CORVUS
Customer Service

System Manager
Training

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APPENDIX A - GLOSSARY

APPENDIX B - ERROR MESSAGES

SECTION 1
INTRODUCTION

INTRODUCTION

The System Manager Training Class is designed to provide the information necessary to maintain a Corvus Omninet Local Area Network, both hardware and software. It is our intention to give you pertinent and easily accessible information for your continued use.

The manual and course information is specifically designed for use by the System Manager, whois responsible for planning the system, keeping the system running smoothly, and insuring that the network resources are used wisely.

Although the primary focus of this course is the Constellation software, it is important to understand the function of the network hardware. You will find important hardware documentation included with the software description. Installation and troubleshooting tips are given where appropriate.

Th System Manager's class is parallels the divisions within the Constellation software: Drive Management, Backup Utilities, maintenance Utilities, Utility Server Manager, Transfer Manager, Initialize Drive, Help, and Exit. These sections are further divided into the System Manager's responsibilities, software overview, and hardware installation if appropriate.

Section I contains network terminology. Reading this section before the beginning of class will make key concepts more easily understood.

The training material for this class and all other Corvus Customer Service classes evolves with our product line. Any suggestions you have to improve the course content are appreciated.

TERMINOLOGY OF NETWORKS

Networks currently can have **disk servers** with older model Corvus drives, **printer servers,** and the **Mirror Servers.** Both **The Bank** and the **OmniDrive** have internal servers, eliminating the need for any external device.

The term **server** is frequently used to identify a mass storage system. During system generation, mass storage systems are assigned a server name. The server name identifies the device under Constellation II, the network management software. Each server has a unique Omninet address, set on the address switches, and a unique server name. System generation also gives each mass storage system a server password, drive name, and drive password.

Constellation II uses **server name, drive name,** and **drive password** to identify the mass storage system and too control access to it. Use of devices like the Mirror Server requires knowledge of these names and passwords. In some cases, only the Omninet address and drive number may be required.

Another commonly used term, **multiple server,** means that more tan one mass sotrage system is operating on the same Omninet network; it does not include other server types. A network with one OmniDrive, a printer server, and a Mirror Server is still considered a single server network; adding another OmniDrve would make this a multiple server network. Older

model disk systems, utilizing a single external disk server, are considered part of a single server network. daisy-chained together with one

Users can be classified in two categories: the **System Manager** and **network users.** The primary responsibilities of the System Manager include system backup and system maintenance. The network user's responsibilities are localized in work areas designated by the System Manager. Network users should communicate their needs for disk space and peripherals access to the System Manager.

Omninet refers to the Corvus network configuration that the network software, **Constellation II,** communicates over. **Transporter cards,** located in one of the computer's card slots, permit computers to communicate with network devices such as **The Bank, disk drives, Utility Server,** and other computers.

The Bank, Mirror, and Mirror Server are backup devices. They facilitate the copying of the information on the hard disk to another storage medium. This affords protection of information, an important cosideration in establishing and maintaining a network.

OmniDrives, H-Series, and **Revision B drives** and the Corvus hard disk drives for Omninet. The OmniDrive, the newest in the line, has an internal disk server.

The **Utility Server** allows network users to share printers. Two serial ports and one parallel port allow up to 3 printers to be attached to each Utility Server.

SECTION 2
DRIVE MANAGEMENT

SYSTEM MANAGERS RESPONSIBILITIES

Under Drive Management the System Managers responsibilities include:

1) Create/delete users and passwords
2) Create/delete volumes
3) Control volume access

It must be noted that the needs of the users as well as the anticipated software to be used on the system should be known prior to setting up your volumes, users and access. A good indicator of your needs might be to fill out a table similiar to:

USER NAME	USER PASSWORD	VOL SIZE	ACCESS R/W R/0	MOUNT UNIT
1				
2				
3				
4				

Tips to remember: Volume size is listed in blocks. 2048 blocks= 1 megabyte. Mount unit would depend on operating system and Computer type. This information is listed below in the section covering the Access Manager.

SOFTWARE OVERVIEW

The Drive Management option is found at the main level of the Constellation II Management screen. To gain access to the Constellation II utilities, logon the network as the system manager for the particular computer being used. For example, to perform system management functions from the IBM PC logon as IBMGR; for the Apple II logon as A2MGR.

```
CORVUS MANAGEMENT UTILITY DS
Verson [x.xx]                                 Drive
[c] Copyright 1982, 1983 Corvus Systms Inc.
    ----------------------------------------------------

    D - Drive Management
    B - Backup Utilitie
    M - Maintenance Utilities
    I - Initialize Drive
    C - Configure System

    L - List Drives
    H - Help
    ----------------------------------------------------

    Please select an option:__
```

Constellation II Main Menu

Selecting the Drive Management option you will see:

```
CORVUS UTILITY [x.xx]                        DS
Drive Management                             Drive
[c] Copyright 1982, 1983 Corvus Systms Inc.
---------------------------------------------------

U - User/Device Manager
V - Volume Manager
A - Access Managerilities

B - Boot Manager

S - Select Drive
L - List Drives
E - Exit
---------------------------------------------------

Please select an option:__
```

Drive Management Main Menu

Your primary objective as System Manager under Drive Management is to:

1) Create users
2) Create volumes and
3) Grant users access to volumes.

The following sections are actual menu options with their descriptions.

USER/DEVICE MANAGER

Purpose

The User Manager program lets you add or remove users, change a user's attributes and get a list of users. Each of the options is described below.

Options

ADD USER - Prompt for the user name, password, home server, and operating system type. Add the entry to the selected drive. Check all other disk servers on the network; if the entry does not exist, add it; if entry does exist, replace it.

REMOVE USER - Prompt for the user name. Find the entry in the user table of the current server, and display its contents. For each drive on the current server, find the entry for the specified user and if found, delete all the access entries with that users name. Remove the user name entry from the volume table. This process is repeated for all servers on the network.

CHANGE USER - Prompt for the user name. Find the entry, and display its contents. Prompt for a new password, home server, and operating system. Replace the entry with the new information. Check all other disk servers on the network; if the user exists,

replace it; if the user does not exist, add it.

LIST USERS - Display each user entry in the current user table.

VOLUME MANAGER

Purpose

The Volume Manager lets you add or remove a volume,change its attributes and list the directory of volumes. Each of the options is described below.

Options

ADD A VOLUME - First a table of free spaces available on the drive is compiles. Next, prompt for and validate a volume name, length, starting location, and volume type. If selected, format the volume. Grant access for user 1 (normally the System Manager). Finally, add the new entry to the volume table.

REMOVE VOLUME - Prompt for the volume name. Find the entry and display its contents. Remove all the access table entries with that volume's address. Remove the name from the volume table.

CHANGE VOLUME ATTRIBUTES - Prompt for the volume name. Find the volume table entry, and display its contents. Prompt for a new name and R/W protection. Note that the structure of the volume itself is not modified.

LIST VOLUMES - Display each entry in the volume table for the current drive.

EXTENDED LIST - Prompt for a volume type. Display each entry with that volume type in the current drive's volume table, along with pertinent operating system dependent information extracted from the volume itself.

ACCESS MANAGER

Purpose

The Access Manager program grants a user access to volumes. The program also removes access from a volume, changes access or lists volume access. You can use this to prevent unauthorized users from tapping a particular volume and to mount volumes automatically for a user. A volume must be mounted before a user can have access.

Access is read-only, meaning the user can only read data from the mass storage system or read-write meaning the user can read data and write information to the volume.

Options

NEXT USER - Prompt for a user name. Make that name the current user name.

GRANT ACCESS - Prompt for a volume name. Find the access table entry. Prompt user for the read/write state, mount/unmounted status, and a mount unit. Add the information to the drive's access table.

REMOVE ACCESS - Prompt for the volume name. Find the entry in the drive's access table and delete it.

CHANGE ACCESS - Prompt for the volume name. Locate the entry in the drive's access table.

Prompt user for new information and replace this in the drive's access table. entry.

LIST ACCESS - Find all drive's access table entries. For each entry; locate the matching volume table entry and print the combined table of information.

HELP - Displays help options. These include help, view volume and user list.

VIEW VOLUME - For each volume table entry, print the volume name. Find the matching access table entry; if one exists, print an "x" which will indicate the user has access to this volume.

USER LIST - For each user table entry, print the user name. Find the matching user table entry for that drive and if one exists print the user ID number.

BOOT MANAGER

Purpose

The Boot Manager is used to add and delete boot files. It can also be used to display information relevant to boot files previously installed.

Options

ADD A BOOT FILE - Copy a boot file to the Corvus Volume. Updates the appropriate entry in the boot table and sets a pointer to locate the new boot file.

REMOVE FILE - Deletes the chosen file from the Corvus Volume and updates the entry in the boot table.

LISTFILES - Prints the entries from the boot table and prints the computer type associated with the entry.

SELECT DRIVE

Purpose

This option is used to select the Mass Storage Device you want to communicate with.

Options

By simply choosing the "Select Drive" option the program will prompt you for the drive name and password. Once selected all operations that are chosen will be made on the chosen drive. If you cannot remember the drive name enter the address location number indicated by your address switch setting.

LIST DRIVES

Purpose

This option is used to list all drives that are attached and operational on your network.

Options

Choosing this selection will display a listing of all drives on the network. It automatically updates and displays the active user table.

EXIT

Purpose

Choosing "Exit" will clear the screen of the current menu and bring you to the next layer of software. Exit is chosEn to terminate program. On Some computer keyboards the "escape key" will perform the same function as exit.

Options

Choosing "Exit" will terminate the current program.

SECTION 3
BACKUP UTILITIES

SYSTEM MANAGERS RESPONSIBILITIES

Backup of all network information should be a primary function of the the System Manager. In the event of a fatal drive error, maintenance can be performed and the data restored to the drive(s) without loss of valuable information.

Ideally, backup of information should be performed at the end of each working day. Keep in mind that the drive being backed up cannot be accessed by any user during the backup.

BACKUP DEVICES

Corvus provides various methods for backup of drive information. Backup may be performed using the following devices:

o Mirror
o Mirror Server
o Bank
o Floppy

Each of these devices and their compatible systems is discussed in the following section.

MIRROR

The Mirror allows the backing up of network information onto a video tape cassette. It is connected to the main drive bus and converts data into a video format for output to a connector at the rear of the drive. The "video out" connector is then connected to a video cassette recorder for recording onto a video cassette for backup.

Restoring information back to a drive is performed by playing back the video tape where the video output of the VCR is connected to the "video in" connector of the drive.

Introduction

The Corvus Mirror hardware can be purchased in two configurations:

o Internal Mirror
o External Mirror

An internal mirror may be installed within a Corvus 11/20-MB Revision B drive, a 6 MB Revision B drive or into an H-Series Drive. If a drive is ordered with an internal Mirror installed, an 'M' will be marked at the end of the serial number. For example:
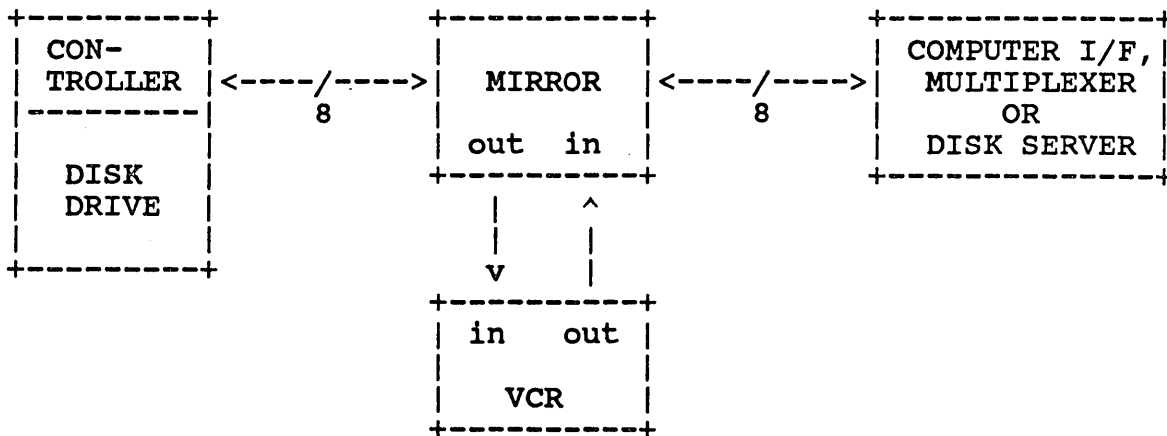

213-CH-0752/M

An external Mirror may be purchased and attached to the rear connector of a drive and to the computer interface card, a Multiplexer or a Disk Server.

All Mirror utilities operate the same for internal Mirrors and external Mirrors.

Hardware Set-Up

Hardware installation for a Mirror is quite simple. In the following section we will describe the installation of a Mirror PBC into a drive which did not contain one previously, and also describe cable installation for an internal and external Mirror.

When the Mirror is installed, it shares the 8 bit control, address and data lines of the controller and is directly controlled by the processor within the drive. The following block diagram illustrates the Mirror installed in reference to the Computer, the Drive and the Video Cassette Recorder.

```
+----------+              +-----------+              +----------------+
|  CON-    |              |           |              | COMPUTER I/F,  |
|  TROLLER |<----/---->|  MIRROR   |<----/---->| MULTIPLEXER    |
|----------|     8        |           |     8        |      OR        |
|          |              |           |              |  DISK SERVER   |
|  DISK    |              | out   in  |              +----------------+
|  DRIVE   |              +-----------+
|          |                 |     ^
|          |                 |     |
+----------+                 v     |
                          +-----------+
                          | in    out |
                          |           |
                          |    VCR    |
                          +-----------+
```

Mirror Installation Block Diagram

In the event that the Mirror is to be installed in a daisy chained drive set-up, the Mirror should be installed only in the first drive of the chain.

Internal Mirror Installation

An internal Mirror PCB may be installed into an existing Corvus drive which did not previously contain one. Their is a difference, however, in the type of Mirror board which should be installed for the various disk drives. The table below should be consulted when ordering an internal Mirror Board for installation:

```
+----------------------------------------------------+
|           DRIVE                |    PART NUMBER     |
|--------------------------------|--------------------|
|11/20-MB Rev B    (60 Hz)       |    8010-08026      |
|                  (50 Hz)       |    8010-08687      |
|--------------------------------|--------------------|
|6-MB Revision B                 |    8010-08025      |
|--------------------------------|--------------------|
|H-Series                        |    8010-08025      |
+----------------------------------------------------+
```
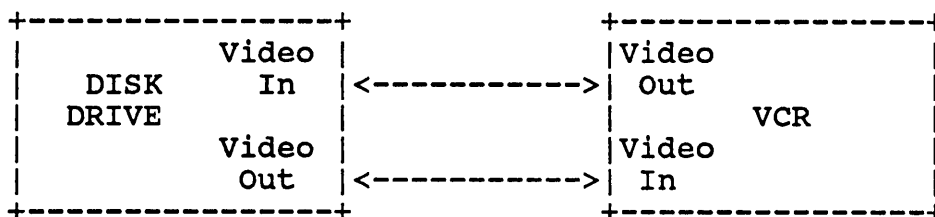
Mirror PCA Part Numbers

Note that the 11/20-MB Revision B Drive Mirror PCB is available in 50 and 60 Hz frequency
ratings for foreign use. Also, that the 6-MB Revision B and the H-Series drives use the
same internal Mirror PCB.

The internal Mirror on a 11/20-MB Revision B drive is mounted onto the bottom service
door and the internal cables must be installed.

For the 6-MB Revision B and the H-Series drive, the internal Mirror PCB is installed into
the empty slot of the backplane, in front of the controller PCB. The Mirror switches at
the rear of the drive must also be set correctly.

Video cables must be installed from the rear of the drive to the VCR.

```
+----------------+                  +----------------+
|          Video |                  |Video           |
|   DISK     In  |<------------>|   Out            |
|   DRIVE        |                  |           VCR  |
|          Video |                  |Video           |
|          Out   |<------------>|   In             |
+----------------+                  +----------------+
```

Internal Mirror Wiring Diagram

Refer to the Mirror Service Manual (Part Number 7100-03345-00) for installation details.

External Mirror

The installation of an external Mirror is the same for the 6-MB Revision B, the 11/20-MB
Revision B, and H-Series drives. A Mirror cable is supplied to connect the processor
connector of the drive to the Mirror board. The Mirror board will be connected to the
interface card within the computer if it is a single user system. If the system is con-
nected to a Network the Mirror will connect to the Multiplexer or Disk Server.

Also, the video cable must be connected to the VCR as described in the internal Mirror
installation section.

Software Set-up

The Mirror utilities are copies to the hard drive during the drive initialization process and should reside on the drive. The utilities may also be run from a floppy.

Operation

The Mirror utilities support operation of the Corvus Mirror. The options available thru these utilities are:

o Back Up
o Identify
o Verify
o Restore

When the Mirror utilities are selected the following prompt will be displayed:

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

Selecting the Back-Up option will load the following screen display:

BACKUP A: V(OLUME D(RIVE P(HY-DRV:___

The Back Up option allows the backing up of drive data by:

Volume: Individual volumes can be backed up using this option.

Drive: Under Constellation I using the Apple II, a 20 MB drive was seen as two virtual drives. Selecting this option allow the backing up of either of the virtual drives by declaring the drive to be backed up.

Physical: This option will back up the entire contents of a pysical drive. It also allows the backing up of each of the drives in a daisy chained drive set-up.

Once the type of back up has been selected, the screen ask for the following information:

                    Date: __

                    Time: __

                    Name: __

                    Comment: __

This information will be recorded as an image header on the tape, later to be used for image identification.

The Screen will next prompt you to begin the backup:

                    POSITION THE RECORDER AND START RECORD
                    PRESS <RETURN> WHEN READY

The tape should be allowed to run for a few counts on the counter to avoid recording on the tape leader and to avoid tape positioning errors during other operations.

At the conclusion of the back up, the screen will display:

BACKUP FINISHED
ERROR STATUS:

DISK ERRORS: 0
- ALL DATA STORED-

This message does not guarantee that the data was successfully stored. To verify the integrity of the stored data, a verify should be run. This option checks the data by testing the CRC byte that was added to the data during backup. A verify should alway be run after a backup to insure that the backup was successful. After selecting the verify option, the screen should display:

VERIFY SELECTED
POSITION RECORDER AND START PLAYBACK
PRESS <RETURN> WHEN READY

When the <Return> key is pressed, the screen will display:

VERIFY IN PROGESS...

At the conclusion of the verify, the screen will display:

ERROR STATUS:

RECOVERED ERRORS:
TAPE READ ERRORS:
- ALL DATA RECEIVED-

Recovered errors are errors which were rebuilt from the 4 block images which were recorded. As a rule of thumb, there should be no more that 200 recovered errors in the backup of a 20 MB drive.

Tape read errors are hard error which we not recovered. A report of any tape read errors means that the backup was not successful and should be performed again.

Multiple drive backups can be recorded on a single tape. To differentiate between backups, the identify option must be run. The identify option will read the image header which was entered during back up and will also display the size of the back up and the type of operating system it was generated on. The screen will display:

IMAGE ID   :
SIZE: :
GENERATED ON:
DATED   :
TIME   :

```
NAME        :
COMMENT     :
```

The restore option will copy the recorded back-up on the video tape to the drive. The type of restore options are similar to the Backup option: When the restore option is chosen, the screen will display:

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

Volume: Individual volumes can be Restored using this option.

Drive: Under Constellation I using the Apple II, a 20 MB drive was seen as two virtual drives. Selecting this option allow the restoring of either of the virtual drives by declaring the drive to be restored.

Physical: This option will restore the entire contents of a physical drive. It also allows the restoring of each of the drives in a daisy chained drive set-up.

Manual: Under the Manual option, a restore may be done block by block. The starting and ending address must be specified.

After selection of the type of restore to be performed, the screen will display:

```
POSITION RECORDER AND START PLAYBACK
PRESS <RETURN> WHEN READY
```

When <Return> is pressed the screen will display:

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

MIRROR SERVER

The Corvus OmniDrive has been designed with the Omninet Disk Server built into the processor PCB and the 34 pin connector to which the Mirror was connected has been eliminated. In order to provide back up capabilities to video tape for the Omnidrive, Corvus designed a Mirror with a disk server built in. This now makes the Mirror Server a network device capable of backing up all drives on an Omninet network.

Hardware Set-Up

The set-up of the Mirror Server onto the network is similar to adding other network devices to Omninet:
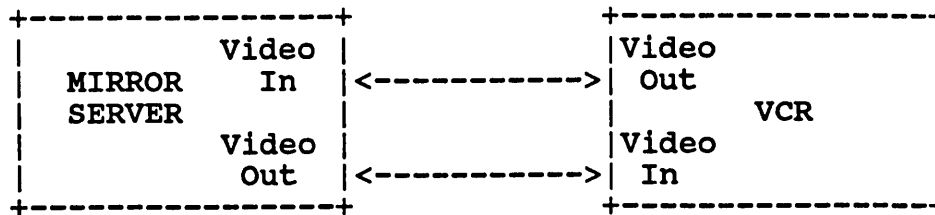
Install a Tap Box onto the network Trunk Cable.

Install a Tap Cable to the Tap Box and connect the other end to the Mirror Server.

Select a network address not being used by any other network device and set the Mirror Server Network Address switches to the selected address.

Install the power cable to the Mirror Server

To connect the Mirror Server to the VCR, connect the video cable provided as follows:

```
+----------------+              +----------------+
|         Video  |              |Video           |
|  MIRROR    In  |<------------>| Out            |
|  SERVER        |              |          VCR   |
|         Video  |              |Video           |
|          Out   |<------------>| In             |
+----------------+              +----------------+
```

               Mirror Server Video Cable Wiring Diagram

Software Installation

The Mirror Server utilities can be run from the Corvus drive or from the floppy drive

In order to install the Mirror Server Software onto the drive, The Constellation II Update utility is to be used.

Boot into the system and log on as the System Manager.

When the Constellation II options appear, select the Maintenance option.

When the Maintenance option appears, select the Update option.

The screen will prompt you to insert the floppy diskette into the floppy drive and press return. The contents of the Mirror Server utilities will now be copied to the Corvus Drive.

Operation

The operation of the Mirror Server parallels the standard Mirror Utilities with a few exceptions. The major differences are that a transfer table must be built and that a list of images on a single tape can be listed. The backup utility options available are:

o Backup to Tape
o Restore to drive
o Create the Transfer Table
o Verify backup
o List Tape Directory
o Identify Tape Image
o Help
o Exit

Each of these options will be discussed as an overview. Detailed instructions for Mirror Server Operation can be found in the Mirror Server Managers Guide (Part Number 7100-06601-01)

The utilities may be run from the volume containing the Mirror utilities or from the bootable Mirror Server diskette provided with the Mirror Server.

Transfer Table

A Transfer Table must be built in order to provide backup or restore pathnames. It provides the image name, the server name, drive name, volume address and length for the backup or restore operation. The Transfer Table also allows multiple entries which enables the System Manager to backup or restore several volumes or drives in one operation.

The create Transfer Table option allows you to:

o Add Drives to Table
o Add Volumes to Table
o Add Blocks to Table
o List Table
o Exit

Remember that the Transfer Table must always be saved in order for it to be run.

Backup

The Backup option will use the information entered into the Transfer table for backing up the intended information. The Transfer table will appear and if all is OK, the table may be accepted with a 'Y' for yes.

The screen will then ask if the tape will be used exclusively for an OmniDrive. This is an important step because while the Mirror Server can backup different models of Corvus drives, the OmniDrive backup cannot be restored onto other drive models and other drive model backups cannot be restored onto an OmniDrive. This is due to different transfer rates between the OmniDrive and other Corvus drive models.

The error results file can be spooled to a printer if the pipes area exists and printer service is installed.

Other information about the backup will also be requested:

o Tape Title
o Length of Tape
o Current Date
o Correct Time

This information is important because it will later be used to identify one backup from another.

The VCR must now be setup to backup and the backup begun. The directory will be written and at the conclusion of the backup, an error report will be generated on the screen.

Verify

The error report does not guarantee that the data was successfully stored. In order to

check the integrity of the stored data, a verify should be run. This option checks the data by testing the CRC byte that was added to the data during backup. A verify should alway be run after a backup to insure that the backup was successful.

Restore

The Restore option will copy the recorded back up on the video tape to the drive. The type of restore options are similar to the Backup option in that a transfer table must be created before a restore and the error results may be spooled to a printer.

THE BANK

The Bank is a random access backup device which is Omninet ready and uses an interchangable, continuous loop 1/2 inch tapes. Bank tapes are available in 100 MB and 200 Mb capacities and must be formatted with the use of the Bank Diagnostics prior to use.

The Bank Diagnostics diskette (BDIAG) is shipped with each Bank shipped and is supplied for the operating system requested.

The technical decription in this section is an overview. For a detailed description of the Bank Tape formatting procedure, refer to the Bank Guide (Part Number 7100-05671).

Hardware Installation

Installation procedures for the Bank can be found in the Bank Guide (Part Number 7100-05671). Typical hardware installation is accomplished by installing a Tap Box onto the network trunk and attaching the Bank to the network via a Tap Cable.

Generally, Bank installation consists of:

o Installing Tap Box
o Installing Tap Cable
o Installing Power Cable
o Setting Omninet Address Switches

Install the tap box, tap cable, power cable, and set the Omninet address switches as described in the Bank Users Guide.
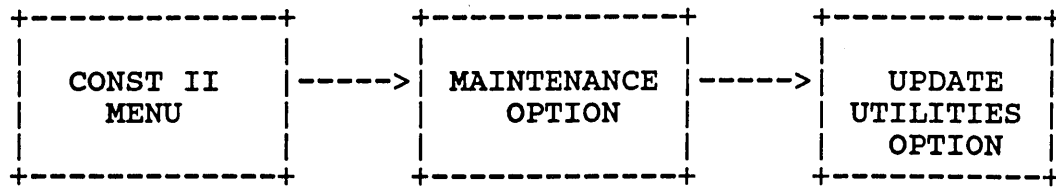
Hardware installation is now complete.

The Bank Omninet address switches must be set to a unique number not being used by any other network device.

Software Installation

The following description is an overview. For detailed information, refer to the Transfer Managers Guide (Part Number 7100-05671). Bank software installation requires the following items:

o Bank Utilities floppy

The Bank software update is performed using the update option in the maintenance section of the Constellation II utilities. The chart below depicts the option selection sequence:

```
+-------------+        +-------------+        +-----------+
|             |        |             |        |           |
|   CONST II  |----->  | MAINTENANCE |----->  |   UPDATE  |
|    MENU     |        |   OPTION    |        | UTILITIES |
|             |        |             |        |  OPTION   |
|             |        |             |        |           |
+-------------+        +-------------+        +-----------+
```

The contents of the Bank utilities diskette will be copied to and can now be run from the Omnidrive.

The bank Utilites may be run from the volume or from the floppy diskette containing them.

Operation

Prior to actual operation, a Bank tape must be formatted using the Bank Diagnostic utility. refer to the Bank Guide for procedures.

The Transfer Manager utility allows selection of operations that the Bank will perform. The selectable options are:

o Drive to Image
o Image to drive
o Remove an Image
o List Images
o Volume Copy
o Media Copy

DRIVE TO IMAGE COPY - The Transfer Manager allows the transfer of the entire contents of the selected drive to the Bank tape. The drive to image copy begins copying at block zero and copies only the used area of the drive. The copy will be listed on the tape as an 'image'. Individual volumes within the 'image' can also be listed.

IMAGE TO DRIVE COPY - The image to drive copy will copy a previously recorded drive image onto a drive.

REMOVE AN IMAGE - This option will remove a previously recorded image from the Bank tape.

LIST IMAGES - A complete list of images recorded on the Bank tape can be listed with this option. Note that recorded volumes can not be listed.

VOLUME COPY - With the volume copy option, a volume from within a drive can be copied to the Bank tape. A volume from within an image on the Bank tape may also be copied to a selected drive.

MEDIA COPY - The entire contents of a network mass storage device may be copied to a similar network device i.e. drive to drive, Bank to Bank. The receiving device must have the capacity to receive all data sent by the source device.

FLOPPY BACKUP

The Floppy Backup option allows you to backup a Corvus Drive to floppies. You must have enough formatted floppies on hand to hold all the information contained in the volume.

Operation

To enter the floppy backup utility logon as XXXBACKUP where XXX represents the type of computer you are using. You will next be asked for a your name and password. The options displayed will be:

o Backup Volume
o Restore a Volume
o Identify a Diskette
o List Volumes
o Set Options
o Exit

BACKUP VOLUME - Will backup a single volume to floppy.

RESTORE VOLLUME - Restore a single volume from floppy to the drive.

IDENTIFY A DISKETTE - Read the directory of the diskette to insure that the correct floppy is inserted during a restore operation.

LIST VOLUMES - List the names, unit numbers and length of the volumes on the Corvus Drive.

SET OPTIONS - Allows you to enable the Verification option and utilize Password Protection. The Verification option checks that it is correctly copying information from the Corvus volume to diskette during a backup to floppy operation. The Password Protection option allows only persons with the proper name and password to read or perform a restore from the backup diskettes.

The Network Station Users Guide details each of the options and its execution for each type of operating system that Corvus supports.

SOFTWARE OVERVIEW

The following section will briefly describe the following software:

o Mirror
o Archival Staorage
o Remote Backup
o Select Drive
o List Drive
o Exit

These option will appear when the Backup option is selected.

MIRROR - As described in the Mirror section, this option allows the storage and retrieval of data to and from a video tape cassette.

ARCHIVAL STORAGE - This option allowed the Archival Storage of data for Mirror systems which had the Remote Option capability. The Archive would consist of several backups on video tape which were recorded from multiple drives on the Omninet network.

REMOTE BACKUP - The Remote backup option is available for the Mirror and the Mirror Server. The Remote Option package includes:

o Remote Option Software
o Remote Option Cable

It allows the backup to be perfomed with a delay factor. Because the drive cannot be accessed when a backup is being performed, it could be delayed for a convenient amount time. The software controls the delay options and the VCR controls.

Because of the wide variety of VCRs available, this option is only available for use with a Panasonic NV8200 or AG6200.

SELECT DRIVE - The Select Drive option allows the selection of an individual drive for backup when drived are daisy chained together.

LIST DRIVES - The List Drives option displays all active Corvus drives on your system.

EXIT - This option exits you out of the current utility and returns you to the Constellation II main menu.

SECTION 4
MAINTENANCE UTILITIES

SYSTEM MANAGER RESPONSIBILITIES

The System Manager is responsible for the installation, configuration, and daily software maintenance of the Utility Server and its associated PIPES area. Each of these processes is covered in detail in this section.

PURPOSE

The Corvus Utility Server is a network device designed to support multiple printing devices on an Omninet network. These devices may in turn be accessed by any network user. A total of three printers can be attached to each Utility Server and any number of Utility Servers can be connected per network with the only limitation being the number of available network addresses.

DESCRIPTION

The Utility Server is packaged in a white plastic box containing a printed circuit assembly, a power supply, and connecting cabling. The printed circuit assembly contains a Z-80 microprocessor and 64K of memory, two RS-232 serial ports, a Centronics parallel port, and a clock/timer circuit.

INSTALLATION

The Server is manufactured in two configurations, 110/120 Volts and 220/240 Volts. A label on the bottom of the unit indicates the voltage rating. If the voltage rating does not match the local voltage, contact your Corvus dealer.

The Utility Server installation package contains:

>   Utility Server
>   Printer Service Software
>   Power Cord
>   Tap Box
>   Tap Cable

Hardware Installation

First, a tap box should be installed on the network at the desired location. All the rules of Omninet installation apply, so consult the Omninet Installation Guide (Corvus Part Number 7100-06942-01) for installation requirements.

Next, the network address switches of the Utility Server should be set to an unused network address. These switches are located inside the Utility Server box and are accessed by removing the plastic cover from the unit. After setting the network address re-install the cover.

The third step is to connect the Utility Server to the tap box installed previously with the supplied tap cable. Be sure the cable is fully seated into the tap box and the mating connector of the Utility Server.

Next, the printers to be used on the network should be connected to the connectors on the rear panel of the Utility Server. The connectors labeled SERIAL 1 and SERIAL 2 are RS-232C ports used for connecting to serial-type printers. To connect a device to one of these ports, you'll need a cable with a male DB-25 connector at the Utility Server end and a connector suitable for your printer at the other. Consult your printer manual

for the required connector.

The PARALLEL 1 port on the back of the Utility Server connects to a parallel printer
(the interface standard used for this connection is referred to as a "Centronics-type"
interface, any printer which adheres to this standard may be attached to this port). A
cable for this port must have a male DE-15 connector at the Utility Server end and a con-
nector suitable for your printer at the other. Consult your printer manual for the
required connector. A cable is available from Corvus Customer Server (Corvus Part Number
8005-10330-00) with a DE-15 connector at one end and a 36-pin "Centronics" connector at
the other, this cable should be appropriate for most printers.

Next, connect the AC power cord to the unit and into an AC wall outlet.

At this point, the hardware portion of the installation has been completed. We strongly
recommend that you review the installation prior to proceeding to the software installation.

Software Installation

Prior to using the Utility Server, Printer Service software must be loaded onto the network
and configured for use with the printers attached.

The first step is to logon the network as the System Manager and create two volumes.
This is accomplished by selecting the Drive Management option of Constellation II followed
by the Volume Manager. Select 'Add a volume' and you will be prompted to enter a name
for the volume, type "PSERVER". This volume will contain the Printer Service software
upon completion of the installation. The volume should have a length of at least 296
blocks and the starting block address must be a value divisible by 8. When prompted to
do so, select a volume type of 'UCSD'. Next, if a PIPES volume has not been created pre-
viously, it should be done so now. Note that the PIPES volume must be completely contained
prior to block 32767 and should also be of type UCSD. This completes the addition of
the required volumes.

Next, the PSERVER volume must be mounted to permit the copying of the Printer Service
software from floppy to the PSERVER volume. This is accomplished by using the Access
Manager option. When requested for the user name, type in the name of the system
manager for that computer type (e.g. IBMGR, A2MGR, etc.). Next select the option for
changing volume access and type PSERVER when prompted for the volume name. Now, when
asked for the mount status, type "M" to mount the volume; next you will be prompted for
a mount unit number, the number entered should be as follows:

Computer	Mount Unit
Apple II	11
IBM PC	10
Zenith Z100	10
TI Professional	10
DEC Rainbow	9

At this point, re-boot the computer to permit the copying of the Printer Service software
to the hard disk. Logon as the System Manager, and select the Maintenance Utilities option.
Remove the Constellation II System Managers diskette from floppy drive A or 1, and insert
the Printer Service software which is supplied with the Utility Server (Note that the
Printer Service software is computer dependent, e.g IBM Printer Service for IBM PC's and
compatibles, Apple II Printer Service for Apple II, etc.). Next, select the Update Util-
ities option. This step will copy the software from the distribution diskette to the
hard disk. When the software has successfully copied from the floppy to the hard disk,
the system will automatically load and run the Utility Server Manager. The next phase

is to configure the Utility Server for the printers being used.

The first step is to install the block address of the PSERVER volume into the Utility Server Boot file. This is accomplished by selecting the 'C' option of the Utility Server Manager. When asked if it is "OK to install boot volume address (Y/N)?" type "Y". Next, run the Boot Manager program to install the Utility Servers boot code into the Corvus volume. The name of the Utility Servers boot file should be entered when prompted. The volume the file is located in and the files name is 'PSERVER:BOOT.PRINTSRV'. The "Computer Type" should be entered as 'PRINTSRV'.

PRINTER SERVICE

Next, the three ports of the Utility Server need to be configured. This is performed through the Printer Service option of the Utility Server Manager. First, make sure the Utility Server is turned off. Again, re-boot the system, and logon as the System Manager. Select the Utility Server Manager of Constellation II, followed by Printer Service. If you are installing the first Utility Server on the network, press return when prompted for the configuration file name. If this is other than the first Utility Server on the network, type 'P.CONFG.' followed by the network address of the Utility Server. For example, if the address of the Utility Server is 12, type 'P.CONFG.12'. Since the configuration file does not yet exist, type 'Y' when asked whether or not to create the file.

You may now proceed to configure each of the ports of the Utility Server. Each port has its own choice in the menu. For SERIAL 1 select A, for SERIAL 2 select B, and for PARALLEL 1 select C.

For each of the serial ports, the following hardware set-up information is needed:

  Baud Rate - Rates from 300 to 9600

  Character Size - 7 or 8 bits

  Parity - Odd, Even or Disabled

  Handshake - Carrier Detect - Normal or Inverted
            Data Terminal Ready - Normal or Invere
            X/ON - X/OFF

Each of these should be set to the correct parameters for your particular printer.

The next group of options, called DESPOOL Parameters, is identical for both serial and parallel printers, and is therefore covered at the end of the section on parallel printers.

The paralled port, PARALLEL 1, has only two hardware options to be set.

  Character Size - 7 or 8 bits

  Parity - Odd, Even, Disabled

Returning to the DESPOOL Parameters, the options here are as follows:

Active - For each port which has a printer physically connected, set this to TRUE. This is a TRUE/FALSE option, therefore, simply type 'A' to toggle between true and false.

Name of Pipe - This is the name which is logically associated with the port being con-

figured. The name may be up to 8 characters in length and should be unique for each active port.

Device type - Presently unimplemented

LineFeed ON - If your printer does not automatically perform a line feed to advance the paper when a carriage return is received, set this to TRUE. Again, this is a TRUE/FALSE option.

Max Lines/Page - If the documents being spooled are primarily un-formatted text files (e.g. program source files) the number of lines printed per page should be set to create an 8 blank line gap between sheets of paper. Documents which embed control or escape sequences in them, should have this set to 0.

Tap Spacing - similar to Max Lines/Page, this option will escape control-I's to the number set here. Documents which embed control or escape sequences in them, should have this set to 255.

Next, save the configuration file so it may later being used by the Utility Server. When prompted, enter the Omninet network address of the Utility Server being configured.

TIME SERVICE

The Utility Server has a built-in Real-Time Clock circuit to permit the time and date stamping of documents printed. During installation of the Utility Server or after either a power failure for turning it Off/On, the time and date must be set using the Time Service option of the Utility Server Manager.

First, set switch 8 of the Utility Server network address switch to "OFF". This will force the Utility Server to load the time and date from the network instead of its internal clock/time circuit. Next, logon as the System Manager for your computer and select the Utility Server Manager followed by the Time Service option. When prompted type in the date, in the format "12-JUN-1985". Next, enter the time in 24-hour format. For example, 15:23:00 for 3:23 P.M. When asked if it is "OK to set time and date (Y/N)?" type "Y". Finally, set switch 8 of the Utility Server network address switch to "ON". This will enable the internal clock/time circuit and the Utility Server will automatically keep the correct time and date.

TROUBLESHOOTING

Difficulty may be experienced when either installing a new Utility Server or one which has been in use which is now malfunctioning in some manner. To aid the System Manager in determining the nature of the failure, a list of common symptoms, and their causes and corrections has been assembled.

SYMPTOM: When attempting to boot the Utility Server, the following self-test message is displayed:

```
RAM  OK
ROM  OK
NET  OK
BOOT  ???????????
```

CAUSE: One of the following is a possible cause for this symptom:

1. The server containing the Printer Service software is not at Omninet address 0.

2. During the process of installing the Printer Service software, the boot code (BOOT.PRINTSRV) was not installed within the Corvus volume.

3. For the first case, reset the Omninet address switches to address 0 on the Disk Server or OmniDrive containing the Printer Service software.

4. For the second case, check that the BOOT.PRINTSRV file is installed within the Corvus volume. This can be accomplished by using the Boot Manager under Constellation II's Drive Management utilities. If the file is missing, use the add option of the Boot Manager to install the boot code.

SYMPTOM: When attempting to boot the Utility Server, the following self-test message is displayed:

```
        RAM  OK
        ROM  OK
        NET  OK


        Invalid Boot Code
```

CAUSE:

FIX:

SYMPTOM: After completing the self-test and the boot process, the busy light rapidly flashes on and off.

CAUSE: This can be attributed to either the PIPES volume not being found or a network communication failure.

FIX: Check the following items:

1. The PIPES volume has been created and is on server 0.

2. The PIPES volume has been initialized.

3. Verify the network is in working order.

SYMPTOM: When attempting to install the Printer Service software, an I/O error #9 is displayed.

CAUSE: The Update utilities were not able to find either the PSERV diskette and/or the PSERVER volume.

FIX: Make sure the PSERV diskette for the appropriate computer is placed in floppy drive A. Also, check the PSERVER volume is mounted on the correct mount unit for the computer being used. Note that after changing the mount status to the correct mount unit for the system manager that the system must be re-booted to Constellation II to update the mount table.

SYMPTOM: During the Utility Server self-test, garbage is printed on the printers connected to the serial ports, but all spooled files look fine.

CAUSE: The self-test results are transmitted to the serial ports at 1200 baud, 7 data

bits, and no parity. If the printed connected to this port is configured differently from this, garbage will be displayed.

FIX: Re-configure the printer to 1200 baud, 7 data bits, and no parity.

SYMPTOM: The PIPES area is despooled, however, nothing is printed.

CAUSE: This can normally be attributed to either the wrong Utility Server port configuration or an incorrectly wired interface cable to the printer.

FIX: Verify both the Utility Server port configuration (Printer Service under the Utility Server Management option of Constellation II) and the wiring of the interface cable.

INSTALLATION TIPS

Below is a short list of items to be aware of during the installation of the Utility Server hardware and Printer Service software.

1. The two volumes, PSERVER and PIPES must reside on the server which is at Omninet address 0.

2. The PIPES volumes must be entirely contained before block address 32767.

3. The starting block address and size of the PSERVER volume must be divisible by 8 (eight).

4. PSERVER and PIPES must be of the volume type UCSD. This is independent of the computer and operating system being used.

5. Individual users on the network do not require access to either the PIPES or PSERVER volume.

6. Only one set of Printer Service software need be installed on multiple computer-type networks.

7. Prior to using the Update Utilities option to install the Printer Service software, the system manager must have the PSERVER volume mounted on a specific mount unit. This mount unit is different for the various computer types. Also, after setting the mount unit, the system should be re-booted to update the mount table. (Note the manual states a mount unit of 10, regardless of computer type.)

Computer	Mount Unit
Apple II	11
IBM PC	10
Zenith Z100	10
TI Professional	10
DEC Rainbow	9

SECTION 5
UTILITY SERVER MANAGER

SYSTEM MANAGER RESPONSIBILITIES

The System Manager is responsible for the installation, configuration, and daily software maintenance of the Utility Server and its associated PIPES area. Each of these processes is covered in detail in this section.

PURPOSE

The Corvus Utility Server is a network device designed to support multiple printing devices on an Omninet network. These devices may in turn be accessed by any network user. A total of three printers can be attached to each Utility Server and any number of Utility Servers can be connected per network with the only limitation being the number of available network addresses.

DESCRIPTION

The Utility Server is packaged in a white plastic box containing a printed circuit assembly, a power supply, and connecting cabling. The printed circuit assembly contains a Z-80 microprocessor and 64K of memory, two RS-232 serial ports, a Centronics parallel port, and a clock/timer circuit.

INSTALLATION

The Server is manufactured in two configurations, 110/120 Volts and 220/240 Volts. A label on the bottom of the unit indicates the voltage rating. If the voltage rating does not match the local voltage, contact your Corvus dealer.

The Utility Server installation package contains:

    Utility Server
    Printer Service Software
    Power Cord
    Tap Box
    Tap Cable

Hardware Installation

First, a tap box should be installed on the network at the desired location. All the rules of Omninet installation apply, so consult the Omninet Installation Guide (Corvus Part Number 7100-06942-01) for installation requirements.

Next, the network address switches of the Utility Server should be set to an unused network address. These switches are located inside the Utility Server box and are accessed by removing the plastic cover from the unit. After setting the network address re-install the cover.

The third step is to connect the Utility Server to the tap box installed previously with the supplied tap cable. Be sure the cable is fully seated into the tap box and the mating connector of the Utility Server.

Next, the printers to be used on the network should be connected to the connectors on the rear panel of the Utility Server. The connectors labeled SERIAL 1 and SERIAL 2 are RS-232C ports used for connecting to serial-type printers. To connect a device to one of these ports, you'll need a cable with a male DB-25 connector at the Utility Server end and a connector suitable for your printer at the other. Consult your printer manual for the required connector.

The PARALLEL 1 port on the back of the Utility Server connects to a parallel printer (the interface standard used for this connection is referred to as a "Centronics-type" interface, any printer which adheres to this standard may be attached to this port). A cable for this port must have a male DE-15 connector at the Utility Server end and a con-nector suitable for your printer at the other. Consult your printer manual for the required connector. A cable is available from Corvus Customer Server (Corvus Part Number 8005-10330-00) with a DE-15 connector at one end and a 36-pin "Centronics" connector at the other, this cable should be appropriate for most printers.

Next, connect the AC power cord to the unit and into an AC wall outlet.

At this point, the hardware portion of the installation has been completed. We strongly recommend that you review the installation prior to proceeding to the software installation.

Software Installation

Prior to using the Utility Server, Printer Service software must be loaded onto the network and configured for use with the printers attached.

The first step is to logon the network as the System Manager and create two volumes. This is accomplished by selecting the Drive Management option of Constellation II followed by the Volume Manager. Select 'Add a volume' and you will be prompted to enter a name for the volume, type "PSERVER". This volume will contain the Printer Service software upon completion of the installation. The volume should have a length of at least 296 blocks and the starting block address must be a value divisible by 8. When prompted to do so, select a volume type of 'UCSD'. Next, if a PIPES volume has not been created pre-viously, it should be done so now. Note that the PIPES volume must be completely contained prior to block 32767 and should also be of type UCSD. This completes the addition of the required volumes.

Next, the PSERVER volume must be mounted to permit the copying of the Printer Service software from floppy to the PSERVER volume. This is accomplished by using the Access Manager option. When requested for the user name, type in the name of the system manager for that computer type (e.g. IBMGR, A2MGR, etc.). Next select the option for changing volume access and type PSERVER when prompted for the volume name. Now, when asked for the mount status, type "M" to mount the volume; next you will be prompted for a mount unit number, the number entered should be as follows:

Computer	Mount Unit
Apple II	11
IBM PC	10
Zenith Z100	10
TI Professional	10
DEC Rainbow	9

At this point, re-boot the computer to permit the copying of the Printer Service software to the hard disk. Logon as the System Manager, and select the Maintenance Utilities option. Remove the Constellation II System Managers diskette from floppy drive A or 1, and insert the Printer Service software which is supplied with the Utility Server (Note that the Printer Service software is computer dependent, e.g IBM Printer Service for IBM PC's and compatibles, Apple II Printer Service for Apple II, etc.). Next, select the Update Utilities option. This step will copy the software from the distribution diskette to the hard disk. When the software has successfully copied from the floppy to the hard disk, the system will automatically load and run the Utility Server Manager. The next phase is to configure the Utility Server for the printers being used.

The first step is to install the block address of the PSERVER volume into the Utility Server Boot file. This is accomplished by selecting the 'C' option of the Utility Server Manager. When asked if it is "OK to install boot volume address (Y/N)?" type "Y". Next, run the Boot Manager program to install the Utility Servers boot code into the Corvus volume. The name of the Utility Servers boot file should be entered when prompted. The volume the file is located in and the files name is 'PSERVER:BOOT.PRINTSRV'. The "Computer Type" should be entered as 'PRINTSRV'.

PRINTER SERVICE

Next, the three ports of the Utility Server need to be configured. This is performed through the Printer Service option of the Utility Server Manager. First, make sure the Utility Server is turned off. Again, re-boot the system, and logon as the System Manager. Select the Utility Server Manager of Constellation II, followed by Printer Service. If you are installing the first Utility Server on the network, press return when prompted for the configuration file name. If this is other than the first Utility Server on the network, type 'P.CONFG.' followed by the network address of the Utility Server. For example, if the address of the Utility Server is 12, type 'P.CONFG.12'. Since the configuration file does not yet exist, type 'Y' when asked whether or not to create the file.

You may now proceed to configure each of the ports of the Utility Server. Each port has its own choice in the menu. For SERIAL 1 select A, for SERIAL 2 select B, and for PARALLEL 1 select C.

For each of the serial ports, the following hardware set-up information is needed:

  Baud Rate - Rates from 300 to 9600

  Character Size - 7 or 8 bits

  Parity - Odd, Even or Disabled

  Handshake - Carrier Detect - Normal or Inverted
          Data Terminal Ready - Normal or Invere
          X/ON - X/OFF

Each of these should be set to the correct parameters for your particular printer.

The next group of options, called DESPOOL Parameters, is identical for both serial and

parallel printers, and is therefore covered at the end of the section on parallel printers.

The paralled port, PARALLEL 1, has only two hardware options to be set.

  Character Size - 7 or 8 bits

  Parity - Odd, Even, Disabled

Returning to the DESPOOL Parameters, the options here are as follows:

Active - For each port which has a printer physically connected, set this to TRUE. This is a TRUE/FALSE option, therefore, simply type 'A' to toggle between true and false.

Name of Pipe - This is the name which is logically associated with the port being configured. The name may be up to 8 characters in length and should be unique for each active port.

Device type - Presently unimplemented

LineFeed ON - If your printer does not automatically perform a line feed to advance the paper when a carriage return is received, set this to TRUE. Again, this is a TRUE/FALSE option.

Max Lines/Page - If the documents being spooled are primarily un-formatted text files (e.g. program source files) the number of lines printed per page should be set to create an 8 blank line gap between sheets of paper. Documents which embed control or escape sequences in them, should have this set to 0.

Tap Spacing - similar to Max Lines/Page, this option will escape control-I's to the number set here. Documents which embed control or escape sequences in them, should have this set to 255.

Next, save the configuration file so it may later being used by the Utility Server. When prompted, enter the Omninet network address of the Utility Server being configured.

TIME SERVICE

The Utility Server has a built-in Real-Time Clock circuit to permit the time and date stamping of documents printed. During installation of the Utility Server or after either a power failure for turning it Off/On, the time and date must be set using the Time Service option of the Utility Server Manager.

First, set switch 8 of the Utility Server network address switch to "OFF". This will force the Utility Server to load the time and date from the network instead of its internal clock/time circuit. Next, logon as the System Manager for your computer and select the Utility Server Manager followed by the Time Service option. When prompted type in the date, in the format "12-JUN-1985". Next, enter the time in 24-hour format. For example, 15:23:00 for 3:23 P.M. When asked if it is "OK to set time and date (Y/N)?" type "Y". Finally, set switch 8 of the Utility Server network address switch to "ON". This will enable the internal clock/time circuit and the Utility Server will

automatically keep the correct time and date.

TROUBLESHOOTING

Difficulty may be experienced when either installing a new Utility Server or one which has been in use which is now malfunctioning in some manner. To aid the System Manager in determining the nature of the failure, a list of common symptoms, and their causes and corrections has been assembled.

SYMPTOM: When attempting to boot the Utility Server, the following self-test message is displayed:

```
RAM  OK
ROM  OK
NET  OK
BOOT ???????????
```

CAUSE: One of the following is a possible cause for this symptom:

1. The server containing the Printer Service software is not at Omninet address 0.

2. During the process of installing the Printer Service software, the boot code (BOOT.PRINTSRV) was not installed within the Corvus volume.

3. For the first case, reset the Omninet address switches to address 0 on the Disk Server or OmniDrive containing the Printer Service software.

4. For the second case, check that the BOOT.PRINTSRV file is installed within the Corvus volume. This can be accomplished by using the Boot Manager under Constellation II's Drive Management utilities. If the file is missing, use the add option of the Boot Manager to install the boot code.

SYMPTOM: When attempting to boot the Utility Server, the following self-test message is displayed:

```
RAM  OK
ROM  OK
NET  OK
```

```
Invalid Boot Code
```

CAUSE:

FIX:

SYMPTOM: After completing the self-test and the boot process, the busy light rapidly flashes on and off.

CAUSE: This can be attributed to either the PIPES volume not being found or a network communication failure.

FIX: Check the following items:

1. The PIPES volume has been created and is on server 0.

2. The PIPES volume has been initialized.

3. Verify the network is in working order.

SYMPTOM: When attempting to install the Printer Service software, an I/O error #9 is displayed.

CAUSE: The Update utilities were not able to find either the PSERV diskette and/or the PSERVER volume.

FIX: Make sure the PSERV diskette for the appropriate computer is placed in floppy drive A. Also, check the PSERVER volume is mounted on the correct mount unit for the computer being used. Note that after changing the mount status to the correct mount unit for the system manager that the system must be re-booted to Constellation II to update the mount table.

SYMPTOM: During the Utility Server self-test, garbage is printed on the printers connected to the serial ports, but all spooled files look fine.

CAUSE: The self-test results are transmitted to the serial ports at 1200 baud, 7 data bits, and no parity. If the printed connected to this port is configured differently from this, garbage will be displayed.

FIX: Re-configure the printer to 1200 baud, 7 data bits, and no parity.

SYMPTOM: The PIPES area is despooled, however, nothing is printed.

CAUSE: This can normally be attributed to either the wrong Utility Server port configuration or an incorrectly wired interface cable to the printer.

FIX: Verify both the Utility Server port configuration (Printer Service under the Utility Server Management option of Constellation II) and the wiring of the interface cable.

INSTALLATION TIPS

Below is a short list of items to be aware of during the installation of the Utility Server hardware and Printer Service software.

1. The two volumes, PSERVER and PIPES must reside on the server which is at Omninet address 0.

2. The PIPES volumes must be entirely contained before block address 32767.

3. The starting block address and size of the PSERVER volume must be divisible by 8 (eight).

4. PSERVER and PIPES must be of the volume type UCSD. This is independent of the computer and operating system being used.

5. Individual users on the network do not require access to either the PIPES or PSERVER volume.

6. Only one set of Printer Service software need be installed on multiple computer-type networks.

7. Prior to using the Update Utilities option to install the Printer Service software, the system manager must have the PSERVER volume mounted on a specific mount unit. This mount unit is different for the various computer types. Also, after setting the mount unit, the system should be re-booted to update the mount table. (Note the manual states a mount unit of 10, regardless of computer type.)

Computer	Mount Unit
Apple II	11
IBM PC	10
Zenith Z100	10
TI Professional	10
DEC Rainbow	9

SECTION 6
TRANSFER UTILITIES

SYSTEM MANAGER RESPONSIBILITIES

The System Manager is responsible for keeping an accurate and current copy of all data stored on the Omninet local area network. One of the methods to accomplish this is by using the transfer utilities.

SOFTWARE INSTALLATION

The transfer utilities are included with The Bank diagnostics when a Bank is normally purchased. The Transfer utilities are also included in all of the latest Constellation II software utilities. The transfer utilities can be run from floppy diskette or can be copied to a Corvus mass storage device by updating the Constellation II utilities.

The following steps outline how to update the Constellation II utilities to include the Transfer utilities.

1. Boot to the System Manager's Constellation II log-on message.

2. Enter the System Manager's name and password. The Corvus management utility main menu will appear as shown below:

```
CORVUS MANAGEMENT UTILITY DS
Verson [x.xx]                               Drive
[c] Copyright 1982, 1983 Corvus Systms Inc.
    ------------------------------------------------

D - Drive Management
B - Backup Utilities
M - Maintenance Utilities
I - Initialize Drive
C - Configure System

L - List Drives
H - Help
    ------------------------------------------------

Please select an option:__
```

Management Main Menu without Transfer Manager

3. Select the maintenance option. The screen will display:

```
  CORVUS UTILITY [x.xx]                        DS
  Drive Management                             Drive
  [c] Copyright 1982, 1983 Corvus Systms Inc.
  ------------------------------------------------------

  U - User/Device Manager
  V - Volume Manager
  A - Access Manager

  B - Boot Manager

  S - Select Drive
  L - List Drives
  E - Exit
  ------------------------------------------------------

  Please select an option:__
```

Drive Management Main Menu

4. Select the update utilities option. The screen will display:

> **Please insert the update diskette in drive A.**
> **Press <space> after inserting the diskette.**

5. Put the transfer utilities diskette in the floppy drive and press the space bar. The screen will display:

> **Copying contents of floppy ....**

When the update has ended, the screen will display:

> **Update complete.**
> **Please reboot.**

6. Remove the transfer utilites diskette.

7. Boot to the System Manager's Constellation II log-on message.

8. Enter the System Manager's name and password. The screen will display the Management Menu shown above.

9. The transfer utilities can now be run from the mass storage device by selecting the Transfer Manager option.

CAPABILITIES

The transfer utilities can transfer all the data or specific volumes from one Corvus mass

storage device to another. To accomplish this there are three options available from the transfer manager menu. They are Image Copy, Volume Copy, and Media Copy.

Image Copy

Some Corvus mass storage systems, such as The Bank and the 126-MB OmniDrive, are capable of holding the contents of smaller mass storage systems. When a large storage system contains copies of smaller systems, each copy is considered an image.

Each Corvus mass storage system has its own CORVUS volume that is a master directory of all volumes and images contained on the system. When an image copy is made, the destination device keeps its own CORVUS volume. Once the image copy has been made to the destination device its CORVUS volume is updated to include in its directory the name of the image just made.

All contents of the source, including its CORVUS volume, are copied to the the destination device. The image then contains a CORVUS volume that can be considered a subdirectory of volumes contained on that image.

The transfer program provides two options for image copy. They are drive to image and image to drive.

Drive To Image Copy

The drive to image copies an image from a smaller storage system onto a larger system. It copies only the allocated space on the storage system. It does not copy unused space.

The contents of a smaller system, such as a 6-MB drive, can be copied to The Bank or larger drive. Once all the information from the source device has been copied to the destination device it is considered an image on the destination device.

Image to Drive Copy

The image to drive option copies a selected image from a larger system onto a smaller system. The destination device must be the same size or larger than the image being transfered to it.

The image to drive option differs from the drive to image option only slightly. If the destination device is new or its data cannot be accessed, it has no server and drive names or passwords. If this is the case, the copy procedure changes slightly: when the transfer program requests server and drive names, the server station address and drive number are entered.

Volume Copy

The volume copy option allows for a single volume or multiple volumes to be copied from one mass storage device to another. Any volume can be copied, including volumes from within an image. A volume is not considered an image.

Media Copy

The media copy option is designed to transfer all the data from one device to another device. The destination device must be he same size or larger. Media copy works similarly to image copy but differs in one major way: during media copy, the CORVUS volume on the source device replaces the CORVUS volume on the destination device; during image copy, the transfer program only updates the CORVUS volume of the destination device to include the name of the device image.

SOFTWARE OVERVIEW

The Transfer utilities can be run from floppy diskette or run from the Corvus management main menu by selecting the transfer manager option. If run from floppy the write protect tab must be removed so a result file can be written to the diskette during the transfer.

The Transfer Manager main menu has a number of options that are available. They will be briefly described below.

```
Transfer Manager[x.xx]
[c] Copyright 1983 Corvus Systms Inc.
Main Menu
    ---------------------------------------------------

D - Drive to Image Copy
I - Image to Drive Copy

R - Remove an Image
L - List Images

V - Volume Copy
M - Media Copy
S - Show Results
H - Help
E - Exit
    ---------------------------------------------------

    Please select an option:__
```

Transfer Manager Menu

Drive to Image Copy - Copies a device as an image onto a larger device. It copies only the allocated space.

Image to Drive Copy - Copies a selected image from a larger device onto a smaller device. The destination device must be the same size or larger than the image that is to be transfered to it.

Remove an Image - Removes an image from a device. This utility will not remove volumes.

Removing a volume must be done from the volume management utilities.

List Images - Lists the images on a particular device. It can also list the volumes within a particular image.

Volume Copy - Copies a volume or volumes from one device to another. Volumes from within an image can also be copied.

Media Copy - Copies data from one device to another device of the same size or larger. The CORVUS volume on the source device replaces the Corvus volume on the destination device.

Show Results - Displays the results file created during transfers. This file indicates if a transfer has been successful or not.

Help - Briefly explains the transfer program options.

Exit - Exits the transfer program and returns to the Corvus management main menu.

SECTION 7
INITIALIZE DRIVE

SYSTEM MANAGERS RESPONSIBILITIES

Under the Initialize Drive menu selection the System Managers responsibility is to load
the Constellation II software to the Corvus hard disk drive. This would need to be done
in the following circumstances:

1. Setting up the hard disk drive for the first time, requiring a drive initialization.

2. A hard disk drive problem in which the information is damaged or cannot be accessed
   requiring a drive initialization.

3. Mixing other computer types on the same network. This would require you to modify
   an existing drive by copying the specific computers system volumes to a seperate area
   of the hard disk drive.

The Constellation II Software allows you to perform all of these tasks with relative ease.
It is important to note that when initializing or modifying a drive the communication
link between your computer and the hard disk drive must be operational. This chapter
will cover hardware setup, software installation of system volumes, and a software over-
view of menu selections from the Constellation II software.

SOFTWARE INSTALLATION

The Initialize Drive main menu option allows the System Manager to set up the drive with
the necessary system volumes. The procedure that follows will set up a hard disk drive
using the standard configuration.

Boot the CORMS21 diskette from drive A, when prompted for the Sysgen password enter HAI,
this loads the System Generation main menu. From the main menu, select "I" to initialize
a new drive. You will then be prompted to enter the Server Number, and the drive number
to initialize. Enter 0 for server number and 1 for the drive number. (The server number
refers to the address setting of the drive and the drive number refers to the number of
drives at the server address that is input). The screen will display the selected drive
is server 0, drive 1 and will prompt you to enter the disk server name. Usually the
default is accepted and in this case you would accept SERVER0. You then will be asked
to enter the disk server password, and the default in our example is SERVER0. Next you
will be prompted to enter the drive name, accepting the default inputs DRIVE1, and then
asks you for your drive password. (When entered you will always be asked to give the
drive password to make changes through the System Manager program. Remember your Pass-
words!.) The prompt "Do you want to use the standard configuation" appears choosing yes
the screen displays "Blocks 9 through 2546 will be overwritten". Ok to initialize the
new drive (y/n). Choosing yes continues the program that will copy your System Volumes
to the Hard disk drive Prompting you for the correct diskettes.

Items of interest that are valuable to know during initialization are:

Under MS-DOS 3.0 on the IBM PC the software allows you to copy just the Corvus Volume to
the Hard disk drive. This could be used in a multiple drive situation where disk space
is at a premium. The additional drives would only require the Corvus Volume be copied
to the selected drive on the network provided that the a minimum of one hard disk drive

on the network contains the balance of the system volumes. This is possible because the software mounts volumes across servers. The disadvantage of setting up your network in this manner is that when the drive with your system volumes is not operational, all of your other drives would not have access to the needed system volumes. If this was the case you could not access any information on your network.

When prompted "Do you want to use the standard configuration (Y/N)?" you would want to select no in the following circumstances:

1. If you are setting up a multiple drive network.

2. If you are planning to expand your system. (Adding more drives, or peripheral devices such as the Bank and Mirror server)

3. If you will be adding different computer makes such as IBM, Apple, TI etc. on the same network.

The configuration sets the size and attributes of the CORVUS Volume. Accepting the standard configuration in any of the situations given would fill the Corvus volume and would not allow you to update your utilities when adding another device to the network.

SOFTWARE OVERVIEW

The System Generation program is used to create the Corvus volume, and to prepare the hard disk drive for Corvus software installation.

You can get to the Initialize Drive option by signing on as the SMGR for your appropriate computer type and selecting the Initialize Drive option. The Screen will look like this:

```
CORVUS MANAGEMENT UTILITY DS
Verson [x.xx]                            Drive
[c] Copyright 1982, 1983 Corvus Systms Inc.
    ------------------------------------------------

D - Drive Management
B - Backup Utilitie
M - Maintenance Utilities
I - Initialize Drive
C - Configure System

L - List Drives
H - Help
    ------------------------------------------------

Please select an option:__
```

Constellation II Main Menu

INITIALIZE A NEW DRIVE - Prompt for location and length of Corvus volume and after input creates the system volume, several system users and the necessary boot files for system communication.

After selecting the initialize a new drive option, the following will occur:

Decides on sizes for SYSTEM.BOOT, NETWORK.USER, DRIVE.USER, DRIVE.VOLUME, AND DRIVE.ACCESS tables, based on length of Corvus volume. Build DRIVE.INFO block and write it. Copy the boot code to the proper location in the Corvus volume. Build a directory for the Corvus Volume and write it. Write the value 0FFH to all table entries (initial value). Create NETWORK.USER entries for all default users. Create DRIVE.USER entries for all users. Create a DRIVE.VOLUME entry for Corvus volume, and any operating sytem volumes. Create a DRIVE.ACCESS entry for each default user-volume access.

MODIFY AN EXISTING DRIVE - Is used primarily to copy system volumes to the hard disk drive but differs from initializaion. Modifying a drive will allow you to copy system volumes to a designated location. Using this operation correctly will not affect existing system volumes on the hard disk drive. You would use this option to convert Constellation I to Constellation II, mix other computer types using Constellation II and if you are using Apple IIs, adding different operating systems. The menu you see here will be different depending on the computer system you are using. The descriptions however will correspond to your options.

Mix - You would use this option to add different computer types to the network using Constellation II. After selecting the "mix" option, the following would occur:

    Finds the Corvus Volume
    Adds entries for new users, volumes and accesses
    Adds new boot code.

Add - This option is different for the different computer types. The options on the menu will appear different depending on the computer type and what is to be added. For example here is a screen menu for IBM and one for Apple. After selecting the "add" option, the following would occur:

    Finds an unused area of the drive
    Proceeds same as the "initialize drive" option.

DISPLAY DRIVES ON LINE - Will list Mass storage devices on the network.

EXIT - Choosing "Exit" will clear the screen of the current menu and bring you to the next layer of software. Exit is choson to terminate the program. On some computer keyboards the "escape Key" will perform the same function.

APPENDIX A
GLOSSARY

Acknowledgement - A message sent to a transmitting host by the receiving host to indicate that the data was received correctly.

Active Junction Box - A signal amplifier used every 1000 feet (330 meters) of network trunk to extend the maximum trunk length to 4000 feet (1200 meters). Also used to support "branches" or "T"'s from the main trunk line.

Address Mark Detector - Checks the incoming data stream for missing clock. Patterns used in indentifying the start of ID and data fields.

ADLC - Advance Data Link Controller, used in OMNINET circuitry to convert transmitted data from parallel to serial and received data from serial to parallel. Also performs idle line and CRC checking

Bank - A Corvus product which backs up network storage devices onto either 100 MB or 200 MB cartridge tape.

Bit - Single binary digit. Smallest representative unit of data, several of which make up characters (A-Z, 0-9, etc.). Bits may be either a one or a zero, on or off, set or reset. This may be shown by either a signal being present or not, or by a signal changing states or being constant.

Block - A unit of storage space on a Corvus mass storage system equal to 512 bytes or 4K bits. Two thousand and forty-eight blocks equal one megabyte.

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

Brake or Solenoid Brake - Immediately after power-down, this mechanism engages, so as to minimize contact time between heads and disk surface, and brings the platters to a stop.

Buffer - Temporary storage used to compensate for a difference in the rate of data flow or time in the occurrence of an event.

Byte - 8 bits of data.

Cartridge Holder - Component of the Bank's tape transport mechanism which holds the tape cartridge and places it in position for reading and writing.

Command Vector - Also called a Control Block, this is the set of instructions in host memory which contain the information necessary for execution of a particular command a an Omninet Transporter.

Constellation - The original name of the Corvus Multiplexer.

Constellation II - Also written as Constellation or Const II, network software managing a number of users and computers and their access to one or more Corvus mass storage systems.

Corcom - The rear bezel unit which accepts the power cord, and contains the line filter, line voltage PCA, and fuse.

CPU - Central Processing Unit. In a microcomputer, an integrated circuit which performs the arithmetic, logical, and control functions necessary to execute the individual instructions of a program.

CRC - Cyclic Redundancy Check. An error detection method in serial data handling systems.

CSMA - Carrier Sense Multiple Access. A collision avoidance method which senses for network activity prior to data transmission.

Cylinger - Vertically aligned tracks on all platter surfaces.

Default - A value the computer automatically assumes if no other value is specified.

Despool - Method of transferring a file from the PIPES volume to a user's console, a file of his own or a printer.

DIP Switches - Dual Inline Package switches. These two-position switches are used to set operational parameters such as the network address of a device or the drive size.

Directory - A list of files on a specific volumes.

Direct Memory Access (DMA) - The ability to read or write data to a disk without involving the Central Processing Unit (CPU). In a network environment, the Transporter circuitry takes temporary control of the host bus and directly reads or writes to a location in host memory without host processor intervention.

Disk Mechanism or Sealed Mechanism - The hard disk drive assembly consisting of platters, drive motor, head assembly, and stepper motor mechanism, all in a sealed cast aluminum body. To these components are added externally a Read/Write and Motor Control PCA to form the entire Hard Disk Assembly (HDA).

Disk Server - Device which interfaces Winchester disk to and from the Omninet network.

Down-Load - The transfer of code from a host system to a target system. In an OmniDrive system, code is down-loaded from the host computer to the drive Controller RAM to be executed by the Controller processor.

DVM - Digital Voltage Meter. A meter used for measuring voltages, which shows by means of a display consisting of changing digits, proportional to the voltage measured.

File - A collection of data.

Firmware - Programs stored in read-only memory devices. Corvus Controller Firmware resides on the first four tracks of Omnidrives.

Flowchart - Algorithmic chart depicting logical sequences used in this manual for troubleshooting procedures.

Front Bezel - The front panel of the cabinet, containing the Paddleboard PCA and logo plate.

Gain - The factor by which an amplifier increases an electronic signal.

Ground Strap - Located at the lower end of the drive sealed mechanism spindle, the ground strap consists of a copper metal strip terminating with a carbon "button" which rides on the spindle end. This device discharges any static charge which may build up on the platters or spindle.

H-Series - A line of Corvus drives using 5 1/4" Winchester disk technology with 6-MB, 12-MB and 18-MB capacities.

Head - In the Winchester drive, a low-mass aerodynamically-shaped component containing a wire winding, and usually made from glass-ferrite. When current passes through the winding, an electromagnetic flux is induced into the platter surface representing a bit. There is one head for each data surface and floats 18 microinches above the platters on a cushion of air.

Head (Tape Segment)'- Denotes a physical section of a Bank tape. Each head contains 256 sectors. There are 4 heads on a 100-MB tape and 8 heads on a 200-MB tape.

Header - A field which preceeds the data being sent. The header contains information about the packet to be transmitted.

Headstack - Casting to which all heads are attached. Located in the top of the headstack is the microchip responsible for head selection and signal buffering.

HDA - Hard Disk Assembly or sealed Winchester drive mechanism.

Host - A computer or intelligent peripheral device attached to the network via an Omninet Transporter.

IC - Integrated Circuit. A hybrid, densely populated wafer of silicon containing many resistors and transistors.

Index - A starting point indicated by the position of a device which, when sensed electronically, establishes the beginning of a sector or track.

Index Detector - A sensor which monitors the the index tab of the spindle motor to determine the RPM of a drive.

Interleaving Specification - Dictates the number of sectors which will be skipped between reads and writes on a disk platter.

K - Short for kilo or 1000. In terms of computer storage, 1024.

Leaf Switch - An electrical switch consisting of two pieces of metal which, when actuated, by pressure, forces one half to be moved away from the other, breaking electrical contact. The leaf then springs back to its original position when pressure is removed.

LED - Light Emitting Diode. Used to indicate the condition or status of electronic circuitry.

Line Conditioner - Device positioned on incoming AC line to filter high and low voltage spikes to provide noise-free power.

LSI - Large Scale Integration. An IC manufacturing technology which allows thousands of gates to be contained on a single silicon wafer.

Mass Storage - Refers to a magnetic disk or tape device used to store large amounts of computer information permanently.

Magnitude Comparator - Comparator internal to the Western Digital Winchester controller (WD 1010) which calculates drive step, direction, present and target track position.

Master Electronics PCA - Printed circuit board used within a Rodime Winchester disk drive to control reading/writing, head selection, fault detection, and stepper motor control.

MB - Short for megabyte, one million bytes.

MFM (Modified Frequency Modulation) - Analog representation of data used by storage devices.

Mirror - Corvus device which changes data to a video format for the purpose of backing up data to a video cartridge.

Mirror Server - A Corvus product which backs up network storage devices onto video cassettes.

Molex Connector - The connector used to connect the tap cable to the an Omninet device or Transporter.

Monochip - An integrated circuit designed by Corvus to synchronize and monitor timing operations to and from the Omninet network.

MOS - Metal Oxide Semiconductor.

Motor Control PCA - Printed circuit board responsible for monitoring the spindle motor speed and adjusting this as necessary.

Multiplexer - Corvus' original networking system. Also referred to as Constellation.

Negative Acknowledgement - A message sent to a transmitting host by a receiving host to indicate the data sent was incorrectly received.

Networking - The ability to connect multiple microcomputers to each other or to one or more mass storage devices and allowing the sharing of peripheral devices.

Node - The combination of a host device and Transporter.

NRZ (Non-Return to Zero) - Digital representation of information used by microprocessors.

Omninet - Corvus' present local area network system.

Packet - A unit of information passed from one Transporter to another Transporter.

Paddleboard - The small PCA located on the front bezel, which contains the three LED's and four function switches.

Printed Circuit Assembly (PCA) - A Printed Circuit Board completely assembled with components.

Pipe - A volume on a disk primarily used as a FIFO (First In First Out) buffer for Spooling and Despooling within a network.

PLA - Programmable Logic Array within the WD1010 Winchester Controller IC which controls the flow of data, recognizes and processes commands from the 6801-1 controller.

Platter - Circular disks coated with a magnetic oxide that will retain a magnetic flux induced byb the Read/Write heads. Both surfaces of each platter contain data.

PROM - Programmable Read Only Memory. A device which has read only functions and usually contains boot codes and parameters used in start up processes. This device can be re-programmed by first erasing it using either ultraviolet light or an electrical pulse.

Protocol - Software and hardware communication specifications.

RAM - Read Write Memory. A memory device used to store and retrieve data.

Read/Write PCA - The printed circuit board assembly responsible for changing the data received from the heads in MFM format and amplifying and shaping the data signal before passing it on to the Controller circuitry for manipulation.

Rear Bezel - The rear panel area of the cabinet.

Result Code - Also called a Status Byte, the first byte of the result record. It indicates command execution status.

Result Record - The location in host memory where user control and other command status information is stored.

ROM - Read Only Memory. A device which has read only functions and usually contains boot code and parameters used in start up processes. This device may only be programmed once.

Sector - Each track is divided radially into segments. Each of these segments is a sector and contains one block of data.

Semaphores - Flags or signals generally used to prevent two or more users from changing data at the same time.

Server - A network device linking the network and other devices, such as printers, which perform specific tasks.

Solenoid - An electro-mechanical device which, when energized by an electric current, actuates a mechanical arm or lever.

Spare Tracks - Good tracks which replace defective ones.   Also used as a verb, to skip over defective tracks.

Spared Tracks - Tracks no longer used because defects were found on them.

Spooling - A method of sharing information among users by temporarily sending a file to a storage area. Corvus software lets network stations spool files to a PIPES volume. A user may then retrieve the information by despooling.

Stepper Motor - Four phase motor which is controlled by the WD 1010 Winchester Controller and positions the read and write heads to appropriate tracks.

Sysgen - Short for system generation, a process which must be performed prior to using the system. This process structures the system to accept volumes according to the requirements of a particular operating system.

Tap Box - Device used for connecting Omninet network devices to the network trunk cable.

Tap Cable - Cable used to connect a device to the Omninet trunk cable.

Task File - Registers within the WD1010 Winchester Controller which specify which track, sector is read from or written to. They can be directly accessed by the 6801 microprocessor.

Terminating Resistor - Resistor placed at the end of each network segment to provide network termination.

Tracks - Concentric circles on a disk platter within which data can be magnetically written to or read from by the read/write heads.

Transporter - Hardware interface to and from the Omninet Local Area Network.

Trunk Cable - Cable which is used as the common bus for connecting Omninet network devices.

Utility Server - A Corvus device which permits sharing printers on an Omninet network.

VCO - Voltage Controller Oscillator circuit in the OmniDrive Controller PCA which is an analog circuit which synchronizes the read/write clock with the incoming data stream.

Version - A number used to identify the individual releases of equipment and software. Version numbers may vary, though the function of each product remains basically the same.

Volume - An area of the Corvus system formatted for a particular operating system.

WD1010 - Western Digital IC designed for controlling Winchester disk drive mechanisms.

APPENDIX B
ERROR MESSAGES

Mirror Errors

FormattedFirst	= 200	Tape must be formatted first
NoRoomOnTape	= 201	No room on tape
DuplicateImageName	= 202	Image name already exists in directory
ImageNotFound	= 203	Image name not found in directory
SizeMismatch	= 204	Specified sizes do not match
NoVolTable	= 205	No volume table on specified drive
NoDirectory	= 206	No directory on tape
TapeisEmpty	= 207	No image on tape

Bad Inputs from User

Badstationaddr	= -100	Network station address range is 0 to 63.
Drivenotfound	= -101	Drive not found.
Badusercount	= -102	Number of users cannot exceed ,Maxusers:4
BadName	= -103	Invalid name.
BadInput	= -104	Invalid input parameter option.
BadPsw	= -105	Invalid password.
unused	= -106	
CVInuse	= -107	Corvus utility already in use on selected drive.
Drive1only	= -108	Option is valid only on drive 1.
BadOSType	= -109	Invalid operating system type.
BadHTType	= -110	Invalid server type.
BadDIType	= -111	Invalid directory type.
BadBTType	= -112	Invalid computer type.

Volume Errors

VolNotFound	= -120	Volume not found.
Volexist	= -121	Volume already exists.
VolNotMounted	= -122	Volume is not mounted.
BadVolType	= -123	Illegal volume type.
BadVolSize	= -124	Invalid volume size.
BadVolAddr	= -125	Illegal volume starting address.
NoVolSpace	= -126	No space on drive for volume.
BadVolSpec	= -127	Invalid volume specification.
ImgNotFound	= -128	Image not found.
ImgExist	= -129	Image already exists.
NoImgSpace	= -130	No space on drive for image.
ImgTooBig	= -131	Source image is larger than destination.

Boot File Errors

NoBootFile	= -160	Boot File not found.
NotABootFile	= -161	File specified is not a Corvus boot file.
BootErr	= -162	Error reading/writing boot file.
NoCorDrvr	= -163	Corvus Driver not installed.
NotConstII	= -164	System must boot from Constellation II environment.
DupTransporter	= -165	Has duplicate transporter address on the Network.
FailCopy	= -166	Failed to copy system files from floppy.

Problems with Corvus Volume

BadDirBlkNo	= -140	Invalid Corvus volume directory block.
CVTnotfound	= -141	Corvus Volume table not found.
ToManyCVFiles	= -142	Volume directory full.
NoCVFileSpace	= -143	Volume full.
VolNeedsKrunch	= -144	File/Volume space exhausted - Krunch volume.
TblFull	= -145	Table full.
SearchFail	= -146	Search fail.
DelFail	= -147	Delete fail.
Ovfl	= -148	Exceed ability to maintain table information.
EntryExist	= -149	Entry already exists.
ListFail	= -150	List fail.
EndOfTable	= -151	End of Table marker.
ReplaceFail	= -152	Failed to replace an entry.
DrvIOerror	= -153	Drive I/O error.
SlotIOerror	= -153	substitute DrvIOerror
BlkRdError	= -154	Error in BLOCKREAD
BlkWrError	= -155	Error in BLOCKWRITE
ProgNotFound	= -156	Unable to execute program

User Manager Errors

UserNotFound	= -180	User not found.
NoAccPrivilege	= -181	User has no access to volume.
DuplVolAccess	= -182	User already has access to volume.
BadAccess	= -183	Invalid access specifier.
InvVolUnit	= -185	Invalid unit specifier.
UnmntSysVol	= -186	Attempt to unmount system volume.
NoWriteAccess	= -187	Unable to grant READ/WRITE access to volume.
UserExist	= -188	User already exists.

Spool Errors

IncludeError	= -200	WARNING : Include file not found.
DevOffLine	= -201	Spooling device not available.
LineTooLong	= -202	WARNING : Line too long at line :
PnameTooLong	= -203	Pipe name too long. (8 characters max)
NoPipesArea	= -204	No PIPES volume found on drive 1.

Pipe Errors

PipEmpty	= -8	tried to read an empty pipe
PipNotOpen	= -9	pipe was not open for read or write
PipFull	= -10	tried to write to a full pipe
PipOpErr	= -11	tried to open (for reading an open pipe)
PipNotThere	= -12	pipe does not exist
PipNoRoom	= -13	the pipe data structures are full
PipBadCmd	= -14	illegal pipe command
PipNotInitted	= -15	pipes area not initialized
PipDskErr	= -255	error on disk access

Semaphore Errors

SmFull	= -253	semaphore table is full
SmDskErr	= -255	disk error during write through