

Symbolics VAX/VMS Chaosnet Software Installation Guide (for VAX/VMS V4.x)

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This document corresponds to VAX/VMS Chaosnet Release 6.0 and later releases.

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1. Introduction

This software installation guide accompanies VAX/VMS Chaosnet Release 6.0.

This document sets forth the procedures for installing Symbolics Chaosnet software on VAX/VMS, for restarting the Chaosnet, and for relinking and recompiling the Chaosnet software. The last chapter presents an overview of how the VAX/VMS Chaosnet software works.

To install the VAX/VMS Chaosnet Release 6.0, you must be running VAX/VMS Version 4.0. This Chaosnet software cannot be run on earlier versions of VAX/VMS, such as Version 3.5. You should also be running Symbolics Release 6.0 or any of the Release 6.x maintenance releases. In addition, any Digital Equipment Corporation DEUNA interfaces that are to be used by the Chaosnet software must already be installed and verified, by you or by Digital.

For more information about the namespace database and the associated editor, which are used in the installation procedure, see the document *Networks*.

2. Procedures for Installing the Symbolics VAX/VMS Chaosnet Software

This chapter describes the steps used to install Symbolics VAX/VMS Chaosnet software. Follow all of these steps in the order shown:

1. Mount and load the installation tape.
2. Use CHNAMES.COM to define logical names to be used during the installation.
3. Test the hardware.
4. Build the network host table.
5. Create and install the Chaosnet startup command procedure.
6. Start up the network control software and verify that the higher level services work correctly.
7. Edit SYSTARTUP.COM.

The following paragraphs describe each of these steps in detail.

1. Mount and load the installation tape.

The first step in installing this software is to mount and load the installation tape using the VAX/VMS BACKUP utility. The tape was written at 1600 BPI using VAX/VMS version 4.0 with the following command:

```
$ BACKUP CHAOS$DISK:[CHAOS...] MT:CHAOS60.BCK/DENSITY=1600
```

If you already have a Chaosnet kit, and this installation tape is an update for you, you should use the VAX/VMS command RENAME to rename all of your [CHAOS...] directories to [OLDCHAOS...]. You must be sure to rename all the [CHAOS...] directories on any of your disks. Once the new kit has been installed and has run without problems for a period of several days, back up the [OLDCHAOS] directories to tape and delete them from the disks.

Do not proceed with this installation if you still have any [CHAOS...] directory trees.

To load the installation tape, decide on which disk you wish to place the new [CHAOS] directory and type the following commands. This example uses the disk DISK: and the tape drive MTA2.

```
$ MOUNT/FOREIGN MTA2
$ BACKUP MT:CHAOS60.BCK DISK:[*...]*.*.*
```

This requires about 7500 blocks of disk space.

2. Define logical names to be used during the installation.

The command procedure CHNAMES.COM defines the logical names for the VAX/VMS Chaosnet system. If all the Chaosnet software is on SYSSYSDEVICE, you need only to type the following command to define the logical names:

```
$ @[CHAOS]CHNAMES SUPERVISOR
```

The SUPERVISOR parameter specifies the type of logical name that is being defined.

If you placed the software on a disk other than SYSSYSDEVICE, you must specify the disk or disks that contain the software. CHNAMES.COM accepts up to four parameters for specifying these disks. These parameters are documented in CHNAMES.COM.

3. Test the hardware.

Before proceeding any further with the installation of the VAX/VMS Chaosnet software, any network hardware interfaces need to be installed and tested. This software supports three types of network interface:

- The Symbolics Chaos hardware interface
- The Digital Equipment Corporation UNIBUS-to-Ethernet Adapter (DEUNA)
- The Interlan Ethernet interface

If your configuration includes Digital Equipment DEUNA interfaces, it is your responsibility to have them installed and verified (via diagnostic software) before you install the Chaosnet support. (Typically, the DEUNA board is installed and checked out by Digital field service personnel.)

If your configuration has an Interlan interface that you want the Chaosnet software to use, make sure that you have read Chapters 1 and 2 of the *NI1010 UNIBUS Ethernet Communications Controller Manual* and have installed the board following the checklist on Page 13. If you do not have this manual, contact the supplier of the interface for a copy.

If you need to reset the switches on your Interlan board, use the command procedure SWITCHES.COM, as shown in the following example:

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```
$ @[CHAOS.DRIVER.INTERLAN]SWITCHES.COM
```

After all of your hardware is installed, test it by using the command procedure [CHAOS]TESTHW.COM, as shown in the following example:

```
$ @CHAOS$DISK:[CHAOS]TESTHW
```

This test procedure requires the use of another machine (preferably a Lisp Machine) that is directly connected to the physical network of each interface on your VAX/VMS system that you wish to test. For example, if your system is a VAX with both a Chaos hardware interface and an Ethernet interface, you must either have two machines at your disposal or have one other machine that also has interfaces to the same physical media.

The command procedure TESTHW.COM first prompts you for some device configuration data, and then loads the required drivers and I/O data structures. It then runs a test program for each interface. The test programs are [CHAOS.DRIVER]PCTESTER for Chaos hardware and [CHAOS.DRIVER.INTERLAN]NITESTER for the Interlan interfaces. (There are no comparable test programs for the Digital Equipment DEUNA, since it is assumed to have been verified already.) These programs can be run manually without going through TESTHW.COM by determining the 16-bit Chaosnet software address for each interface. This is done either by polling the board in the case of Chaos hardware or by prompting you, the user, in the case of Ethernet boards. These 16-bit addresses should correspond to the octal addresses specified in your network host tables (see step 4).

The next step is to send a STATUS request packet to your VAX from the other machine(s) you are using. To do this, use the **HOSTAT** command on the VAX or the **hostat** function on the Lisp Machine. In the examples shown below, the number 24001 is the Chaosnet address of the VAX being tested.

The following example shows the **HOSTAT** command being used on a VAX:

```
$ @HOSTAT 24001
```

On a Lisp Machine, you would use the **hostat** function:

```
(hostat 24001)
```

The VAX then looks for the request packet for 60 seconds and answers it with a packet from a node called "Ethernet-Vax" or "CHAOS-VAX". If the other machine sees the response, you then have bidirectional communication on the subnet to which the interface is attached. This means that your hardware and device driver are working correctly.

CAUTION: Do not attempt to bring up the network control software until all of your interfaces have successfully completed their hardware tests.

After TESTHW.COM completes successfully, reboot the VAX to clear out the drivers and I/O database.

4. Build the network host table.

A sample copy of this is included in [CHAOS.HOST.TABLESEX]NETHOSTS.TXT. If you have the host table on some other machine, you can compile a dummy host table with just the entry for that machine and then copy the full table to your VAX from there. Incidentally, the host table is just like the ITS/TENEX/TOPS20 host table.

- The source for this host table is [CHAOS.HOST.TABLES]NETHOSTS.TXT. You must add the following line at the beginning of this file:

```
NET CHAOS,7
```

- Once you have created or edited this file, you should run HTMAKE:

```
$ RUN CHAOS$SYSTEM:HTMAKE
```

This will compile the file into the host database.

- Next you need to update the terminal location database for the name server/user. Edit the file CHAOS\$SRCDISK:[CHAOS.SERVER]NAMEDAT.MAR, entering the locations for the various terminal lines, following the format in the file. You then run the following command procedures to compile the database then link and install it:

```
$ @CHAOS$SRCDISK:[CHAOS.SERVER]NAMEDAT COMPILE
$ @CHAOS$SRCDISK:[CHAOS.SERVER]NAME LINK
$ @CHAOS$SRCDISK:[CHAOS.SERVER]NAME INSTALL
```

If you do not do this, all terminal locations will be listed as "Unknown Location".

5. Create and install the Chaosnet startup command procedure.

To create and install the startup procedure, enter the following VAX/VMS command:

```
$ @CHAOS$SRCDISK:[CHAOS]MKCHSTART
```

This procedure prompts you for configuration details and provides instructions for how to proceed.

6. Start up the network control software and verify that higher level services (for example, files and mail) work correctly.

Test out the network by invoking `SYSSMANAGER:CHSTART.COM` and running a few of the higher level programs, such as `MAIL`.

7. Edit `SYSTARTUP.COM`. Once you are satisfied that the installation has been successful and that your network is working without any major problems, you can cause the network to start up automatically after a system reboot. To do this, edit the command file `SYSTARTUP.COM` to run `@SYSSMANAGER:CHSTART` and edit any system-wide login file(s) to run `@SYSSMANAGER:CHLOGIN`.

3. Restarting the Chaosnet

The Chaosnet software is implemented with device drivers and a process called CHAOSNET_NCP. This is described in more detail in Chapter 6. If the CHAOSNET_NCP process goes away, you can do the following to attempt to start up a new CHAOSNET_NCP process:

```
$ @SYSSMANAGER:CHRESTART
```

Do not attempt to use CHSTART.COM a second time, as that might crash the VAX/VMS system.

If the process is still there, but it appears to be stuck in some way, you must first stop it with the VAX/VMS command STOP, and then follow the procedure described above.

4. Modifying The Chaosnet Software

NOTE: Please notify the Symbolics Customer Support Department (the address is available from your local Customer Support or Sales Office) in writing before attempting to make any patches or modifications to the VAX/VMS Chaosnet software. In accordance with the conditions governing program services contained in the program license agreement, any modifications or patches that are made without prior written approval from Symbolics will free Symbolics of any responsibility to support the network communications for the VAX/VMS system on which the modified software is being run. If you do modify the Chaosnet software, the entire Chaosnet system can be recompiled by doing the following:

```
$ @CHAOS$SRCDISK:[CHAOS]CHREBUILD COMPILE
```

It can be relinked by doing the following:

```
$ @CHAOS$SRCDISK:[CHAOS]CHREBUILD LINK
```

The resulting files will need to be installed in their proper directories and libraries, which can be done by typing the following command:

```
$ @CHAOS$SRCDISK:[CHAOS]CHREBUILD INSTALL
```

In all cases there should be no error messages of any kind. The only warning messages should be about lack of a transfer address for device drivers.

Each component of the system has a similar COM file for compiling, linking and installing just that component. See the command file REBUILD.COM for details.

5. Updating Lisp Machines To Know About You

After installing the VAX/VMS Chaosnet software, use the namespace database editor to register your VAX in the namespace database, if you have not already done so.

If you frequently check to see who is logged in to your VAX/VMS system, you might find it convenient to assign a number as a **terminal-f-argument**, so that a simple key sequence such as `FUNCTION 2 F` will display the names and the locations of VAX/VMS users. **terminal-f-arguments** are maintained as attributes of your site's namespace object. For example, if your site is named `NORTH-POLE`, use the following command to edit the site's namespace object and add a new **terminal-f-argument** attribute that associates a number with the name of your VAX/VMS host:

```
(tv:edit-namespace-object :site "NORTH-POLE")
```

For more information about the namespace database and the associated editor, see the *Networks* document.

6. How The Software Works

The Chaosnet protocol for VAX/VMS is implemented with device drivers and a process called CHAOSNET_NCP, which runs the program CHAOS\$SYSTEM:CHNCP.EXE. The physical Chaos hardware is handled by the PC device for which the device driver is PCDRIVER (CHAOS\$SYSTEM:PCDRIVER.EXE). The physical Ethernet is handled by the NI device for which the device driver is NIDRIVER (CHAOS\$SYSTEM:NIDRIVER.EXE). These devices handle the packet input and output to the actual hardware, but provide no sharing, retransmission, connections, or any of the other features of the Chaosnet protocol. Those features are handled by the NCP (the VAX/VMS Network Control Program). The NCP handles such tasks as the establishment and maintenance of Chaosnet connections, starting of server processes, and error logging.

Chaosnet connections are established by opening the CH device. The CH device is a software device whose sole purpose is to transfer packets from the user program (or server program) to the NCP, which is responsible for such tasks as ordering the requests for transmission, for retransmission, and for flow control. In the supplied version of the CHSTART.COM file, 16 Chaosnet connections can exist in the system at one time. Each CHAn device corresponds to a single connection; CHA0: is used by the NCP.

It is important that you do not make any changes involving or affecting the CH device.

Servers are started by the NCP in response to any RFC (Request for Connection) with no matching LSN waiting for it. If an RFC for FILE comes in, the image CHAOS\$RFC:FILE.EXE is run. This runs with the SETPRV privilege (and sometimes other privileges), which should be thrown away by any program needing to protect itself against arbitrary actions by a user. For example, there is a complete LOGIN system call implemented for the FILE server, which takes the password, hashes it according to DEC's algorithm, looks up the user in the SYSUAF, and sets the user's privileges, quotas, and UIC. You would want to disable SETPRV in the program when it is not needed to avoid a user misusing the LOGIN system.

Servers will be seen as detached processes with a UIC of [4,200] (unless your installation changes the UIC of the NCP, or unless the server changes the UIC itself, as the FILE server does once it logs in). These servers will have a process name of the form FOO[00A2]. The FOO will be the contact name which that server is serving; the number in brackets is a hexadecimal sequence number to assure uniqueness.

The NCP does full error logging, and it should remain alive unless it gets 20 errors in a single hour. All NCP errors, server starts, exits, connection openings and

closings (including CLS texts) are logged. In order for this log file to be kept, the UIC [4,200] will need a couple hundred blocks of disk quota. (If that UIC is unavailable, another system UIC can be used if the file `SYSS$MANAGER:CHSTART.COM` is edited).

The program `CHAOS$SYSTEM:NCPERRFMT.EXE` is responsible for formatting the error logs that are kept on `CHAOS$DISK:[CHAOS.LOG]CHERROR.LOG;*`. If you expect to ask the NCP to close the current version, you must have the `SYSPRV` privilege. The NCP will prompt for an input file, asking if the NCP should close the file if the NCP has that file open, and direct the results to `SYSS$OUTPUT`. Press `[RETURN]` for the current file. Alternatively, this can be run as a foreign command, as shown in the following example:

```
$ NCPERRFMT == $CHAOS$SYSTEM:NCPERRFMT
$ NCPERRFMT [CHAOS.LOG]CHERROR.LOG;5 /OUTPUT=CHERROR.LIS
```

This creates the output file `CHERROR.LIS`. You can also include the `/BEFORE=<date-time>` and the `/AFTER=<date-time>` qualifiers to specify when this will run.

All the sources of programs actually in use (as opposed to those under development or obsolete) are in a state such that they can be compiled and linked without error. All support routines are available from the `CHAOS$LIBRARY:CHAOS.OLB` library and are discussed further in the document *Networks*. Most BLISS code should need only `SYSS$LIBRARY:LIB.REQ` and `CHAOS$LIBRARY:CHAOS.L32`. Some more specialized changes may also need `NCPDEFS.L32`. Some programs have their own BLISS libraries on the same directories as well. All sources are present, along with current object files and EXE files. There is documentation on the library routines in the files `[CHAOS.DOC]CHAOS.TXT` and `HOSTLIB.TXT`.

You do not need to place all the software on the same pack. There are provisions for placing EXE files, sources and object libraries on three different devices. If you wish to do so, carefully read the documentation in `[CHAOS]CHNAMES.COM` to see how to divide up the software among the devices. Then, change the invocation of `CHNAMES.COM` by specifying your system, source, and object file devices, as shown in the following model:

```
$ @SYSS$MANAGER:CHNAMES SYSTEM <sysdev> <srcdev> <objdev>
```

If you have any problems to report, such as servers going away, you must include the log file. The actual log file in BACKUP format should be used, not a formatted ASCII version. In addition, you must include your `NETHOSTS.TXT` file so that the log file can be interpreted.

Also, any system crash reports must include a BACKUP format tape of `SYSDUMP.DMP`, as well as your site configuration file and your `SYSS$MANAGER:CHSTART.COM` file if it is different from the one supplied to you.

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