access table. This affects only the user being supervised and other users may continue to use the volume.

EXAMPLE:

```
REMOVE : ENTER VOLUME NAME : EXTRA <return>  
OK TO REMOVE EXTRA : ? Y
```

L(ist

Pressing L for L(ist, lists the user's access table. It also shows which volumes are mounted on which units.

Backup.Code
 Restore.Code
 Vmgr.Code [volume manager]
 Basics.Code [Basics boot]

All Apple utilities—filer, compiler, assembler, linker, and librarian.

In a second volume that only the System Manager has access to, and all other users have no access to, put the following files and programs.

Diagnostic.
 Vinit.Code
 Setboot.Code
 CFxx.x.Data
 Boot.Data
 Psysgen.Code
 Basics3.Data
 Basics3.Omni
 Corvus.Library

Give each user read-write access to a volume that has the following files and is mounted on unit number four for that user.

System.Miscinfo
 System.Pascal
 System.Library

WARNING

ANY VOLUME MOUNTED ON UNIT #4 MUST HAVE THESE THREE FILES. THIS IS ESSENTIAL IF THE USER IS TO BE ABLE TO BOOT INTO THE SYSTEM.

Share

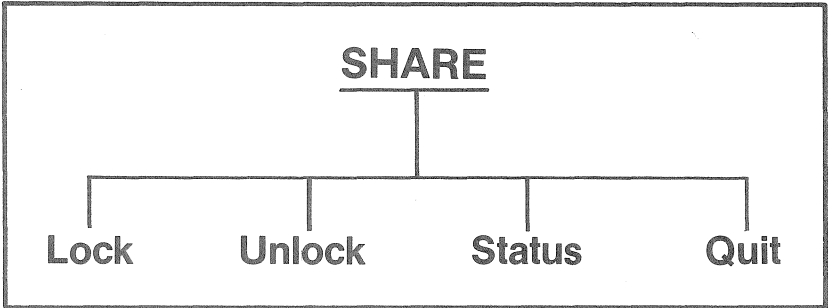
The program Share on the Constellation Pascal diskette is an example of an application of Semaphores. Share uses the Semaphores Unit in the file Corvus.Library.

Our sample Share program does not actually lock a user out of a designated file. It works on the honor system, where users agree to lock a given semaphore name before entering a jointly used file. If the semaphore is locked, a second user must wait until it is unlocked. Unlike our sample program, however, you can make your applications actually lock users out of a file.

This sample program has four options which display on your screen when you run the program.

To run Share, press X for X(ecute and type SYS:SHARE return.

SHARE : LOCK UNLOCK STATUS QUIT ?



Lock

To Lock a semaphore, press L for Lock. A semaphore name can be up to eight characters long. When you are prompted, type the name of your semaphore.

```
LOCK WHICH SEMAPHORE ? ABC <return>
SEMAPHORE ABC IS NOW LOCKED, AND YOU HAVE
CONTROL OF THE SHARED RESOURCE
```

Unlock

Press U for Unlock. Type the name of the semaphore you want to unlock.

```
UNLOCK WHICH SEMAPHORE ? ABC <return>
SEMAPHORE ABC WAS SET, IS NOW UNLOCKED,
AND THE SHARED RESOURCE IS FREE.
```

Status

To list the active semaphores, press S for Status.

```
LIST OF LOCKED KEYS :
0. HOUR
1. TEST
2. ABC
.
.
.
```


Quit

Quit exits the Share program.

TO SUPERVISE THE SEMAPHORE TABLE SEE THE CMGR PROGRAM.

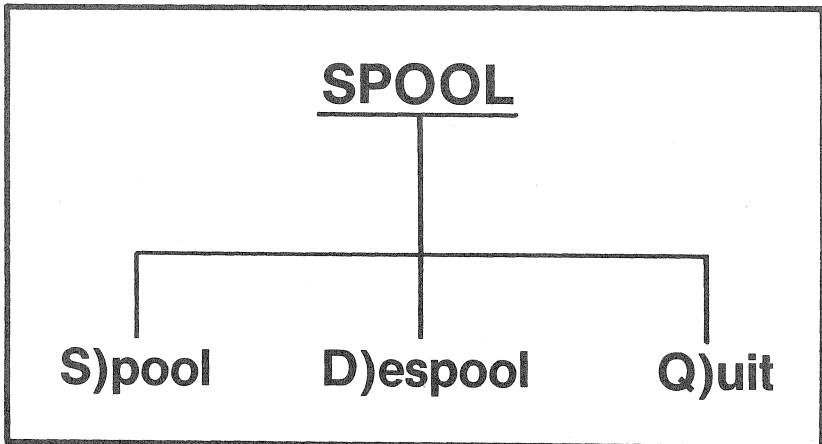
Spool

The program Spool on the Constellation utilities diskette is an example of an application of Pipes. It uses the Pipes Unit provided in the file Corvus.Library and implements a traditional shared printer facility. This program assumes that you have several users spooling output to an agreed upon pipe name. One computer with a printer must be used to despool from the agreed upon pipe name. If desired, another computer with a printer may be used to simultaneously despool from a different pipe name.

This program has six options which display on your screen when you run the program. The following example assumes you have put the Spool program in the volume named Sys, along with all the rest of your utilities that can be shared by all nodes of the system.

To run Spool, press X for X(ecute and type SYS:SPOOL <return>.

```
S)POOL D)ESPOL Q)UIT C)ONSOLE P)RINTER
A)LT SLOT [x.x]:
ACTIVE SLOT FOR SPOOLING
DESPOOLING IS 6
DESPOOLING DEVICE IS PRINTER
```



If there is no printer connected to the Apple, the program displays:

DESPOOLING DEVICE IS CONSOLE

S)pool

Press S for S)pool.

**SPOOL:
ONLY TEXT FILES MAY BE SPOOLED. ".TEXT"
WILL BE APPENDED TO THE FILE NAME. USE CR
TO TERMINATE INPUT STRING. TO QUIT
SPOOLING, TYPE CR FOR FILE NAME.**

ENTER FILE NAME TO BE SPOOLED : LETTER <return>
DO YOU WANT UCSD PASCAL TEXT
DECODING ? Y <return>

When asked for a message to be sent with the file, type in a message that readily identifies the document. This message is printed on the first page of your output, along with the name of your file.

ENTER MESSAGE TO SEND WITH FILE :
(80 CHARS. MAX.)

HERB FREENOVER—MAR 13, 1981 — <return>

The program prompts you with a default pipe, called PRINTER. You may press return to use the default or type in a pipe name of your own choice. Spool uses only the first eight letters of the pipe name for identification. You would normally use the default name, but you may have two kinds of printers, such as a fast line printer and a slow one, with the names FastLp and SlowLp, respectively.

In the following example, we use the pipe name Sledgehammer.

SPOOL TO WHICH PIPE ?
PRINTER SLEDGEHAMMER <return>
SPOOLING FILE TO PIPE SLEDGEHAMMER[3]
.....
13 BLOCKS WRITTEN TO PIPE SLEDGEHAMMER[3]

One period is printed for each 512 byte block written to the pipe. The 3 in square brackets after the pipe name is the pipe number of the pipe to which your file was spooled. While there may be several pipes called Sledgehammer, only yours has the number 3.

When it is done writing to the pipe name, Spool asks for another file to be spooled. If you are finished spooling, press <return> and the program returns you to the Spool menu. Otherwise, you may enter another file name to be spooled.

```
ENTER FILE NAME TO BE SPOOLED : <return>
S)POOL D)ESPOOL Q)UIT C)ONSOLE
P)RINTER A)LT SLOT [xx]:
```

If you interrupt the Spool program while a file is being spooled, the pipe is left in a bad state and must be purged with the Params option of the Diagnostic program.

D)espool

The D)espool function reads from the specified pipe and writes to the device PRINTER:. A \$P in the file causes an FF character (12) to be output in place of the \$P. Normally, an FF causes a page eject on the printer.

Press D for D)espool. You are asked to name the pipe from which you want to despool. Despool displays a default prompt of PRINTER for the name of the pipe to Despool. You may press <return> and use PRINTER or type in a pipe name of your own choice.

In the example below, we use the name Sledgehammer.

```
DESPOOL FROM WHICH
PIPE ? PRINTER SLEDGEHAMMER <return>
```

D)espool checks for any pipes with the name Sledgehammer. If some exist, it opens the first one of them and prints it.

```
DESPOOLING FROM PIPE SLEDGEHAMMER[3]
.....
```

Again, one period displays for each 512 block of data printed.

After all the pipe files with the specified name have been despoiled, the program waits to despool more files that are spooled with the specified pipe name.

```
WAITING TO DESPOOL PIPE "SLEDGEHAMMER"
HIT ANY KEY TO ESCAPE ...
```

If the program is interrupted while a pipe is being despoiled, the pipe is left in a bad state and must be purged with the Params option of the Diagnostic program.

Press any key to return to the Spool menu.

```
S)POOL D)ESPOOL Q)UIT C)ONSOLE
P)RINTER A)LT SLOT [xx]:
```

Q)uit

Quit exits the Spool program.

TO SUPERVISE THE ACTIVE PIPE TABLE SEE THE CMGR PROGRAM.

C)onsole

Press C for C)onsole sets the despooling device to the console. A line beneath the menu displays which device is set to despool. This option is an automatic default when there is no printer attached to the computer.

DESPOOLING DEVICE IS CONSOLE

P)rinter

Pressing P for P)rinter sets the despooling device to the printer attached to the despooling computer. It displays beneath the menu.

DESPOOLING DEVICE IS PRINTER

A)lt slots

The A)lt slot command is used when you have interlocking networks.

As an example, suppose you have two networks, each with 40 computers connected. Normally, a user on network one cannot communicate with a user on network two. But if you have one printer that is connected to network two and a user on network one wants to print something, that user can plug an Omninet interface card into slot two of his computer, this card connects to network two. A Corvus interface card in slot six is connected to network one.

When the user wants to print something, he X)ecutes the spool program and selects the A)lt slot option. This tells the spooler to use the pipes.area connected to slot two, which is on network two.

ACTIVE SLOT FOR SPOOLING/DESPOOLING IS 5

Cmgr

In order to manage certain network options, Corvus provides the program Cmgr on the Constellation Pascal utilities diskette. This program allows you to manage the semaphore and pipe tables. It also allows you to manage the Mux-Mux table for Multiplexer systems.

Cmgr has four options which display on your screen when you run the program. To run the program Cmgr, press X for X(ecute from the command level menu. Type CMGR <return>.

```
EXECUTE WHAT FILE ?          CMGR <return>
CMGR: C(ONST P(IPE S(EMAPHORE Q ?
```

Q

Pressing Q for Quit, exits the Cmgr program.

C(onst

Before connecting a Master Multiplexer to a Multiplexer network, you must X(ecute the program Cmgr and update the Constellation table. By updating this table you tell the disk controller what is attached to each port of the Master Multiplexer. This is necessary only when a Master Multiplexer is attached to the system.

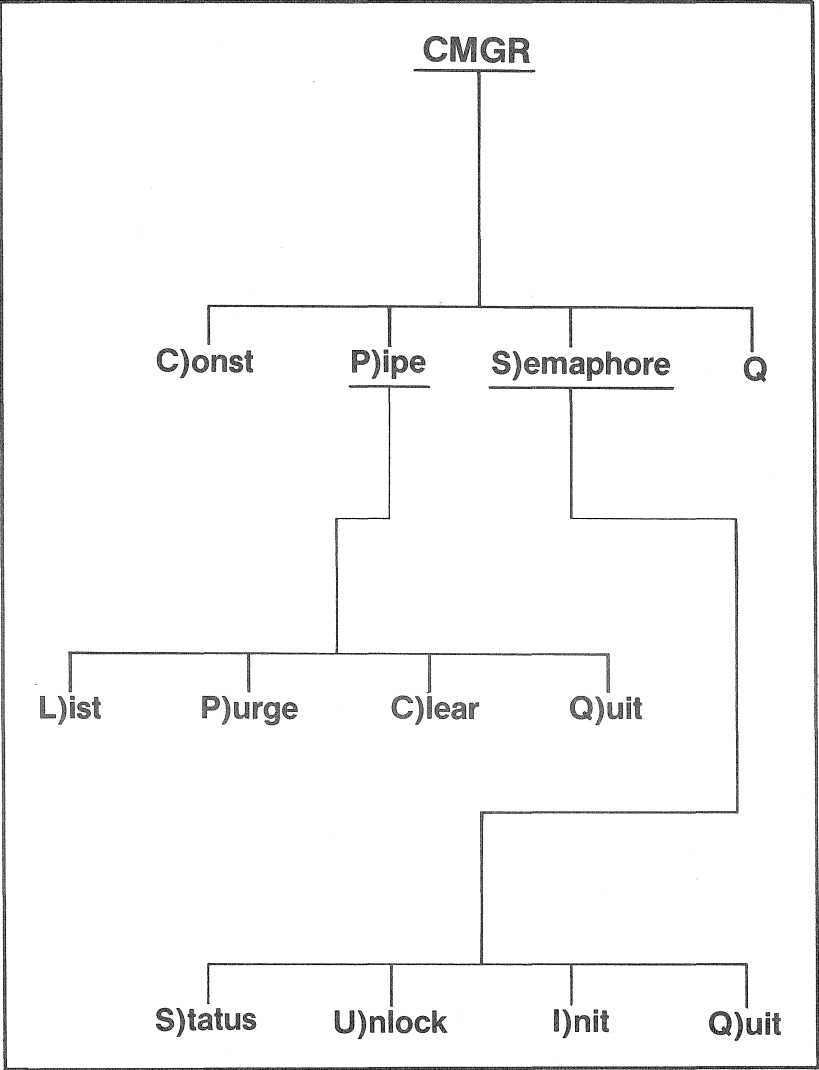
This option also allows you to change the polling parameters. The polling parameters are reserved for future use. We recommend that you do not change the polling parameters.

To update the Constellation table from the Pascal or Pascal-BASICs environment, press C for C(onst from the Cmgr menu.

```
CONSTELLATION:
MUX-MUX CONFIGURATION

      M      M
      M      M
      M      M
      M      M
          X

POLLING PARAMETERS: 180, 16, 32, 0
```



Press Y for Yes in response to the following two questions.

```
DO YOU WISH TO MODIFY ANY OF THESE ? N
CHANGE MUX-MUX CONFIGURATION ?
ENTER N(OTHING M(MUX C(OMPUTER
L(SI-11 FOR EACH SLOT:
      5      4
      6      3
      7      2
      8      1
      X
```

Y
Y

The program presents you with a numbered representation of the slots of a Master Multiplexer. Note the order of the numbers. The X indicates the slot that connects to the cable from the drive.

As you are prompted for each slot, enter the appropriate option for that slot. If there is nothing connected to a particular slot, press N for N(othing. If there is a multiplexer connected to the slot, press M for M(ux. It is also alright to specify M for a slot to which nothing is connected. If there is a computer, other than an LSI-11, connected to the slot, press C for C(omputer. If there is an LSI-11 connected to the slot, press L for L(si-11. If there is an Omninet Disk Server connected to the slot, press C for C(omputer.

Since each Multiplexer network can have any combination of computers and multiplexers, the following is an example of different responses:

```
SLOT 1? M
SLOT 2? N
SLOT 3? N
SLOT 4? C
SLOT 5? C
SLOT 6? N
SLOT 7? M
SLOT 8? C
```

After you have finished answering the slot prompts, you are asked if you want to change the polling parameters. Press N for No to this question.

```
CHANGE POLLING PARAMETERS
(NOT RECOMMENDED)?
CONSTELLATION PARAMETERS UPDATED.
```

N

P(ipe

With the Pipe option, you can supervise the Pipe table. To use the pipe option, press P for P(ipe. A list of options displays.

PIPES: L(IST P(URGE C(LEAR Q(UIT ?

Q(uit

Pressing Q for Q(uit, exits the P(ipes option of the program and returns you to the Cmgr menu.

L(ist

Press L for L(ist to list the pipe table. A list of pipes displays. It shows you the pipe name, the state of each pipe, whether a pipe contains data or not and how many blocks of data are in the pipe.

```

ACTIVE PIPES ARE:
1. FRANKLIN   CLOSED   ----   CONTAINS DATA
              32 BLOCKS
2. PRINTER    OPEN     READ   CONTAINS DATA
              10 BLOCKS
3. DOGHOUSE   OPEN     READ   CONTAINS DATA
              4 BLOCKS
4. PRINTER    CLOSED   ----   CONTAINS DATA
              37 BLOCKS
5. PRINTER    CLOSED   ----   CONTAINS DATA
              150 BLOCKS

```

Any pipe that is open and not currently in use (i.e. not printing or being spooled to) is in a bad state. It cannot be accessed. You should purge any such pipe. A Pipe that is closed and contains data is waiting to be despoiled.

P(urge

Press P for P(urge to delete a single pipe.

```

PURGE WHICH PIPE (ENTER
PIPE NUMBER) ? 0
PIPE 5 PURGED

```

5 <return>

P)urge should be used to delete Pipes that are in a bad state. A Pipe that is open is in a bad state unless someone is accessing it. Pipes enter this state when the spooling or despooling process is interrupted.

C(lear

Press C for C(lear to purge all pipes in the Pipe Table.

```
RE-INITIALIZING PIPES WITH BLOCK 12190,
LENGTH 1018
```

Since this clears all pipes from the pipe table, the program asks for confirmation of the clear command before continuing. A default value of N for No displays. If you do not wish to clear the table, press <return>. If you want to continue, press Y for Yes.

```
OK TO CONTINUE ? N Y
```

To relocate or change the size of the pipes area, you must first purge the pipes volume and use the program Vinit to recreate it.

S(emaphore

The Semaphore option allows you to supervise the semaphore table. To use the Semaphore option, press S for S(emaphore. An option menu displays.

```
SEMAPHORES : S(TATUS U(NLOCK I(NIT Q(UIT ?
```

Q(uit

Pressing Q for Q(uit, exits the S(emaphore option and returns you to the Cmgr menu.

S(tatus

Press S for S(tatus to list the Semaphore table. This lists the name and number of each semaphore.

```
LIST OF LOCKED KEYS :
0. DENISE
1. DUSK
2. DUCK
3. FRY
4. ZIPPY
```

U(nlock

To unlock a semaphore, press U for U(nlock. Unlocking a semaphore removes it from the semaphore list.

```
UNLOCK WHICH SEMAPHORE ? DUSK <return>
```

```
SEMAPHORE DUSK WAS SET, IS NOW UNLOCKED
```

I(nit

Press I for I(nit to purge all semaphores in the Semaphore Table. Since I(nit clears all semaphores from the semaphore table, the program asks for confirmation of the I(nit command. A default value of N for No displays. If you do not wish to init the table press <return>, otherwise, if you want to continue, press Y for Yes.

OK TO CLEAR ALL SEMAPHORES ? N Y

BASICs

Network Initialization Utilities

This section describes the Corvus Constellation BASIC Utilities and replacing old utilities. It is not an initialization procedure.

Constcreate

The Constcreate program must be run to initialize the volume access table of each volume, which allows the System Manager access to the volumes. Other users may later be given access to the volumes with the Access Manager program.

The Constcreate program prompts you for the drive number and a range of volumes to initialize. This program can be run only if you have booted in a single user mode.

To run Constcreate, type `RUN CONSTCREATE <return>`.

EXAMPLE:

```
1 RUN CONSTCREATE,V2 <return>
```

BASICS VOLUME PREPARATION PROGRAM

**THIS PROGRAM WILL MAKE A GROUP OF
BASICS VOLUMES PROTECTED AGAINST ALL
CONSTELLATION USERS EXCEPT USER
NUMBER ONE, WHO WILL BE GIVEN WRITE
ACCESS TO ALL VOLUMES.**

You are asked if you would like to continue. Pressing Y for Yes continues the program, pressing N for No aborts the program. Next, indicate which drive—1 or 2—is being initialized.

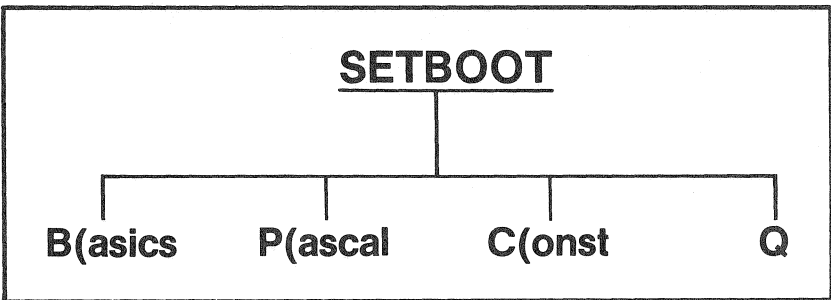
For BASICs-only systems, the full range of volumes indicated in parentheses should be specified. For Pascal-BASICs systems, you should specify the number of volumes you created with the D(osvols option in Vinit.

CONTINUE (Y/N) ?	Y
DRIVE (1 OR 2) :	1
STARTING VOLUME (1..67) :	1 <return>
ENDING VOLUME (1..67) :	19 <return>
INITIALIZING VOLUMES . .	
END OF PROGRAM	

▶ **INITIALIZING USED IN THIS CONTEXT DOES NOT IMPLY DESTRUCTION OF ANY DATA.**

Setboot

Setboot allows you to choose which mode—BASIC, Pascal, or Constellation—the Corvus disk system automatically boots up in when powered on. This utility needs to be run if you have a Pascal-BASICs system and you desire to boot up with BASICs instead of Pascal, or if you are initializing a system for Constellation software. The C(onst option should be set only after you have finished all other initialization procedures.



To run Setboot, type RUN SETBOOT return. A small menu displays, press C for C(onst. Then press Q for Quit.

EXAMPLE:

```

| RUN SETBOOT,V2 <return>
VER x.x CORVUS BOOT SELECTION PROGRAM
P(ASCAL B(ASICS C(ONST Q:

```

C

When you are running Constellation software, the C(onst and Q options are the only choices you should specify. The other two choices, P(ascal and B(asics, are for single user systems where the boot is either Pascal or BASICs, not both. By specifying the C(onst option both operating systems can be used; some designated users may boot up in Pascal while others may boot up in BASICs.

Replacing the BASICs Utilities

All Omninet users must have the latest version of all Corvus utility programs. If you are upgrading a single user or Constellation system to Omninet, you must replace all your old utilities with the new utilities provided with the Omninet Disk Server.

If you are upgrading an existing single user system, follow the directions in the following section titled 'Replacing the Constellation Utilities.'

If you are upgrading an existing Constellation system, follow the directions in the following section titled 'Replacing the Constellation Utilities.'

Replacing the Single User Utilities

The Corvus BASICs utilities you receive with Omninet are contained on one diskette labeled, 'Corvus AP BASICs Utilities.' You should replace whatever version of the Corvus BASICs utilities that are on the drive with the utilities on the new diskette at this time.

To do this you will need a diskette drive connected to slot 4 of the Apple and the Corvus interface card connected to slot 6. With your system up and running, insert the new utilities into the diskette drive and type LOAD COPY3,S4,D1,VO <return>. Then type RUN <return>.

The old version of the utilities should be in volume one of drive one on the Corvus disk system. Answer the prompts concerning the copy parameters as in the example below.

```
FROM SLOT (4)
FROM DRIVE (1)
FROM VOLUME (0)
TO SLOT (6)
TO DRIVE (1)
TO VOLUME (2)
```

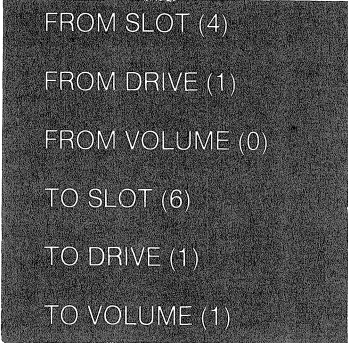
If the Corvus utilities are in a different volume than our example, specify the appropriate parameters. After the copy is complete you will have an updated version of the Corvus BASICs utilities.

Replacing the Constellation Utilities

The Corvus BASICs Constellation utilities you receive with Omninet are contained on one diskette labeled, 'Corvus Constellation BASICs Utilities.' You should replace whatever version of the Corvus BASICs Constellation utilities that are on the drive with the utilities on the new diskette at this time.

To do this you will need a diskette drive connected to slot 4 of the Apple and the Corvus interface card connected to slot 6. With your system up and running, insert the new utilities into the diskette drive and type LOAD COPY3,S6,V1 <return>. Then type RUN <return>.

The old version of the Constellation utilities should be in volume two of drive one on the Corvus disk system. Answer the prompts concerning the copy parameters as in the example below.



```
FROM SLOT (4)
FROM DRIVE (1)
FROM VOLUME (0)
TO SLOT (6)
TO DRIVE (1)
TO VOLUME (1)
```

If the Corvus Constellation utilities are in a different volume than our example, specify the appropriate parameters. After the copy is complete you will have an updated version of the Corvus BASICs Constellation utilities.

Initializing for BASICs

The Constellation software can be installed on an existing single user Corvus system, with Apple BASICs, without deleting any existing volumes. You must already have BASICs running on your Corvus drive as outlined in Chapter Three of this manual before beginning the following instructions. Also, finish reading this Section before attempting to bring up your Constellation software. Then perform the following steps in the order shown.

This section covers bringing up BASICs with Constellation software for for 5, 10 or 20 MB drives. This section also covers bringing up an existing two drive BASICs system under Constellation software.

► **SINCE CORVUS SOFTWARE HANDLES A 20 MEGABYTE DRIVE AS TWO VIRTUAL 10 MEGABYTE DRIVES, A 20 MEGABYTE DRIVE IS CONSIDERED TO BE MULTIPLE DRIVES. FOLLOW THE INSTRUCTIONS IN THIS SECTION ACCORDINGLY.**

The bringup procedure includes the following fundamental operations:

- Bring up the drive according to the appropriate section(s) in Chapter Three of this manual.
- Connect a floppy drive to your Apple and boot from the Corvus drive.
- Copy the Constellation utilities to the Corvus drive.
- Run the program Constcreate.
- Run the program Setboot and use the C(onst) option.
- Run the program User Manager, zero the user table if necessary, and create users.
- Run the program Volume Updater for all volumes that are to be bootable.
- Run the program Access Manager and set up access tables for each volume to be used.
- Re-boot the system and re-check what you've done.
- For BASICs-only, install Pipes or Semaphores or both if desired.

Because of the different amounts of data space available on the Corvus 5, 10, and 20 MB drives, some of your responses to the prompts in the programs in this section may not be the ones shown. There are 22440 sectors of available data space on a 5 MB drive, 42440 on a 10 MB drive, and 76920 on a 20 MB drive. There is a maximum of 37 BASICs volumes on a 5 MB BASICs drive, 67 on 10 MB BASICs drive, and 67 per 10 megabytes on a 20 MB BASICs drive for a total of 134 BASICs volumes.

► **ONLY THE FIRST TWO DRIVES OF A CORVUS DISK SYSTEM CAN HAVE BASICS VOLUMES ON THEM.**

In the following section, we show you how to set up your Constellation software for two users and the system manager—Bob, Jane, and Smgr. If you want, different names can be substituted for Bob, Jane, and Smgr.

We presume that you have brought up your drive as a single user drive according to the chapter Three of this manual.

If you are running a BASICs-only system, answer 37 for a 5 MB drive or 67 for a 10 or MB drive to all prompts asking for the range of your volumes. In the following steps, we show a value of 20 for these prompts.

▶ PLEASE TAKE CARE TO FOLLOW THESE INSTRUCTIONS IN THE EXACT ORDER LISTED.

1. If you are running a Pascal-BASICs system, follow the directions in the section titled 'Initializing for Pascal' before continuing with this section. Otherwise,



POWER OFF

power off the system and connect a floppy drive to slot four in your computer. Power on and place the CORVUS BASICS UTILITIES diskette into the floppy drive. Boot your system from the Corvus disk.

2. You must copy the Constellation BASICs Utilities onto your Corvus drive. The Corvus xxAP BASICs Utilities should already be on BASICs volume one of your drive. Copy the Constellation BASICs Utilities to BASICs volume two of your drive.

Type RUN COPY3,S6,V1,D1. Answer the prompts as follows. One prompt line appears at a time. As soon as you answer it the next prompt line appears.

```
FROM   SLOT (4) :?  4 <return>
FROM   DRIVE (1) :? <return>
FROM   VOLUME (0) :? <return>
```

```
TO     SLOT (6) :?  6 <return>
TO     DRIVE (1) :? <return>
TO     VOLUME (1) :? 2 <return>
```

After you answer the last prompt. Copy3 redisplayes your selections and asks if it is o.k. to copy. Press Y for Yes if all the parameters are the ones desired.

```
FROM
      SLOT-4
      DRIVE-1
      VOLUME-0

TO
      SLOT-6
      DRIVE-1
      VOLUME-2

OK TO COPY?  Y
```

When it is done copying, Copy3 asks you if you want to copy again. Press N for No.

3. Run the Constcreate program by typing RUN CONSTCREATE,S6,V2 <return>. If an error message that says "MEMORY FULL" displays, it is because your Apple's memory is still filled with the previous program and there isn't enough memory space left to run the current program. To clear memory type FP <return>, then type RUN CONSTCREATE,S6,V2 <return> again.

1 RUN CONSTCREATE,S6,V2 <return>

Constcreate initializes the volume's Access tables and give user number one, Smgr, read-write access to all specified BASICs volumes. You should specify the full range; i.e. use the starting and ending volume numbers given in parenthesis.

```
BASICS VOLUME PREPARATION PROGRAM

THIS PROGRAM WILL MAKE A GROUP OF
BASICS VOLUMES PROTECTED AGAINST
ALL CONSTELLATION USERS EXCEPT
USER NUMBER ONE, WHO WILL BE GIVEN
RITE ACCESS TO ALL VOLUMES.
```

```

CONTINUE (Y/N) ?      Y
DRIVE (1 or 2) :     1
STARTING VOLUME (1..67) : 1
ENDING VOLUME (1..67) : 67 <return>
INITIALIZING VOLUMES . . .
END OF PROGRAM
    
```

If you have a second drive or a 20 megabyte drive with BASICs in your system, run the Constcreate program for that drive, also.

4. Run the User Manager program. Type RUN USER MANAGER,V2,S6,D1 <return>.

```

1 RUN USER MANAGER,V2,S6,D1 <return>
QUIT Z(EROUSERS L(IST A(DD R(EMOVE :
    
```

IF YOU ARE RUNNING A PASCAL-BASICS SYSTEM, DO NOT PRESS Z FOR Z(EROUSERS. SKIP THE Z(EROUSERS OPTION AND CONTINUE WITH A(DD USER BOB. THIS OPTION SHOULD BE USED ONLY FOR INITIALIZATION.

Press Z for Z(erosers. You are asked if you want to continue. Press Y for Yes.

```

CONTINUE Y/N ?      Y
. . . . .
. . . . .
    
```

If you used the Z(erosers option, you are automatically prompted to A(dd the first user. If you didn't use the Z(erosers option, then press A for A(dd to add user Bob.

Add the user who is to be the system manager (Smgr). His ID will be #1, his BASICs boot volume #1, and his default boot system BASICs for BASICs-only systems.

```

ENTER USER NAME (4 CHARS MAX) : SMGR <return>
ENTER PASSWORD (2 CHARS MAX)
OR TYPE return FOR NO PASSWORD : <return>
ENTER BASICS HOME VOLUME (0..67) : 1 <return>
DEFAULT : P(ASCAL OR B(BASICS ? B
    
```

Chap6

Press A to A(dd Bob and give him a password or none as you desire, make his home (BASICS boot) volume #3, and his default boot BASICS.

```
ENTER USER NAME (4 CHARS MAX) : BOB <return>
ENTER PASSWORD (2 CHARS MAX)
OR TYPE return FOR NO PASSWORD : OZ <return>
ENTER BASICS HOME VOLUME (0..67) : 3 <return>
DEFAULT : P(ASCAL OR B(ASICS ? B
```

Repeat this process for Jane and give her a password if you wish, make her home volume #4, and her default BASIC. Press L for L(ist to check your work.

```
*** CONSTELLATION USER DIRECTORY ***
ID: 1      SMGR      [ ] (BASICS)  VOL: 1
ID: 2      BOB      [ ] (BASICS)  VOL: 3
ID: 3      JANE     [ ] (BASICS)  VOL: 4
Q(UIT Z(EROUSERS L(IST A(DD R(EMOVE:
```

Press Q for Q(uit.

5. Write a short Hello program for Bob's and Jane's home volumes. Type the following.

```
]
] DELETE EMPTY,V3 <return>
] DELETE EMPTY,V4 <return>
]
] NEW <return>
] 10 HOME <return>
] 20 PRINT:PRINT:PRINT:PRINT <return>
] 30 PRINT "HELLO BOB" <return>
] 40 END <return>
] SAVE BOB'S PROGRAM,V3 <return>
] LIST 30 <return>
] 30 PRINT "HELLO JANE" <return>
] SAVE JANE'S PROGRAM,V4 <return>
]
```

6. We presume volume one on drive one has a bootable DOS image if not, use the Apple System Master floppy and a floppy drive to transfer a bootable image to Bob's and Jane's volumes. The only difference is in your responses to the 'FROM' prompts, the slot is 4 and the volume if 0 if you are using a floppy disk.

Chap6

Type RUN VOLUME UPDATER,V2 <return>.

1 RUN VOLUME UPDATER,V2 <return>

Type your responses as follows.

```
----->'FROM' VOLUME TO UPDATE
          DOS IMAGE<-----

SLOT                (E.G. 6): 6
DRIVE               (E.G. 1): 1
[USE VOLUME '0' FOR FLOPPY]
VOLUME              (E.G. 1): 1

FETCHING DOS IMAGE FROM VOLUMES.
THE CURRENT 'HELLO' PROGRAM IS:
      CORVUS UTILITIES
TYPE NEW NAME (or.<cr> TO
NOT CHANGE)
NEW:                BOB'S PROGRAM
```

```
----->'TO' VOLUME TO UPDATE
          DOS IMAGE<-----

SLOT                (E.G. 6): 6
DRIVE               (E.G. 1): 1
[USE VOLUME '0' FOR FLOPPY]
VOLUME              (E.G. 1): 3

WRITING DOS IMAGE TO VOLUME
VOLUME 3 UPDATED
```

Press Y for Yes when the computer asks you if you want to update another file.

UPDATE ANOTHER VOLUME (Y/N) ? Y

Repeat this process for Jane. All but two of the responses you type are the same. Type JANE'S PROGRAM in response to the new program prompt. Type 4 in response to the 'TO' volume prompt.

Type N for No when the computer asks you if you want to update another file.

7. Run the Access Manager program to give Bob and Jane read-write access to their home (default boot) volumes. The display prompts you for the drive number and volume number to be managed. We show volume three's access table first.

Type RUN ACCESS MANAGER,V2 <return>

1 RUN ACCESS MANAGER,V2 <return>

Type 1 in response to the drive prompt and type 3 <return> in response to the volume prompt. Then press H <return> for Help.

```
DRIVE (1 OR 2) : 1 <return>
VOLUME (1 .. 67) : 3 <return>
```

```
-----
-- * TABLE OF CONSTELLATION USER ACCESS * --
-----

SMGR [ 1 ] — WRITE

[ OTHER USERS — NO ACCESS ]

COMMAND (HELP GIVE HELP): H <return>
```

```
HELP — REPEATS THIS DISPLAY
SHOW — SHOWS CURRENT ACCESS
SAVE — SAVES CURRENT ACCESS AS
PERMANENT AND EXITS
CHANGE — CHANGES ACCESS
QUIT — ABORTS THE PROGRAM WITHOUT
CHANGING ACCESS
VOLUME — SAVES CURRENT ACCESS AS PERMANENT
AND MOVES TO A NEW VOLUME
```

Press C <return> for Change. Type BOB return for the name of the user ID. Press W for Write in response to the options prompt.

```
COMMAND (HELP GIVES HELP): C <return>

ENTER : USER NAME OR ID TO CHANGE
'OTHERS' OR 'END'
USER BOB [2] NOT PRESENT
'WRITE' — ADD WITH WRITE OPTION
'READ' — ADD WITH READ-ONLY OPTION
'ESCAPE' — TAKE NO ACTION
-----> ENTER OPTION: W <return>
```

The program repeats the display. Press E for End.

```
ENTER : USER NAME OF ID TO CHANGE
OTHERS' OR 'END'
```

E <return>

Press V <return> for Volume. Volume three's access is saved, and you are prompted again for a volume in which to set up user access.

Now give Bob and Jane read access to volume one. Type 1 <return> in response to the volume prompt. After the option display, Press C <return> for Change. Type BOB <return> for the name of the user ID. Type R <return> for the Read option. The program repeats the display. Type JANE <return> for the name of the user ID. Type R <return> for the Read option. When display repeats, press E <return> for End.

Type V <return> for Volume to save the change. Type 1 <return> in response to the drive prompt and type 1 <return> in response to the volume prompt. After the option display, press C <return> for Change. Type BOB <return> for the name of the user ID. Press R <return> for the Read option.

The program repeats the display. Type JANE <return> for the name of the user ID. Type R <return> for the Read option. When the display repeats, press E <return> for End.

Press V <return> for Volume. Now set up volume four, which is Jane's volume, type 1 <return> in response to the drive prompt and type 4 <return> in response to the volume prompt. Press C <return> for Change. Type JANE <return> for the name of the user ID. Type W <return> for the Write option. When the display repeats, press E <return> for End. Type SAVE <return> for Save.

This process must be repeated for each volume to which a user is to be given access.

8. Run the Setboot program. Type RUN SETBOOT,V2,S6 <return>. Press C <return> for the C(const option.

```
1 RUN SETBOOT,V2,S6 <return>
```

```
VER x.x CORVUS BOOT SELECTION PROGRAM
```

```
P(ASCAL B(ASICS C(ONST Q:
```

C

```
LOADING SETBOOT.OBJ . . . . .
```

```
CORVUS BOOT NOW SET UP TO CONSTELLATION
```

9. Re-boot the system. Type PR#6 <return>.

```
1 PR#6 <return>
```

Type SMGR < in response to the prompt for user name.

Power the system up and wait 15 seconds for your drive to come up to speed. Log on as Smgr. Type CATALOG,V99 <return> to make sure your system is running correctly. If it is running correctly, you see a listing of all the volumes.

10. Check out your new system to make sure it is set up and running correctly. Type PR#6 <return>, then log on as Smgr.

Try some simple tests to make sure Smgr capabilities are working. Check out each user.

Installing Pipes For BASICs-Only

On the CONSTELLATION UTILITIES DISKETTE for BASICs, there is a program called PIPES INIT. It automatically sets aside 580 blocks for Pipes, from an unused portion of the disk.

▶ **THE PIPES AREA CAN ONLY BE ON DRIVE ONE. IF YOU ARE RUNNING PASCAL-BASICS, THE PIPES AREA MUST BE IN THE PASCAL AREA OF THE DISK.**

To set up a Pipes area for BASICs-only, run the program PIPES INIT. This program informs you that a Pipes area will be initialized and asks if you want to continue. If you want to create a pipes area, press Y for Yes.

**PIPES INITIALIZATION PROGRAM
THIS PROGRAM WILL INITIALIZE A PIPE AREA
DO YOU WANT TO CONTINUE ?**

Y

PIPES INITIALIZED

WARNING

IF YOU ARE USING A 20 MB DRIVE WITH BASICS-ONLY, THE SECOND DRIVE MUST HAVE A TRACK OFFSET OF 976 OR GREATER. REFER TO THE DIAGNOSTIC PROGRAM, P(ARMS OPTION EXPLAINED IN CHAPTER FIVE OF THIS MANUAL.

Installing Semaphores For BASICs-Only

To use Semaphores with BASICs-only, you must initialize a Semaphore table by running the program Semaphore Init.

To run Semaphore Init, type LOAD SEMAPHORE INIT <return>. Type RUN <return>.



LOAD SEMAPHORE INIT <return>
RUN <return>

This program greets you with its version number and release date. When it asks you if you want to continue, type Y for Yes.

```

VER x.x
SEMAPHORE INITIALIZATION
13 - FEB - 8

THIS PROGRAM CLEARS THE SEMAPHORE TABLE
(I.E. , IT UNLOCKS ALL SEMAPHORES.)

OK TO CONTINUE ?

```

Y

After you have done this, the semaphore table is ready for use.

Adding a Drive To a Corvus Network System

This section covers bringing up Constellation software for BASICs on an add-on drive of 5 or 10 megabytes. You can only have a maximum of one add-on drive with BASICs volumes or one 20 megabyte drive. bringing up a 20 MB drive is covered in section the section titled 'Initializing For BASICs.

- Set the boot to a single user
- Connect your drive and related hardware, then run the program Volume Init for the add-on drive.
- Run the program Constcreate for drive 2.

▶ FOLLOW THESE INSTRUCTIONS IN THE EXACT ORDER PRESENTED.

1. You must initialize any uninitialized volumes. Type RUN VOLUME INIT,V1,S6,D1 <return>. Enter the lowest number shown for the first volume number and the highest number shown for the last volume number.

WARNING

INITIALIZING A VOLUME DESTROYS ANY DATA CURRENTLY CONTAINED IN A VOLUME.

```

BULK VOLUME INIT PROGRAM
CORVUS SYSTEMS — 1980

```

```

ENTER SLOT NO. FOR CORVUS DRIVE ?
ENTER FIRST VOLUME NUMBER (1..67) :
ENTER LAST VOLUME NUMBER (1..67) :

```

6

1 <return>

67 <return>

Chap6

2. Run the program CONSTCREATE for the add-on drive. Type LOAD CONSTCREATE,S6,V2,D1 <return>. Type RUN <return>. Respond with the lowest number in parenthesis for the starting volume prompt and the highest number in parenthesis for the ending volume prompt.

```
] LOAD CONSTCREATE,S6,V2,D1 <return>
] RUN <return>
```

Respond as follows.

BASICS VOLUME PREPARATION PROGRAM

THIS PROGRAM WILL MAKE A GROUP OF BASICS VOLUMES PROTECTED AGAINST ALL CONSTELLATION USERS EXCEPT USER NUMBER ONE, WHO WILL BE GIVEN WRITE ACCESS TO ALL VOLUMES.

```
CONTINUE (Y/N) ?      Y
DRIVE (1 OR 2) :     2
STARTING VOLUME (1..67) : 1 <return>
ENDING VOLUME (1..67) : 67 <return>
INITIALIZING VOLUMES ...
END OF PROGRAM
```

3. Run the program setboot. Type LOAD SETBOOT,S6,V2,D1 <return>. Type RUN <return>. Press C for C(onst).

```
] LOAD SETBOOT,S6,V2,D1 <return>
] RUN <return>
```

B(ASICS P(ASCAL C(ONST : C

Network Management

The Corvus Constellation software for BASICs is designed to allow multiple BASICs users to share a Corvus disk system.

The Corvus Constellation software for BASICs is designed to allow multiple BASICs users to share a Corvus disk system.

The disk drive is divided into multiple DOS 3.3 volumes similar to floppy diskettes. Like a floppy, each volume has a volume number and a fixed size. Each DOS 3.3 volume contains 560 sectors of 256 bytes each.

Constellation software for BASICs includes a program to set up Constellation user names and two programs to control volume access. The program to set up user names is the User Manager. The two programs to control volume access are the Constcreate program and the Access Manager program.

User Manager

The User Manager program is used to manipulate the user table. This table is implemented to keep track of the valid system users. It contains a log-on name, an optional password, and information describing the default boot system—BASICs or Pascal. The same user table is shared by both Pascal and BASICs on a Pascal-BASICs system and can be updated by either system.

The user table includes the following elements:

- User # — The user ID number is a sequential table entry number between 1 and 126. User ID #1 is significant; user number 1 is known as the system manager and has special access rights.
- Log-on — Each user must type a four character log-on name to gain access to the Constellation system.
- Password — The password is an optional two character field. To gain access to the system when a password is specified, the user must type in the password after typing in his log-on name.
- Default System — The default system defines which operating system—Pascal or BASICs—the user boots up in once he has logged on.
- BASICs Volume — The BASICs volume number is the volume a user boots up in after logging on if the default system is BASICs-only. If the default system is Pascal in a Pascal-BASICs system, the BASICs volume number is the volume a user boots up in after X(ecuting the program Basics.

Access Management

The Constcreate program initializes the volume access table for a volume. The Access Manager program is used to manipulate the volume access tables. There is one volume access table for each BASICs volume. A volume access table contains information as to which users have access rights to the volume and what type of access rights they have.

As many as 21 users can be designated to have specific access rights to any particular volume. They can be granted one of two classes of access:

Read — Read-only access to the volume.

Write — Read and write access to the volume.

All users not specifically listed as having a particular access right are referred to as "others." The set of users referred to as "others" can be given one of three classes of access rights:

None — No access to the volume.

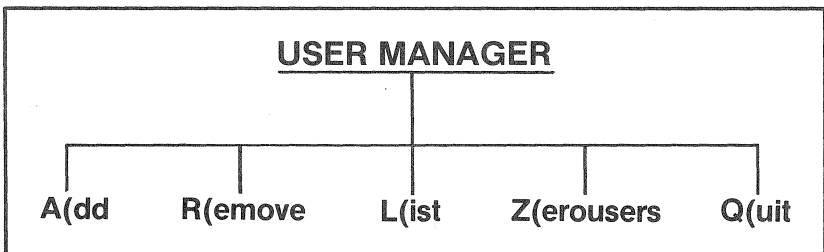
Read — Read-only access to the volume.

Write — Read and write access to the volume.

User Manager — Adding and Deleting Users

User Assignments

A user name is any alphanumeric string up to four characters in length. More than four characters may be typed but only the first four are used. Also, the user may optionally be assigned a one or two character password, any alphanumeric string is valid.



One user attribute is the user ID number. This is a sequential number, between one and 126, that is assigned when the user is added to the user table. The only user that has any specific significance is the user with ID #1, which is assigned system manager capabilities. If you wish to change the name or password for the system manager, you must take care to remove User #1 and immediately add a user, because the next user added is assigned as User #1 and, consequently, becomes the system manager.

Each user is assigned a default BASICs boot volume. In order for the user to have BASICs access, this default boot volume must contain an Apple System Master image. This is obtained by copying with the Copy3 program from a DOS 3.3 floppy that can be booted or the default boot volume can be updated with the Volume Updater program.

Each user is assigned either a P(ascal or a B(asics default boot. A BASICs default automatically boots the user to the BASICs environment in the default BASICs boot volume assigned to the user.

To add or delete a user, you must first log on as Smgr. Users may then be added and deleted from the Constellation's table of allowed users by typing RUN USER MANAGER,V2 <return>.

```
J RUN USER MANAGER,V2 return
```

```
A(DD R(EMOVE L(IST Z(EROUSERS Q(UIT:
```

The User Manager program recognizes the following commands: add a user, remove a user, list all users, zerousers, and quit.

A(dd

Pressing A for A(dd, allows you to add a new user.

EXAMPLE:

```
ENTER USER NAME (4 CHARS MAX):
ENTER PASSWORD (2 CHARS MAX)
OR TYPE RETURN FOR NO PASSWORD:
ENTER BASICS HOME VOLUME (0..67):
DEFAULT: P(ASCAL OR B(ASICS ?
```

```
GOOD <return>
```

```
ZZ <return>
```

```
19 <return>
```

```
B
```

R(emove

Pressing R for R(emove allows you to remove a user. It then asks if you are sure and prompts you with a default response of N for No. To remove a user, you must respond with Y for yes.

EXAMPLE:

```

ENTER ID TO REMOVE (1..126): 11 <return>
REMOVE USER GOOD
ARE YOU SURE ? N
Y <return>

```

L(ist

Pressing L for L(ist, lists all users and their attributes, which means their user ID number, name, password, and whether they have Pascal or BASICS boot default and their default BASICS volume number.

```

*** CONSTELLATION USER DIRECTORY ***
ID: 1    SMGR  [  ]  (BASICS)  VOL: 1
ID: 2    BBCF  [IT ]  (BASICS)  VOL: 4
ID: 3    BETT  [  ]  (PASCAL)  VOL: 9
ID: 4    ED    [ED]  (PASCAL)  VOL: 3
ID: 5    LUSH  [US]  (BASICS)  VOL: 5
ID: 6    BART  [  ]  (PASCAL)  VOL: 13

Q(UIT Z(EROUSERS L(IST A(DD R(EMOVE :

```

Z(erosers

Pressing Z for Z(erosers, removes all users from the system user table. This option should be used only when installing the Constellation software. We recommend that you use extreme caution with this option.

Q(uit

Pressing Q for Quit, ends the User Manager program.

Changing a User's Password and Boot Characteristics

To change a user's attributes, the user must be R(emoved and then A(dded again. The new user will have the same access attributes as the removed user.

Access Manager — Changing a Volume Access Table

The System manager may change a user's allowed volume access by running the Access Manager program.

Each BASICS volume can be accessed by up to 26 users who have individually been granted either read-write or read-only access. Users not explicitly mentioned in the up to 26 users part of the access table are

referred to as "others" and can be collectively granted one of three classes of access rights: 1) no access, 2) read-only access, or 3) read-write access.

To alter a volume access table, the system manager performs the following steps in the order shown.

1. Run the Access Manager program. It prompts you for the drive number and volume number to modify.

EXAMPLE:

```
] RUN ACCESS MANAGER,V2 <return>
```

Type 1 in response to the drive prompt and type 19 return in response to the volume prompt. Then press H <return> for Help.

```
DRIVE (1 OR 2) : 1 <return>
VOLUME (1 .. 67) : 19 <return>
```

```
-----
  * TABLE OF CONSTELLATION USER ACCESS *
-----

SMGR [ 1] — WRITE           BEN [ 33] — READ
GOOD [ 51]

[ OTHER USERS — NO ACCESS ]

COMMAND (HELP GIVE HELP):
```

2. The system manager may change the volume access table by adding, deleting, or modifying a user's access rights. A Help command has been implemented to list the program's options. All commands, except Save, may be abbreviated to any extent. H, He, and Hel are all valid ways to request Help. Save may be abbreviated only as far as SA. Typing just S always runs the show option. Press H <return> for Help.

```
HELP — REPEATS THIS DISPLAY
SHOW — SHOWS CURRENT ACCESS
SAVE — SAVES CURRENT ACCESS AS
PERMANENT AND EXITS
CHANGE — CHANGES ACCESS
QUIT — ABORTS THE PROGRAM WITHOUT
CHANGING ACCESS
VOLUME — SAVES CURRENT ACCESS AS PERMANENT
AND MOVES TO A NEW VOLUME
```

To add write access for volume 19 for a user named Good, press C <return> for Change, enter user name GOOD <return> and specify WRITE <return>.

```

COMMAND (HELP GIVES HELP): C <return>
ENTER USER NAME OR ID TO CHANGE
'OTHERS' OR 'END' GOOD <return>
USER GOOD [51] NOT PRESENT
'WRITE' — ADD WITH WRITE OPTION
'READ' — ADD WITH READ-ONLY OPTION
'ESCAPE' — TAKE NO ACTION
----->ENTER OPTION : WRITE <return>
    
```

3. When the table has been modified to the system manager's satisfaction, it can be permanently saved with the Save command, which terminates the program, or with the Volume command to alter another volume table. You may also exit the program without affecting the state of the current volume access table by selecting the Quit option.

▶ **THE ACCESS MANAGER PROGRAM ALLOWS ONLY A USER WITH WRITE ACCESS TO CHANGE A VOLUME ACCESS TABLE. THE PROGRAM CONSTCREATE IS USED TO INITIALIZE A VOLUME'S ACCESS TABLE AND ALLOW THE SYSTEM MANAGER TO ACCESS THE VOLUME.**

Managing the BASICs Constellation Software

There are only two absolute requirements that must be met in order to run the Constellation in the BASICs environment. Each user who is to be allowed access to the BASICs system must be assigned a boot volume that has an image of a bootable DOS 3.3 floppy. This image must have been transferred to the Constellation system with the Copy3 program, or made bootable through the use of the Volume Updater. The second requirement is the user must have either read or write access to his home volume.

When a volume is generated or made bootable by using the Copy3 program, all users, except smgr, are removed from the volume's access table. In such cases, you must run the Access Manager program and add users to the volume access table.

The following suggestions are strongly recommended to ensure a smoothly functioning Constellation software system. Allow only the system manager write access and other users read only access to a volume with all the Corvus Utilities **except** the following:

SETBOOT
CONSTCREATE
USER MANAGER
ACCESS MANAGER
PIPES INIT
SEMAPHORES INIT
MIRROR
APPLESOFT
BOOT PREP
BOOT PREP
DIAGNOSTIC

The above files and programs should be kept in a volume that the System Manager has complete access to and all other users have no access to.

Special Considerations with BASICS

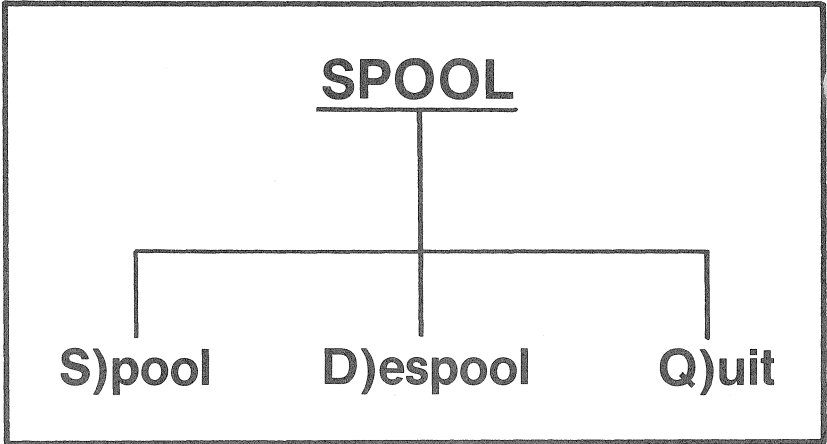
Due to the fact that the execution of the BASIC interpreter is quite slow when connected to the Corvus Multiplexer hardware, it is impossible to do direct peeks and pokes to the memory mapped ports that are used to control the disk. This should not affect any users. The reason for this restriction is that BASICS does not respond fast enough to the receipt of the Ready Status line from the drive to capture the attention of the multiplexer.

It is still possible for BASICS users to talk directly to the disk controller, but it must be done through machine language.

Spool Prep and Spool

You may only spool BASIC text files. In order to get a listing of a program source, you must first create a text file containing the source. The EXEC file Spool Prep is provided for this purpose.

To prepare a BASICS program for Spooling, you must load the desired file into memory and EXEC the program Spool Prep. Spool Prep gives the desired program listing the name Spoolfile.Txt and prepares it to be spooled.



For the following example, we spool a program called Hardwork. Type LOAD HARDWORK <return>. Type EXEC SPOOL PREP <return>.

```
1 LOAD HARDWORK <return>
1 EXEC SPOOL PREP <return>
```

Spool Prep automatically runs the program Spool, which must be in the same volume as Spool Prep.

```
VER x.x
SPOOLER/DESPOOLER
2 - FEB - 81
S)POOL D)ESPOOL Q)UIT:
```

S)pool

To Spool a file, press S for S)pool.

```
VER x.x
SPOOLER/DESPOOLER
2 - FEB - 81
ONLY T E S T FILES MAY BE SPOOLED
THE FILE WILL BE LEFT UNLOCKED.
```

Spool prompts you for the file name to be spooled, which is Spoolfle.Txt in this case. Only textfiles may be spooled. Spool also prompts you for a message to be sent with the file. This message can be up to eighty characters long, and should be used to further identify the document. This message is printed on the first page of your output, along with the name of your file.

**ENTER FILE TO SPOOL
OR CR TO END :**

SPOOLFLE.TXT <return>

**ENTER A 0 - 80
CHARACTER MESSAGE :**

DATE, TIME, AGE <return>

After you have entered the above information, the program asks you which pipe name you want to spool to and presents you with a default pipe name, called Printer. You may press <return> and use Printer or you may type in a pipe name of your own choice. Spool uses only the first eight characters of pipe name for identification.

In the example below, we spool to a pipe named Doghouse.

SPOOL TO : PRINTER DOGHOUSE <return>

SPOOLING TO PIPE DOGHOUSE[5]

,

10 BLOCKS SPOOLED TO PIPE DOGHOUSE[5]

One period displays for each 512 byte block that is spooled.

When the whole file has been spooled, Spool asks you if you want to spool another. If you are finished spooling, press return and the program returns you to the Spool menu. Otherwise, you may enter another file name to be spooled.

**ENTER FILE TO SPOOL
OR <CR> TO END:**

<return>

If you interrupt the Spool program while a file is being spooled, the pipe is left in a bad state and must be purged with the Params option of the Diagnostic program.

D)espool

To despool a spooled file, press D for D)espool.

▶ THE DESPOOLER REQUIRES A PRINTER IN SLOT # 1

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If you have a printer in slot number one, press Y for Yes to continue.

```
CONTINUE (Y/N) ? Y
```

If your printer requires a line feed after a carriage return, press Y for Yes. Otherwise, press <return>.

```
DOES IT REQUIRE A (LF) AFTER A (CR) ? N <return>
```

The program asks which pipe you want to despool. It displays a default prompt of Printer for the name of the file to be despoiled. You may press <return> and use Printer, or type in a name of your own choice. In the example below, we use the name Doghouse.

```
DESPOOL FROM : PRINTER DOGHOUSE <return>  
DESPOOLING FROM DOGHOUSE[5]  
.....  
HIT ANY KEY TO QUIT DESPOOLING
```

Q)uit

Quit allows you to exit the Spool program.

Pipes Diagnostic

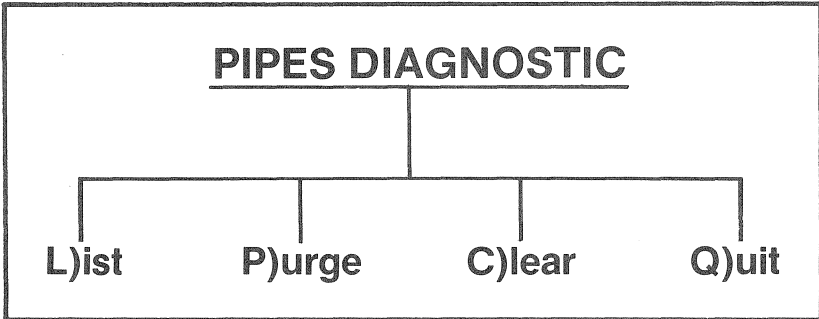
Pipes Diagnostic allows you to list the pipes table. It also allows you to purge one or all existing pipes.

To run Pipes Diagnostic, type LOAD PIPES DIAGNOSTIC <return>. Type RUN <return>.

```
| LOAD PIPES DIAGNOSTIC <return>  
| RUN <return>
```

The program greets you with its version number, release date, and an option menu.

```
VER x.x  
CORVUS PIPES DIAGNOSTIC  
17 - FEB - 81  
  
CHECKING THE STATUS OF THE PIPES AREA . . .  
  
L)IST P)URGE C)LEAR Q)UIT ?
```

**L)ist**

To list the Pipe Table, press L for L)ist.

```

GETTING THE PIPE TABLE . . .
PIPE AREA STARTS AT 18936
ITS LENGTH IS 580 BLOCKS

STATUS OF PIPES

      NAME          O/C      R/W      STATE
FRANKLINF[1]     OPEN     READ    CONTAINS DATA
PRINTER[3 ]      OPEN     READ    CONTAINS DATA
PRINTER[4 ]      CLOSED   READ    CONTAINS DATA
PRINTER[5 ]      OPEN     READ    CONTAINS DATA
PRINTER[6 ]      OPEN     READ    CONTAINS DATA
PRINTER[12 ]     CLOSED   ----    CONTAINS DATA
PRINTER[13 ]     CLOSED   ----    CONTAINS DATA
  
```

A Pipe that is open is in a bad state unless someone is currently accessing it. A Pipe that is closed is waiting to be despoiled.

P)urge

To delete a single pipe, press P for P)urge.

```
PURGE WHICH PIPE [ 1 TO 62 ] ? 5
PURGE PIPE [5] . . .
PIPE [5] PURGED.
```

P)urge should be used to delete Pipes that are in a bad state. A Pipe that is open in a bad state unless someone is accessing it. Pipes get in this state when the spooling or despooling process is interrupted.

C)lear

The Clear option allows you to erase all Pipes listed in the Pipe Table. Press C for C)lear to clear the pipe table.

```
THIS WILL CLEAR OUT THE PIPE AREA BY
PURGING ALL PIPES
AND ALL DATA IN THE
PIPES WILL BE LOST
```

The program asks if you want to continue and presents you with a default N for No. If you want to continue press Y for Yes. Otherwise, press return to use No.

```
CONTINUE ? N Y
```

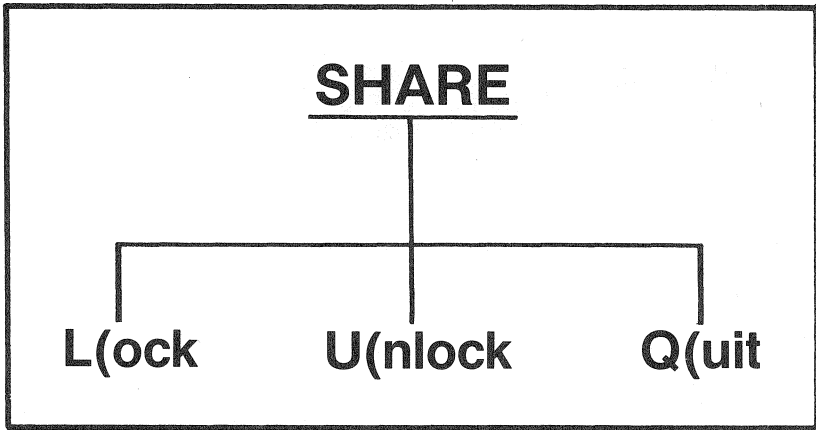
If you answer Y for Yes, the pipe table is cleared and all data in the Pipes is lost.

Share

Our sample Share program does not actually lock a user out of a designated file. It works on the honor system, where users agree to lock a given semaphore name before entering a jointly used file. If the semaphore is locked, a second user must wait until it is unlocked. Unlike our sample program, however, you can make your applications actually lock users out of a file.

The sample program Share is an example of the use of semaphores. To use semaphores, type LOAD SHARE <return>. Type RUN <return>.

```
] LOAD SHARE <return>
] RUN <return>
```



Share greets you with the version number, release date and a menu.

```

VER x.x
SHARE PROGRAM
5 - FEB - 81
SHARE : L(OCK U(NLOCK Q :
  
```

L(ock

To Lock a semaphore, press L for Lock. A semaphore name can be up to eight characters long. When you are prompted, enter the name of your semaphore. In the following example, we use the characters FGH.

```

LOCK WHICH SEMAPHORE ?      FGH <return>

SEMAPHORE FGH IS NOW LOCKED,
AND YOU HAVE CONTROL OF THE
SHARED RESOURCE.
  
```

U(nlock

To Unlock a semaphore, press U for Unlock. Type the name of the semaphore you want to unlock.

```

UNLOCK WHICH SEMAPHORE ?    FGH <return>
SEMAPHORE FGH IS NOW UNLOCKED,
AND THE SHARED RESOURCE IS FREE.
  
```

Chapter Seven**PIPES FOR THE CORVUS NETWORKS**

How Pipes are Used	7-5
Pascal Unit for Pipes	7-9
Pipe Command Details for BASICs	7-11
Print Spooling Using Pipes	7-16

Checklist

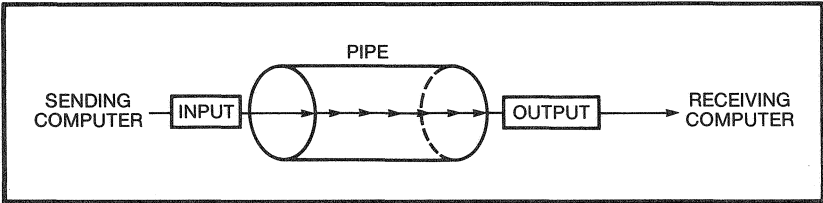
This chapter covers the intrinsics for application programming with Pipes. The following checklist directs your reading efforts.

- If you wish to have some general knowledge about Pipes, read the section titled 'How Pipes are used.'
- For application programming in Pascal, read the section titled 'Pascal Unit for Pipes.'
- For application programming in BASICs, read the section titled 'Pipe Command Details for BASICs.'
- For general information on the Pipe application programs provided by Corvus, read the section titled 'Print Spooling Using Pipes.' For a more detailed description of these programs, read the appropriate sections in Chapter Six.

Chapter Seven

Pipes for the Corvus Networks

The Corvus networks provide a method, called Pipes, by which different computers or programs can send data to each other. A Pipe is a buffer that collects data from a sender and makes it available to a receiver. Senders and receivers, connected to the network, may be different programs on different computers running at different times. The only restriction on the sender/receiver combination is that the sender must send all data before the data is available to the receiver.



How Pipes Are Used

Pipe commands are processed by the Corvus Disk Controller. These commands control writing data to and reading data from the Pipes buffer (see the command detail diagrams).

► **IF YOU ARE NOT FAMILIAR WITH PROGRAMMING, YOU MAY HAVE TROUBLE UNDERSTANDING THIS SECTION. DON'T WORRY! THIS CHAPTER IS NOT MEANT FOR BEGINNING PROGRAMMERS.**

Before a Pipe can be utilized it must be opened for write. A program that is sending data must issue an open write command, which creates, names, and gives a number to a Pipe. The open write command is a two byte command code followed by an eight character Pipe name. Four status bytes are returned: a disk status code, a Pipe status code, the Pipe number, and the Pipe state.

If no error occurs, a disk buffer is ready to receive Senders data. A Pipe write command is used to write data to the Pipe. Pipe write consists of two byte command code followed by the pipe number that was returned by the open write command. The next two bytes contain the length of the data to be written, low order byte first, followed by the block of data. A maximum of 512 bytes may be written with one pipe write command. Four status bytes are returned: a disk status code, a Pipe status code, the low byte and high byte of the length actually written. To write larger files, 512 bytes are written at a time and multiple pipe write commands are used.

After all the desired data has been written to a Pipe, a close write command is issued. The close write command closes a pipe for writing. The close write command is a two byte command code followed by the Pipe number, the Pipe state (close write), and an unused byte. A disk status byte and Pipe status byte are returned (see figures 4.1).

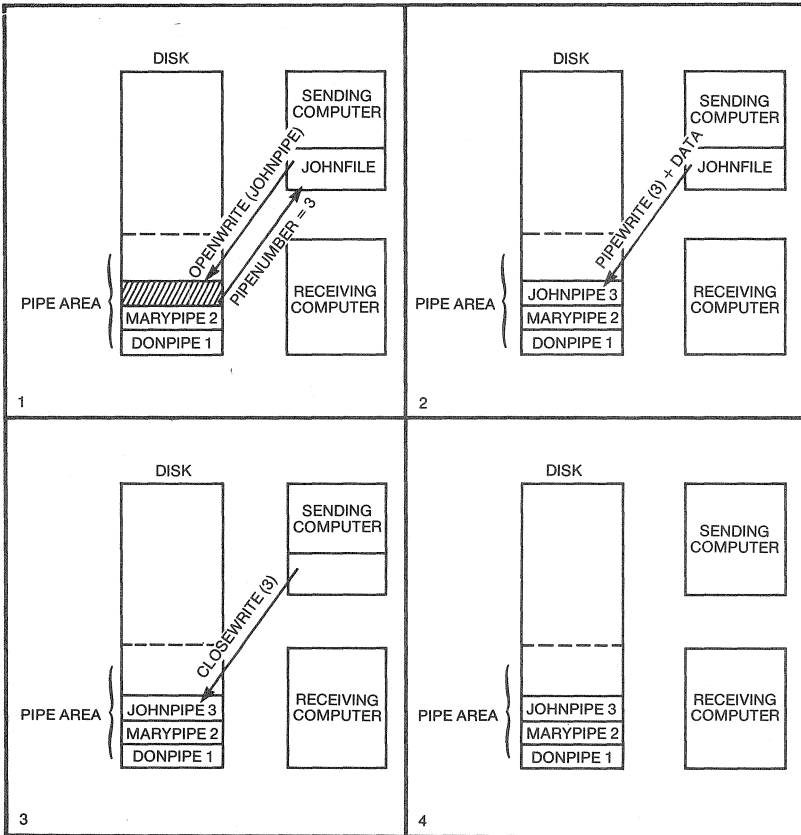
A pipe cannot be read until it has been written by the sequence described above. To read a Pipe, an open read command must be issued. The open read command opens a pipe for reading. An open read command is a two byte command code followed by an eight character Pipe name. Four status bytes are returned: a disk status code, a Pipe status code, the Pipe number, and the Pipe state.

If no errors occur, the Pipe is ready to allow data to be read. The Pipe read command is used to read data from the Pipe. A pipe read command is a two byte command code, followed by the Pipe number and two bytes containing the length of the data to read (low byte first). Four status bytes followed by the actual pipe data are returned. The status bytes include a disk status code, a pipe status code, a low byte and a high byte of the actual data length read. The status bytes are followed by the data. Because a maximum of 512 bytes (one block) may be read with one read command, the pipe read command is used repetitively until all the data has been read.

After all the data from the Pipe has been read, a close read command is issued. The close read command closes a pipe for reading. A Pipe close read command is a two byte command followed by the Pipe number, the Pipe state (close read), and an unused byte. A disk status byte and Pipe status byte are returned. If all the data from a Pipe has been read when it is closed for read, the resources allocated for that Pipe are released and may be used by other Pipes (see figures 4.2).

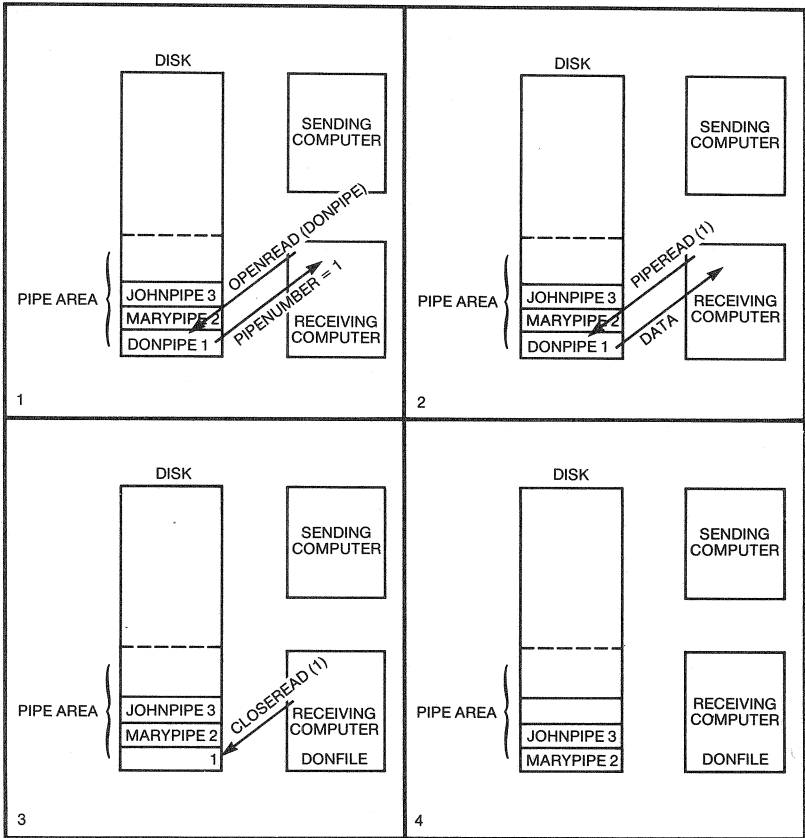
There are three other Pipe commands: Pipe Init, Pipe Status, and Purge Pipe.

Pipe init initializes a pipes area on the disk. A pipe init command is a ten byte command consisting of a two byte command code, the starting disk block number low byte, the starting high byte, the size low byte, the size high byte, and four unused bytes. A disk status byte and a Pipe status byte are returned.



* The above examples assume all commands are successful.

FIGURE 7.1 A TYPICAL SEQUENCE FOR WRITING A PIPE



* The above examples assume all commands are successful.

FIGURE 7.2 A TYPICAL SEQUENCE FOR WRITING A PIPE

► **THE PIPES AREA MUST BE ON DRIVE ONE. THE STARTING ADDRESS IS A BLOCK (512 bytes a block) NUMBER AND THE LENGTH IS THE NUMBER OF BLOCKS.**

The Pipe status command is a five byte command: a three byte command code and two unused bytes. A disk status byte and one or two data blocks (512 bytes each) are returned. The first data block contains a name table that contains the active Pipes. The second block is the pointer table, which contains state information and pointers for both ends of each Pipe.

After using the Pipe Status command to check the name table or the pointer table, Purge Pipe can be used. Purge Pipe allows you to delete an unwanted Pipe. Five bytes are sent: a two byte command code, the Pipe number, the state (purge), and an unused byte. A disk status byte and Pipe status byte are returned.

Pascal Unit For Pipes

Unlike BASICs, where the byte values must be explicitly written into the applications programs (see the program Spool for an example), Pascal Pipe functions handle the details of assembling and sending the internal codes. These functions return a negative integer value if an error occurs or a positive integer value if no error occurs. More specific documentation on the pipe functions can be found in the interface part of the Pipes Unit. The Pipe functions are provided as a Pascal Unit that the user can link to his own Pascal program. This UNIT is in the file Corvus Library, which is included on the Corvus Constellation Utilities diskette for Pascal.

The following paragraphs briefly describe the various functions provided by the Pascal Pipes Unit.

FUNCTION PipeOpWr (pname:string):integer;

PipeOpWr opens a Pipe for writing, assigns the Pipe a name (pname), and assigns a number to the Pipe. This command creates a new Pipe each time it is used. When the operation is successful, it returns a Pipe number. If it is unsuccessful, it returns a negative error code.

FUNCTION PipeWrite (npipe,wlen:integer; info:block): integer;

PipeWrite writes a block of data (wlen) bytes in length from the block (info) to the Pipe corresponding to the Pipe number (npipe). When successful, it returns an integer value equal to the number of bytes written. If unsuccessful, it returns a negative error code. Pipewrite is repeated for each block that is to be written to the pipe.

FUNCTION PipeCIWr (npipe:integer):integer;

PipeCIWr closes the Pipe number (npipe) for writing. It returns a status code. Once a Pipe has been closed for writing, no additional data can be written to it.

FUNCTION PipeOpRd (pname:string):integer;

PipeOpRd opens the Pipe with the specified name (pname) for reading. If the Pipe with the specified name exists and is not already open, this function returns the Pipe number, otherwise it returns a negative error code.

FUNCTION PipeRead (npipe:integer; var info:block):integer;

PipeRead reads a block of data from the Pipe (npipe) and places the data into a block (info). It returns the number of bytes read. If unsuccessful, it returns a negative error code. Piperead is repeated for each block that is to be read from the pipe.

FUNCTION PipeCIRd (npipe:integer):integer;

PipeCIRd closes the Pipe number (npipe) for reading. It returns a status code. If the Pipe is empty, it is closed and Pipe (npipe) is deleted.

FUNCTION Pipelnit (baddr, bsize:integer):integer;

Pipelnit initializes the Pipe data structures and prepares a specified area at (baddr) on the disk for use by Pipes that is (bsize) blocks in length.

FUNCTION PipeStatus (var names,ptrs:block):integer;

PipeStatus reads the name and pointer tables from the disk. Each block, (names) and (ptrs), is 512 bytes in length.

FUNCTION PipePurge (npipe:integer):integer;

PipePurge purges the specified Pipe (npipe).

PASCAL PIPE FUNCTION ERROR CODES

(decimal)

- 8— tried to read an empty Pipe
- 9— Pipe was not open for read or write
- 10— tried to write to a full Pipe
- 11— tried to open (for reading) an open Pipe
- 12— Pipe does not exist
- 13— no room for new Pipes at the moment
- 14— illegal command

▶ **ERROR CODES LESS THAN -127 ARE FATAL DISK ERRORS.**

Pipe Command Details For BASICS

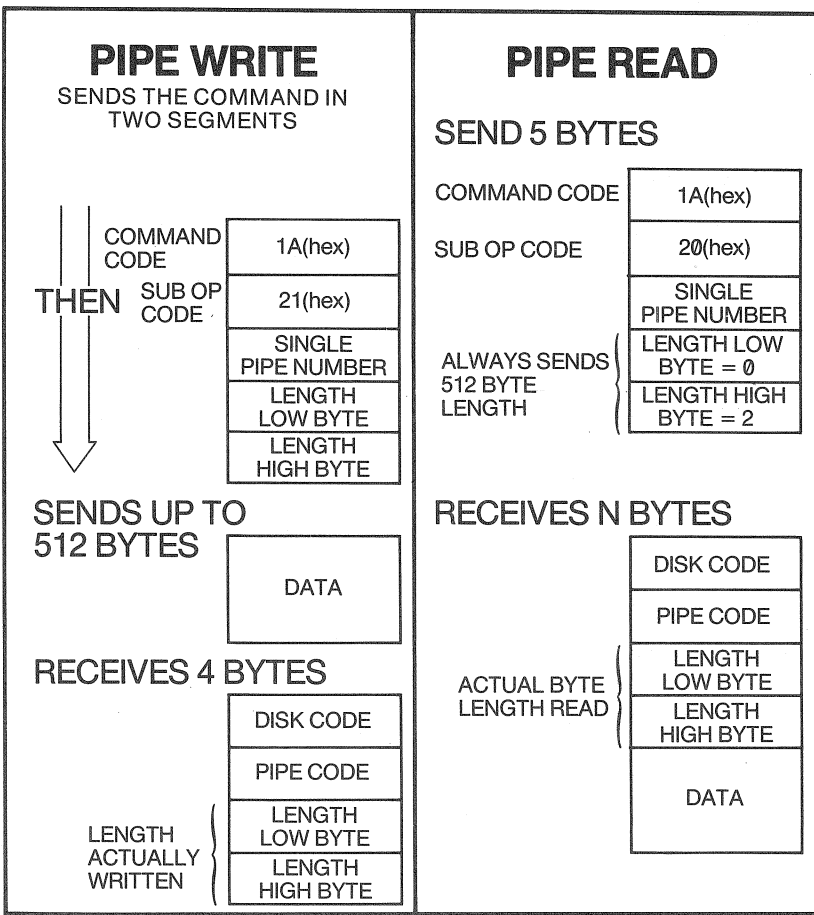
PIPE STATE CODES

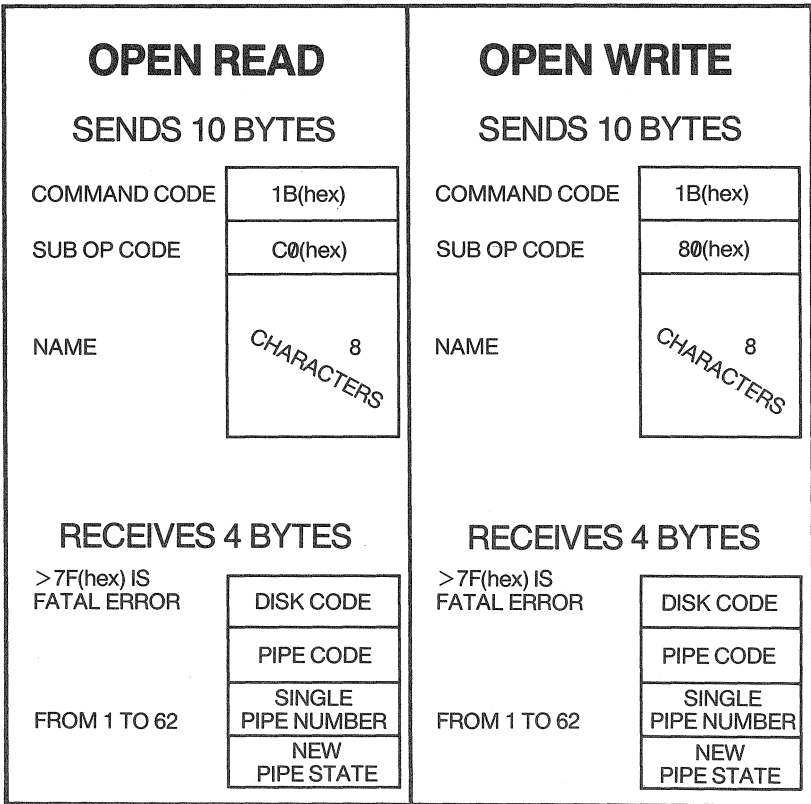
(decimal)

(hex)

1	1 - open for write, file empty
2	2 - open for read, file empty
128	80 - full, not open
129	81 - full, open for write
130	82 - full, open for read

(see diagrams)





CLOSE READ, CLOSE WRITE, & PURGE PIPE

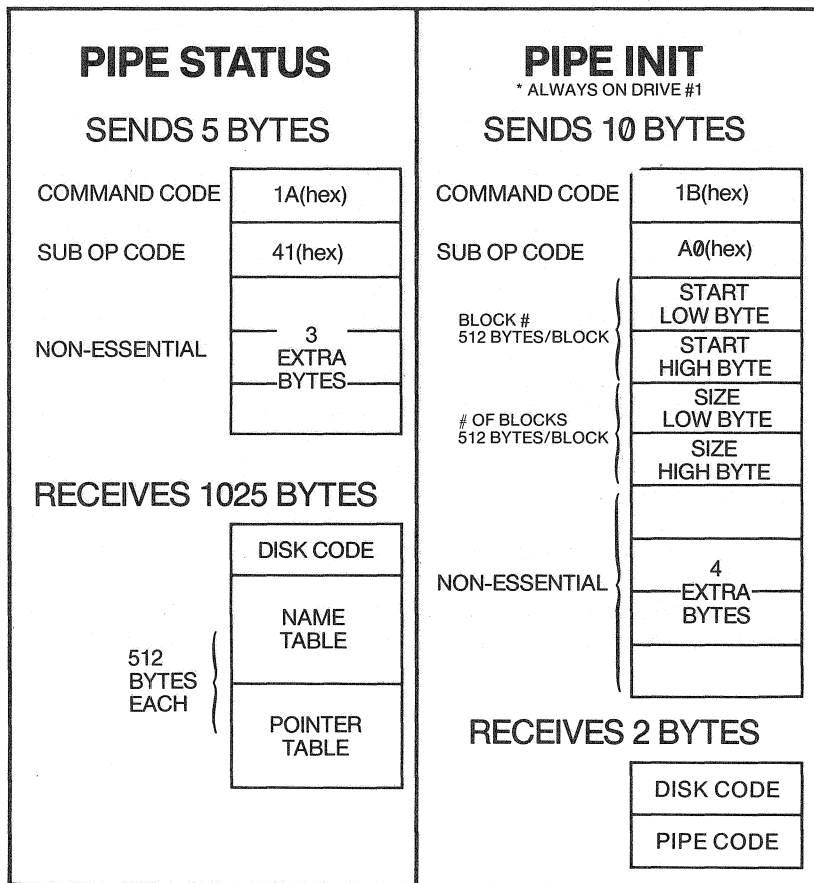
SENDS 5 BYTES

COMMAND CODE	1A(hex)	
SUB OP CODE	40(hex)	
	PIPE NUMBER	{
	STATE	
NON-ESSENTIAL	EXTRA BYTE	

FE(hex) = CLOSE WRITE
 FD(hex) = CLOSE READ
 0 = PURGE

RECEIVES 2 BYTES

DISK CODE
PIPE CODE



Print Spooling Using Pipes

In a Corvus network, Pipes provide a general communications mechanism that can be used to build more sophisticated network applications. Pipes can serve as a utility that enables different computers connected to the same Corvus Drive to communicate with each other or share common peripheral equipment.

Corvus has implemented a printer spooler/despooler using Pipes. It allows all computers connected to a Corvus network to share the same printer. Whenever a user wants to print a file, the user executes the spool program, which sends the file to a Pipe with a designated name. During periods when printing is to be done, one of the computers on the network is dedicated to the printing function by choosing the D(espooler option in the spool program. The despooler searches a list of active Pipes and whenever it finds a Pipe with the designated name, it directs the contents of that Pipe to the printer. Printing continues until the despooler can find no more Pipes with the designated name. Thereafter, the despooler makes periodic checks to see if there are any new files to be printed.

Corvus provides the source for the spooler so users may modify it to fit their own installation or use it as an example of how to use Pipe commands.

Included on the Constellation Utilities diskette for BASICS are two programs called Spool and Spool Prep. Spool Prep is an exec file that converts a program file into a text file. To use it, LOAD the program you wish to print and then Exec Spool Prep. The program is written to a text file called Spoolfle.txt, which can then be spooled.

Included on the Constellation Utilities diskette for Pascal are two files, Spool.Text and Spool.Code, plus the Pipes Unit in Corvus.Library.

Semaphores

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Semaphores for the Corvus Networks

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Checklist

This chapter covers the intrinsics for application programming with Semaphores. The following checklist directs you to the needed sections.

- For general information on the use of Semaphores, read the sections titled 'Simultaneous Volume Access' and 'Use of Semaphores by Host Processors.'
- For information on application programming in Pascal, read the section titled 'Semaphores in Pascal.'
- For information on application programming in BASICs, read the sections titled 'Semaphores in BASIC' and 'Command Details.'

Chapter Eight

Semaphores for the Corvus Networks

Simultaneous Volume Access

The principal reason for giving each user a home volume is to avoid a situation where two or more users are simultaneously accessing the same volume.

If two users are merely reading from the same volume, there is no problem. However, if one user is writing to a volume, another user simultaneously accessing that volume may read inconsistent data. A more serious problem occurs if multiple users are writing to a file or volume at the same time.

This serious problem arises because the operating system in each computer has a copy of the directory for each active disk volume. The directory is usually updated on the disk only when the local operating system thinks it is necessary. The directory may be different in two or more host computer memories since each user can be adding, deleting, or changing files. This leads to two users writing out their files or directories and only the last user to write actually updating the directory on the disk.

To avoid this problem, there are several alternatives useful in specific instances. Read-only access to system utilities or data bases avoids the problem on shared disks. Read-write access to shared volumes can be made safe if all writes are made to existing pre-allocated files and the file is locked while any program has write access to it.

Semaphores can be used to indicate that a particular file is being written to. They can be used to keep two or more programs from writing to the same file or section of a file at the same time. User application programs that need shared read-write access to a data base can be configured to test the status of a semaphore before allowing access to a file.

► **IF YOU ARE A BEGINNER, IT IS POSSIBLE THAT YOU MAY HAVE TROUBLE UNDERSTANDING THIS SECTION. DON'T WORRY! THIS CHAPTER IS NOT MEANT FOR BEGINNING PROGRAMMERS.**

Use of Semaphores by Host Processors

Each computer may, at any time, ask to lock any of the up to 32 semaphores. The request is granted if no other computer has already locked that particular semaphore. The label for the semaphore can be any eight character name that is agreed upon by the programs that wish to share access.

The Lock and Unlock commands send an eight byte name, called the semaphore, that is either placed into or removed from the semaphore table that is managed by the disk controller. If the semaphore name has already been entered, a locked semaphore message is returned. The application program attempting to lock the semaphore can continue to poll the semaphore table until the desired semaphore is no longer locked. The status of the semaphore prior to each operation is also returned to provide for a full test-set or test-clear operation.

The complete semaphore table can be cleared by any processor, but this should only be performed on initialization or for recovery from error conditions.

Semaphores in Pascal

Corvus provides a Pascal unit for Semaphores in the file Corvus.Library, which is found on the floppy labeled Corvus Constellation Utilities for Pascal. The interface specifications of this unit follow.

UNIT Semaphores;

INTERFACE

CONST

Sema4version = '1.5';

[Return codes for the semaphore Unit]

SemWasSet = 128; [the prior state of this semaphore was locked]

SemNotSet = 0; [prior state was unlocked]

SemFull = 253; [semaphore table is full ... (32 active semaphores)]

DiskErr = 255; [disk error during write thru]

[negative function return values indicate disk error conditions]

[0 return means no error (and not set prior to operation)]

[80=128 return means key set prior to operation]

TYPE

semkeys = packed array [0..7] of char;

semkeylist = packed array [0..31] of semkeys;

VAR

preprofile:file;

InSlot2: BOOLEAN; [defaults to FALSE, true only when testing a drive in slot 2 of the Apple]

FUNCTION SemLock (key: STRING): INTEGER;
FUNCTION SemUnlock (key: STRING): INTEGER;
FUNCTION SemClear: INTEGER;
FUNCTION SemStatus(var kbuf: SemKeylist): INTEGER;

[end of interface spec]

Locking a semaphore

The function SemLock is used to lock a semaphore. The formal parameter KEY is the name of the semaphore. The function returns one of the following values.

- 0 — semaphore has been successfully locked.
- 128 — semaphore was already locked, so was not locked by this call.
- 253 — semaphore table was full, so semaphore was not locked.
- 255 — disk error

Unlocking a semaphore

To unlock a semaphore, the function SemUnlock is used. The formal parameter KEY is the name of the semaphore. The function returns one of the following values.

- 0 — semaphore was not locked.
- 128 — semaphore has been successfully unlocked.
- 255 — disk error

Initializing the Semaphore table

The semaphore table should be initialized as part of the installation procedure of the Constellation software. The Vinit program has an option that allows you to initialize the table. However, there may be times when you wish to initialize the table programmatically. The function SemClear is provided for this purpose. It clears the semaphore table, effectively unlocking all semaphores. It returns one of the following values.

- 0 — table successfully cleared
- <-127 — disk error

Listing the semaphore table

The semaphore table may be listed using the Diagnostic program. The function SemStatus allows you to examine the semaphore table programmatically. On returning from the function, the parameter Kbuf contains the names of the locked semaphores, provided the call was successful.

► **THIS FUNCTION REQUIRES THAT THE CORVUS SUPPLIED FILE DIAG.DATA BE PRESENT ON A MOUNTED VOLUME. THIS FILE IS SUPPLIED ON THE FLOPPY LABELED CORVUS 11AP UTILITIES FOR PASCAL.**

SemStatus returns one of the following values:

- 0 — table successfully read
- 2 — unable to put disk in prep mode
(couldn't find file Diag.Data)
- 127 — disk error when trying to read table

Semaphores in Basic

Corvus provides two programs, called Semaphore Init and Share, for handling semaphores in Basics. These two programs are found on the floppy labeled CORVUS CONSTELLATION UTILITIES FOR BASICS.

Semaphores are locked and unlocked by sending the appropriate commands to the Corvus drive. An assembly language program, Bci.Obj, is used to send commands and receive the results.

Locking a semaphore

Lines 1000 through 1140 of the program Share give an example of successfully locking a semaphore.

Unlocking a semaphore

Lines 2000 through 2150 of the program Share give an example of successfully unlocking a semaphore.

Initializing the semaphore table

The semaphore table should be initialized as part of the installation of the Constellation software. The program Semaphore Init is provided for this purpose.

Listing the semaphore table

For Basics users, Corvus does not currently provide a method to list the semaphore table. Those of you who have access to Pascal may use the Pascal Diagnostic program to list the currently locked semaphores.

Constellation Command Details

LOCK

SENDS 10 BYTES

COMMAND CODE	B(hex)
SUB OP CODE	1
USER ASSIGNED KEY ID (8 bytes)	KEY (8 bytes)

RECEIVES 2 BYTES

FE—DISK ERROR DURING WRITE-READ THROUGH	0 80	RETURN CODE
PRIOR KEY STATE (hex)		STATE

0—NOT SET
80—SET

UNLOCK

SENDS 10 BYTES

COMMAND CODE

B(hex)

11 (hex)

USER ASSIGNED
KEY ID
(8 bytes)

KEY
(8 bytes)

RECEIVES 2 BYTES

FD—TABLE FULL
FF—DISK ERROR
DURING
WRITE-READ
THROUGH

RETURN
CODE

PRIOR KEY 0
STATE (hex) 80

STATE

0—NOT SET
80—SET

CLEAR KEY TABLE

SENDS 4 BYTES

COMMAND CODE

1A(hex)

SUB OP CODE
(clear table)

10(hex)

0

0

RECEIVES 1 BYTE

FD—FULL DISK
FE—FATAL ERROR

RETURN
CODE

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