

COHERENT Version 0.7.3 Preliminary Release Notes

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1. Introduction

Congratulations on purchasing the Mark Williams Company COHERENT (tm) operating system for the Commodore C900 personal computer. In addition to this document, your installation kit includes the following items.

- * Three floppy disks, labeled *COHERENT 0.7.3 Volume 1* through 3. These disks contain the root file system of your COHERENT system.

One of these floppy disks is labeled *COHERENT 0.7.3 Boot/build*. This is a boot disk configured specifically for the prototype C900.

- * A set of COHERENT documentation, including:

Introduction to COHERENT Documentation
Introduction to the COHERENT System
COHERENT Command Manual
COHERENT System Manual
COHERENT Administrator's Guide
COHERENT Assembler Reference Manual
awk User's Manual
bc Calculator Language Tutorial
ed Interactive Editor Tutorial
learn User's Guide
lex Lexical Generator Tutorial
m4 Macro Processor User's Manual
nroff Text Processor Tutorial
sh Shell Command Language Tutorial
yacc Parser Generator Tutorial

The *Introduction to the COHERENT System* is the manual you should read first. It is a tutorial, with simple, step-by-step examples. The *COHERENT Command Manual* describes each command available on the COHERENT system.

The procedure described in the next section of these notes will install the COHERENT system onto your hard disk. Please take a few minutes to read all the instructions before you begin the installation.

The remaining sections of these notes describe normal operating procedures for your COHERENT system; give device-specific information about your COHERENT system; and provide additional manual pages for the C900 COHERENT documentation.

As a user of the COHERENT system, you are in an especially important position to tell us how the system can be improved and whether any problems appear. We welcome your comments, and we know you will enjoy using the COHERENT system.

Hardware requirements

To run the COHERENT system, you need the following:

1. A Commodore C900.
2. 512Kb of memory.
3. One double-sided double-track floppy disk drive.
4. A hard disk with 20 megabyte capacity.

Software requirements

The COHERENT installation kit includes three floppy disks, which contain all of the commands and files you need to run the COHERENT system. These disks are labelled *COHERENT 0.7.3 Volume 1* through *3*.

2. Installing your COHERENT file system

The following instructions tell you how to install your COHERENT system on your C900. They tell you how to start the boot procedure and the build procedure from a floppy disk; how to set up additional file systems; and how to deal with problems encountered during the boot and build routines.

Booting COHERENT

The term *boot* is short for *bootstrap*; it means running a simple program that in turn knows how to find the COHERENT system, set it up, and start it running -- in other words, the COHERENT system can pull itself up by its bootstraps.

To boot the COHERENT system, use the following procedure.

Your C900 comes with one double-sided double-track floppy disk drive, called drive 1. Insert the boot/build disk (volume 1), label side up, into drive 1 and close the door.

If the C900 is on, press the reset button found on the back of the computer's cabinet. Otherwise, turn it on. In either case, you will see on your console the message

```
Commodore 900 diagnostics
```

followed by a series of messages from the program that tests whether your C900 is working properly.

The diagnostics program will first attempt to boot COHERENT from the floppy disk. If the boot program cannot be found on the floppy disk, then the diagnostics program will try to boot COHERENT from the hard disk. If neither can be found, then it will access the diagnostic monitor and wait for you give it an instruction. To boot COHERENT from the diagnostic monitor, type

```
(fd,1)coherent
```

This tells the diagnostics program to look on the floppy disk drive again for the boot program.

Building the COHERENT System

The following steps destroy all information on the root partition, hd0, of your hard disk. If there is information on the hard disk in this partition which you wish to keep, copy it to floppy disks before you continue.

Building means installing the COHERENT system onto your hard disk either for the first time or to install an upgraded version of COHERENT. If you happen to be re-installing the COHERENT system, be sure that all users are logged off; then execute the sync routine to ensure that no data are damaged during the re-building process.

To begin the build, insert the boot/build diskette into drive 1 and press the reset key on the back of the computer.

Soon you will receive the message

```
Coherent (486K, 7452) Version 0.7.3
(c) 1982 - 1985 Mark Williams Company, Chicago
#
```

The numbers in parentheses may differ on your system. Type:

```
build
```

The select light on the floppy disk drive will come on again as the system begins the build procedure.

Building the filesystems

The build procedure will now warn you that

```
The next step will destroy all data on the
hard disk root partition. If you need to
save files, type <ctrl-C> to stop this procedure.
If you are ready to build the root file
system, type RETURN.
```

If you have nothing to save on the root partition, type <RETURN>.

The build program will then check your hard disk for bad blocks. While it is checking, the message

```
Checking the hard disk for bad blocks ...
```

will appear on your screen. You may get several error messages of the form

```
(2,0): dev: read error, block=number
status=19
```

These result from tracks marked bad when the hard disk was initialized at the factory. The purpose of this step is to insure that all bad blocks are properly noted by the COHERENT file system, to ensure that no data are written onto them.

After the root partition has been checked, you will receive the message

```
Writing a filesystem to the hard disk ...
```

and a few minutes later you will receive the message:

```
The hard disk system will now boot and
load commands and utilities onto the
root partition. Press the reset key, and
be sure there is no floppy disk in the drive,
so that I will boot from the hard disk.
```

Remove the floppy disk from drive 1 and press the reset button on the back of the computer.

After the computer reboots from hard disk, you will see:

```
Coherent (915K, 11016) Version 0.7.3
(c) 1982-1985 Mark Williams Company, Chicago
```

Now, `build` will ask you for the two remaining floppy disks in order, and return the '#' prompt after it has read them all. Reading the two floppy disks will take about 30 minutes.

Creating additional file systems

The `build` procedure will create only the root file system on its partition. You must build a file system on each of the additional partitions by using the `mkfs` command, as follows.

First, create a *proto* file called `p1`. Assuming that you want to use the partition `/dev/wd2` with 10,336 blocks in it, enter the following:

```
ed p1
a
/dev/null
10336 1400
.
wq
```

The first entry is a *boot block*. Use `/dev/null` because this is not a bootable file system. Normally, this is the file name of the boot block code. 10336 is the number of blocks on the device, and 1400 is the number of *i-nodes*, or files. As a rule of thumb, the number of *i-nodes* should be about one-seventh the number of blocks. Thus, if you have a partition with 5,184 blocks on it, 648 is an acceptable number for the *i-nodes*. The number of *i-nodes* is the largest number of files and directories that can be created on the partition.

If you have placed a swap device on a partition that is shared with space for files, subtract the size of the swap area from the partition size, and use the difference as the number of blocks. This will insure that blocks in the swap area are not used in the file system and thus overwritten by the swapper.

Now, enter the command

```
/etc/mkproto /dev/hd1 <p1 >p2
```

This tells the system to read each block on the partition and maintain a list of blocks that caused read errors. These bad blocks are recorded by the file system, and will

never be used.

Enter the command

```
/etc/mkfs /dev/hd1 p2
```

to create the file system on the partition.

Repeat this process for each of the partitions.

What went wrong?

If your installation of COHERENT does not succeed, either your hardware is not configured correctly or the software supplied on floppy disks is unreadable or inappropriate for your system. Reread the installation instructions carefully, then repeat the installation procedure. If you still cannot install COHERENT, check the manuals that came with your C900 and follow their suggestions to insure that the hardware is operating correctly.

3. Beginning to use the COHERENT system

Once the COHERENT system is installed on your machine, you must boot COHERENT whenever you begin to work with the computer.

Start-up

First, make sure that no floppy disk is in the floppy disk drive. Press the reset button on the back of the computer cabinet. The diagnostic/boot ROM will check the hardware, then it will say:

```
Coherent (915K, 11016) Version 0.7.3
(c) 1982-1985 Mark Williams Company, Chicago
#
```

on the console screen. (The pair of numbers in the parentheses will vary with the amount of memory available on your machine.) On booting, the system is in single-user mode, and commands are executed with the permissions of the superuser, or root.

Whenever you reboot COHERENT, you should both check the file systems on your hard disk and set the date, as shown in the following sections.

Checking the file system

To protect your files and the COHERENT commands from potential loss or damage, you should **check** the file systems on your hard disk whenever you reboot the system. You have four file system partitions: `/dev/hd0`, `/dev/hd1`, `/dev/hd2`, and `/dev/hd3`, with root device being `/dev/hd0`. The command

```
check -s /dev/hd3 /dev/hd2 /dev/hd1 /dev/hd0
```

will tell the system to check the consistency of the your files. It will let you know if anything is out of order, and attempt to reconcile any problems it finds (this is the meaning of the "-s" flag). The following procedure must be followed whenever **check** is invoked:

1. If you are checking the root device, list it last on the command line.
2. If errors are found on the root device, immediately reboot the system *without* typing `sync`. When the system is running again in single-user mode, re-issue the check command for each partition that was found to be in error, listing the root device last on the command line.
3. If there are errors on non-root partitions but not on the root partition, you may re-issue the check command without re-booting, listing each device that had errors.
4. If the errors persist after the second check, the file system must be repaired by hand, using the other file system utilities in command directory `/bin`. These are described in the *COHERENT Administrator's Guide*. You need to check only those partitions that contain files.

Situation (2) is the only instance when you should reboot without typing `sync`. Normally, the `sync` command must be issued to ensure that the file system is up to date before you reboot the system.

If the root file system is severely damaged, you may need to re-install the COHERENT system from the distribution kit.

For more information about repairing file systems, see the *COHERENT Administrator's Guide*.

Setting the date

Whenever you boot the COHERENT system, you should reset the current date and time. The system notes the date and time whenever you create or modify a file. If the date and time settings are not accurate, some commands, e.g., `make` and `at`, will not function properly. If you type

```
date
```

the system will show you what it believes the current date and time to be. If you have not set the `time zone` parameter to your local time zone, the time will be displayed in Greenwich Mean Time, which is six hours ahead of Central Standard Time (Chicago). The section *Changing the time zone*, below, describes how to change the time zone.

If you have already set the time zone, set the date and time with the `date` command. Type:

```
date 8510271317.56
```

to set the date to October 27, 1985, and the time to 1:17:56 P.M.

Changing the time zone

If you are not in the Greenwich time zone, you should change the file `/etc/profile` to specify your time zone. (`/etc/profile` is a file that is executed whenever a user logs on.) Do this with the `timezone` command. To use `timezone`, you must give the names of your standard and daylight-savings time zones, and the location of your time zone in minutes west of Greenwich, England. For example, the command

```
TIMEZONE=EST:300:EDT
```

tells the COHERENT system that your standard time zone is Eastern Standard Time (EDT), your daylight-savings time zone is Eastern Daylight Time (EDT), and that you are located 300 minutes west of Greenwich.

Note that the term *minutes west* refers to minutes of time, not minutes of longitude. To calculate how many minutes of time your city is west of Greenwich, multiply its degrees of longitude by four; for example, Chicago is located 88 degrees west, which means that it is 352 minutes (5 hours and 52 minutes) west of Greenwich *in time*. If you are unsure of the longitude of your city, check any atlas.

Note that the COHERENT system knows when to shift from standard time to daylight savings; no further adjustments on your part are needed.

Going to multi-user mode

After you have set the date and have received the '#' prompt, type <ctrl-D> (hold down the <ctrl> key and strike the D key simultaneously) to shift the system in multi-user mode. You should do this even if you are the only person to use the system. Multi-user mode has a number of advantages:

1. The system runs a process that updates the file systems every 30 seconds. This will largely prevent errors caused by power failure or other sudden system halt.
2. You may log in as a user other than root, and prevent serious damage to protected files in the event of a typographical or other error in a command line.

If you want to become the superuser, you can use the su command to become root. Just type

```
su root
```

and the password (if there is one) to become the superuser. If you are not the only user of this system, you must decide whether you want every user to be able to become the superuser; passwords can be used to control access to superuser status. For more information, see the *COHERENT Administrator's Guide*.

After you have gone to multi-user mode, the system will first execute the shell command file /etc/rc. etc/rc is executed when the system shifts to multi-user mode. The system will now say:

```
Coherent login:
```

If you want to change this login message, edit the file /etc/logmsg. For example, you could change the login message to read

```
Joe's Grille and Computer--
```

Now, you reply with your user name -- which can be any name in the /etc/passwd file, including root.

When you are want to log off, type <ctrl-D>; and the system will reply by printing the login message for the next time you want to use the computer.

4. Tips on using the system

This section gives some more information on how you can use the COHERENT system to its fullest advantage.

Enabling cron

`cron` is a routine allows you to run commands on a regular basis. To use `cron`, simply type:

```
/etc/cron&
```

`cron` will then scan the file `/usr/lib/crontab` once a minute and execute all the commands you place there. For more information on `cron`, see the *COHERENT System Manual*.

Adding new users

To add new users `john` and `mary` to your COHERENT system, use the `newusr` command:

```
/etc/newusr john mary
```

`newusr` will create home directories for `john` and `mary` in the directory `/u`.

If you have a partition for users' directories (`/dev/hd1` in the example given above), before you use `newusr` for the first time, you should be sure that `/u` is mounted by typing the command

```
/etc/mount /dev/hd1 /u
```

This will put the user files into the partition `hd1`. As shipped, this system mounts `/u` on `hd1` when you bring it into multi-user mode.

`newusr` also creates a `.profile` file for each new user. When `john's` `.profile` is created, all it will contain is the line:

```
export PATH=:/u/john/bin:PATH
```

The `.profile` can be edited by the user himself or by the superuser to perform a number of tasks; for example, adding the command

```
/usr/games/fortune
```

to `.profile` means that the user will be greeted with a witty saying from the `fortunes` library every time he logs in.

See the documents *Introduction to the COHERENT System* and *sh Shell Command Language Tutorial* for further information.

Using floppy disks

Because of the flexibility of the COHERENT file system, you can build and use directories directly on floppy disks. For best use of floppy disks, you should understand the following procedures.

To build a file system on a floppy disk in drive 1, insert a formatted diskette into the drive and type the command

```
/etc/mkfs /dev/fd1 2300
```

The number 2300 is the number of blocks on the floppy disk file system.

The next step is to mount a floppy disk that contains the file system so you can access it. For example, type

```
/etc/mount /dev/fd1 /f0
```

to mount the floppy disk in drive 1 on directory `/f0`; then you can refer to files on the floppy disk as being in directory `/f0`. The directory `/f0` has been provided on the system for you to mount floppy disks. The `mount` command will verify that there is a mountable file system on the disk. `mount` will also disallow mounts of more than one device on the same directory. `mount` will check that the mount table `/etc/mtab` is newer than the file `/etc/boottime`. `/etc/boottime` is a dummy file which serves simply to keep the time the system was lasted booted. If `/etc/mtab` is older than `/etc/boottime`, the mount table is possibly invalid.

The last step is to unmount a mounted floppy disk when you are finished using it. Type

```
/etc/umount /dev/fd1
```

to unmount the floppy disk in drive 1.

Because the COHERENT system buffers all data it writes to or receives from a floppy disk, if you do not unmount your floppy disk you may lose data from this disk or from the next disk you put in the drive.

Copying floppy disks

You can use the `dd` command to copy the floppy disks in your COHERENT distribution kit or to copy other floppy disks. Be sure to copy your boot floppy disk and keep the original in a safe place with the other floppy disks from the kit.

Insert the floppy disk you wish to copy in drive 1 and type:

```
dd if=/dev/rfd1 of=/tmp/disk count=50 bs=46b
```

This copies 2,300 blocks from the floppy disk in drive 1 to the file `/tmp/disk`. Then

remove the floppy disk from drive 1 and replace it with a formatted floppy disk. Type:

```
dd if=/tmp/disk of=/dev/rfd1 count=50 bs=46b
```

This copies the contents of the previous floppy disk to the new floppy disk. To make more than one copy, simply repeat the second `dd` command with additional formatted floppy disks.

When you are finished making copies, type

```
rm /tmp/disk
```

to erase the temporary file.

Backing up your hard disk

Because your hard disk may malfunction accidentally and its data destroyed, you should periodically copy the information on it to floppy disks.

You can copy information to floppy disks by mounting each floppy disk (as described in *Using floppy disks* above) and using the `cp` or `cpdir` command to copy specific files or directories. However, the `dump` command provides a more convenient method of backing up entire file systems.

`dump` works with C900 COHERENT to dump to floppy disks rather than to magnetic tape. The `S` option specifies the size of a floppy disk in blocks. To dump the full (level 0) root file system on `/dev/hd1` onto a nine sector-per-track floppy disk in drive 1, type the command

```
dump 0fs /dev/fd1 2300 /dev/hd1
```

For a complete discussion of `dump`, see the *COHERENT Command Manual* and the *COHERENT Administrator's Guide*. You can also dump with the `tar` command.

Normal shutdown

To preserve the integrity of your file system if you reboot the COHERENT system or turn off the C900 for any reason (other than repairing the root file system after performing the `check -s` command), you should always type the command

```
sync
```

before you reboot or power down the system. If you are running multi-user mode, `sync` is automatically executed every 30 seconds.

To reboot or power down a multi-user system, you should log in as root. Tell all other users to log off. Then use the `ps -lax` command to determine the status and owner of each process on the system. When user activity is ended and everyone else has logged off, type

```
kill -1 1
```

to return the system to single-user mode. Make sure you remove floppy disks from the floppy disk drives *before* you turn off the power, or at least open the door of the disk drive. This ensures that if there is a power surge when the C900 is turned off, it will not harm the data on your floppy disks. Then type `sync`.

Now reboot the system by hitting the reset key, or simply turn off the power to your C900, wait approximately one minute, and turn your C900 back on again.

Named pipes

A named pipe, called a *fifo* (first in, first out), is a special device file that you can use to communicate between two processes.

To create an named pipe, enter the command

```
/etc/mknod name p
```

where *name* is the name of the pipe file and the letter *p* tells `mknod` that you are making a named pipe.

For example, to create a named pipe called `connection`, type

```
/etc/mknod connection p
```

To use `connection` to communicate between `process1` and `process2`, type

```
process1 >connection; process2 <connection
```

This is equivalent to typing

```
process1 | process2
```

The advantage of using a named pipe is that, unlike a normal pipe, the named pipe can be shared by processes that do not have the same parent, or are owned by different users.

Just like the regular pipe, the named pipe will fill up a buffer with the output from `process1` and pass it along to `process2` when the buffer is full. If you wrote the output from `process1` into a regular file and then took `process2`'s input from that file, `process1` would have to complete its work before `process2` started; with a named pipe, both can work simultaneously.

Differences from other documentation

The COHERENT system is available on a wide variety of computers. In almost every case, the operation of a COHERENT command is identical on each machine; the system looks the same to the user, regardless of which processor actually executes the commands. However, because of hardware limitations, a few commands do not exist or work differently in the C900 version. This section notes commands that are described in the *COHERENT Command Manual* or the *COHERENT Administrator's Guide* but which are not included in the current C900 version of COHERENT.

1. The erase character, which erases the last character typed, is `<backspace>` or `<ctrl-H>` by default, rather than '#' as noted in the COHERENT system's manuals. Similarly, the kill character, which erases an entire line, defaults to `<ctrl-U>` rather than '@'.
2. The spelling checkers `spell` and `typo` require large dictionary and data files. To keep this release within a manageable size, are not provided.
3. The manual command `man` is included, but the manual text in directory `/usr/man` uses large amounts of disk space and so is not sent with the standard release. They will be provided upon request for a nominal charge.
4. The magnetic tape handling program `tp` does not apply to the C900 and is not included.
5. The `xmail` command has been eliminated.
6. The `newusr` command described above replaces the `mkusr` command mentioned in the *COHERENT Administrator's Guide*.

Possible problems

COHERENT commands can fail when your COHERENT system runs out of some resource, such as memory or disk space. This section lists a few of the problems you might see.

One error message is

```
Out of memory
```

This indicates that your COHERENT system did not have enough memory available to execute the command. It may mean that you have a program with an infinite loop that creates infinite output.

COHERENT may also tell you

```
Can't find xxx
```

when you run out of memory, where `xxx` is the name of the command you typed.

The message

```
Try again!
```

indicates that the system reached its limit on the number of simultaneously active processes and therefore could not execute the command you requested.

The message

```
No space on (/m, n)
```

indicates that the system ran out of space on the file system for the device with major

number *m* and minor number *n*. You can find the major and minor numbers associated with each device by typing

```
ls -l /dev
```

You should unmount the file system and check it with the `-s` option to insure its integrity after you run out of space. If it is the root device, reboot immediately after running check, and check again after rebooting.

Many programs increase their data area automatically as needed. If a program grows too large, you may get the error message

```
Bad system call
```

This usually indicates that COHERENT could not allocate enough memory for an exec system call. Sometimes it indicates that a program detected an irrecoverable error and terminated execution with the `abort` library routine, which deliberately issues a bad system call.

Touring the file system

In the section C900 COHERENT 0.7.3 file system below, you will find a list of the files on the distribution floppy disks. This section briefly describes each directory, to introduce the structure of the COHERENT file system.

The directory `/` is the root directory. All files in every file system are in the root directory or in one of its subdirectories.

Directory `/bin` contains the commands described in the *COHERENT Command Manual*. Some C900-specific commands are described in the *C900 Command Manual* pages below.

File `/coherent` contains the COHERENT system that is running on your C900.

Directory `/dev` contains data on devices.

Directory `/drv` contains data for some of the special device drivers.

Directory `/etc` contains files and commands used in system maintenance. The *COHERENT Command Manual*, *COHERENT System Manual*, and *COHERENT Administrator's Guide* describe these files and commands.

Directories `/f0` and `/f1` are empty directories used to mount floppy disks, as described under the heading *Using floppy disks*, above.

Directory `/lib` contains the phases of the C compiler and the standard C libraries `libc` and `libm`.

Directory `/mnt` is an empty directory used to mount additional file systems.

Directory `/tmp` is used by many COHERENT commands to hold temporary files. The command file `/etc/rc` normally deletes all files in `/tmp` when you bring up the system in multi-user mode.

Directories `/u` and `/v` are for user files. `/u` is the default directory used by `newusr` for installing user home directories.

Directory `/usr` contains subdirectories for use by the users and the system. `/usr/adm` contains administrative files. `/usr/bin` contains the `kermit` and `trout` commands. `/usr/games` contains games. `/usr/include` contains header files included when compiling C programs. `/usr/lib` contains libraries and a few other files. `/usr/man` contains manual pages; because of the size of the *COHERENT Command Manual* and *COHERENT System Manual* files, they are not currently distributed with the system. `/usr/pub` contains an ASCII table. `/usr/spool` contains subdirectories for commands which save information for later execution, such as `lpr` and `mail`.

5. C900 Coherent 0.7.3 files

This section contains a listing of the files on each of the three system disks for COHERENT 0.7.3.

System disk 1

```
/bin
/bin/cpdir
/bin/cat
/bin/ed
/bin/echo
/bin/check
/bin/ichk
/bin/dcheck
/bin/od
/bin/db
/bin/file
/bin/mkdir
/bin/ls
/bin/lc
/bin/sh
/bin/sync
/bin/l
/bin/bad
/bin/chgrp
/bin/chmod
/bin/chown
/bin/cmp
/bin/diff
/bin/du
/bin/df
/bin/me
/bin/rm
/bin/rmdir
/bin/egrep
/bin/grep
/bin/mv
/bin/ps
/bin/pwd
/bin/scat
/bin/kill
/bin/build
/bin/find
/bin/dd
/bin/tty
/bin/login
/bin/lc
/bin/cp
/dev
```

```
/dev/mem
/dev/kmem
/dev/null
/dev/tty
/dev/fd1
/dev/hd0
/dev/hd1
/dev/hd2
/dev/rhd0
/dev/rhd1
/dev/tty50
/dev/tty51
/dev/lp
/dev/rhd2
/dev/swap
/dev/rhd3
/dev/hd3
/dev/modem
/dev/rfd1
/dev/tty52
/dev/ram
/dev/rhd12
/dev/rhd13
/dev/rhdall0
/dev/rhdall1
/dev/hd10
/dev/hd11
/dev/hd12
/dev/hd13
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/etc/ciri
/etc/getty
/etc/init
/etc/load
/etc/mkfs
/etc/mknod
/etc/uload
/etc/umount
/etc/mount
/etc/group
/etc/rc
/etc/profile
/etc/passwd
/etc/boottime
/etc/.profile
/etc/mkproto
/etc/swap
```

```
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/etc/mnttab  
/etc/utmp  
/f0  
/lib  
/mnt  
/tmp  
/usr  
/usr/bin  
/usr/spool  
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/usr/include  
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/bin/ccx  
/bin/ld  
/bin/cc  
/bin/cu  
/bin/sum  
/bin/ar  
/bin/l  
/bin/ac  
/bin/at  
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/bin/basename  
/bin/c  
/bin/cal  
/bin/col  
/bin/comm
```

/bin/conv
/bin/crypt
/bin/deroff
/bin/factor
/bin/from
/bin/help
/bin/join
/bin/learn
/bin/look
/bin/m4
/bin/mesg
/bin/msg
/bin/newgrp
/bin/passwd
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/bin/prop
/bin/prof
/bin/quot
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/bin/sleep
/bin/sort
/bin/split
/bin/stty
/bin/su
/bin/tail
/bin/tar
/bin/tee
/bin/time
/bin/touch
/bin/tr
/bin/typo
/bin/head
/bin/uniq
/bin/version
/bin/wc
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/bin/write
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/bin/bc
/bin/dump
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/bin/dumpdir
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```
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/bin/xencode  
/bin/ncheck  
/bin/spell  
/bin/nroff  
/bin/man  
/bin/tsort  
/bin/lex  
/bin/nld  
/f0  
/mnt  
/tmp  
/v  
/u
```

System disk 3

```
/etc  
/etc/mtab  
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/etc/update  
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```

```
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/usr/include/sys/inode.h  
/usr/include/sys/const.h  
/usr/include/sys/times.h  
/usr/include/sys/timeb.h  
/usr/include/sys/time.h  
/usr/include/time.h  
/usr/include/access.h  
/usr/include/acct.h  
/usr/include/action.h  
/usr/include/ar.h  
/usr/include/assert.h  
/usr/include/canon.h  
/usr/include/chars.h  
/usr/include/const.h  
/usr/include/ctype.h  
/usr/include/dir.h  
/usr/include/errno.h  
/usr/include/fblk.h  
/usr/include/filsys.h  
/usr/include/fperr.h  
/usr/include/grp.h  
/usr/include/ino.h  
/usr/include/inode.h  
/usr/include/l.out.h
```



```
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/usr/include/mtype.h
/usr/include/pwd.h
/usr/include/setjmp.h
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/usr/include/utmp.h
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/usr/games/rubik
/usr/games/moo
/usr/games/fortune
```

6. C900 COHERENT Manual Pages

This section contains additional pages for the *COHERENT Command Manual* and the *COHERENT System Manual* which apply only to the C900 version of COHERENT and to this release of COHERENT, as well as manual pages that have changed since the last major revision of the COHERENT manuals. The introductions in the *COHERENT Command Manual* and the *COHERENT System Manual* describe the format of these pages.

NAME`cron--execute commands periodically`**USAGE**`/etc/cron&`**DESCRIPTION**

`cron` is a daemon that executes commands at preset times. The commands and their scheduled execution times are kept in the file `/usr/lib/crontab`.

Once each minute `cron` searches through the `crontab`. For each command stored there, `cron` compares the current time with the scheduled execution time and executes the command if the times match. When it finishes the search, `cron` sleeps until the next minute. Because it never exits, `cron` should be executed only once (customarily by `/etc/rc`).

The `crontab` file consists of lines separated by newlines. Each line consists of fields separated by white space (tabs or blanks). The first five fields describe the scheduled execution time of the command. In order, they represent:

```
minute (0-59),
hour (0-23),
day of the month (1-31),
month of the year (1-12), and
day of the week (0-6, 0 meaning Sunday).
```

Each field may contain a single integer in the appropriate range, a pair of integers separated by a hyphen '-' (meaning all integers between the two, inclusive), an asterisk '*' (meaning all legal values), or a list of the above forms. The remainder of the line gives the command to be executed at the given time.

For example, the `crontab` entry

```
29 * * 7 0 msg henry Succotash!
```

means that every hour on the half-hour during each Sunday in July, the user named `henry` will have `daemon: Succotash!` written on his terminal.

`cron` recognizes three special characters and escape sequences in the `crontab`. If a command contains the percent character '%', `cron` executes only the portion up to the first '%' as a command and passes the remainder to the command as its standard input. `cron` translates any percent characters '%' in the remainder to newlines. The special interpretation of '%' can be prevented by preceding it with a backslash, '\%'. Finally, `cron` removes the sequence `\newline` from the text before passing it to the shell `sh`; this can be used to make an entry in the `crontab` more readable.

`cron` is designed for commands that need to be executed regularly. Temporal commands that need to be executed only once should be handled with the `at` command.

FILES`/usr/lib/crontab` for stored commands

SEE ALSO

init

COHERENT Command Manual: at

COHERENT Administrator's Guide

NAME

cu--terminal emulation and remote copy utility

USAGE

cu [-h] [-l line] [-s speed] [profile]

DESCRIPTION

cu allows terminal emulation and low-level copying of files between COHERENT and COHERENT-like systems. cu acts as a terminal on the serial line identified to COHERENT as */dev/modem*. It can be used to execute commands on a remote system, or to transfer files to and from the remote system.

The following command line options are available:

-l <i>line</i>	Use 'line' instead of <i>/dev/modem</i>
-s <i>speed</i>	Set the baud rate to 'speed' (default: 1200)
-h	Select half-duplex operation

If the file *profile* is specified, cu will read the file for commands and text, instead of taking input from the standard input device. Input lines that begin with the tilde character '~' are commands, and must be one of the following:

~f	Select full duplex operation
~h	Select half duplex operation
~ss <i>speed</i>	Set baudrate to <i>speed</i>
~w	Wait for carrier

After reading and executing command lines in *profile* (those beginning with '~') cu pushes the rest of the file onto a stack of input files, from which it reads commands and text. As cu reads the input file (or standard input after all other input files have been read), it writes lines not beginning with '~' to the serial port. Lines beginning with '~' are commands to cu. The recognized interactive commands are:

~#	comment
~!	invoke an interactive shell on local system
~< <i>file</i>	redirect input from <i>file</i>
~>> <i>file</i>	redirect to <i>file</i> , as well as to standard output
~>>> <i>file</i>	redirect to <i>file</i> , but not to standard output
~>: <i>file</i>	append to <i>file</i>
~>	end output redirection
~P <i>n</i>	pause <i>n</i> seconds
~q	exit cu and hang up phone line
~Q	exit cu without dropping phone line
~f	enter full-duplex (no echo) mode
~h	enter half-duplex (echo) mode
~s <i>n</i>	set serial port speed to <i>n</i>
~g <i>file</i>	get <i>file</i> from remote system
~p <i>file</i>	put <i>file</i> to remote system
~?	print a list of special commands
~~	send the character '~'

NOTES

Lines of text that begin with '~' will interpreted as commands. If this is not what was intended, the single '~' must be replaced by "--" so that the '~' will be taken literally.

DIAGNOSTICS

cu exits with non-zero status if an error occurs.

NAME

kermit--remote system communication and file transfer

USAGE

```
kermit c[bel baud esc line ]
kermit r[bdfhilt baud line ]
kermit s[abdfhilmx baud line ] file ...
```

DESCRIPTION

kermit allows the user to communicate with a remote computer system and to transfer files between the local and remote systems. kermit can transfer ASCII or binary files of any length in either direction. The two computers must be able to contact each other, such as through a serial line or by modem over a telephone line, and both systems must have kermit available. The user must have login privileges on both systems and appropriate permissions in directories used for file transfer.

The kermit command line specifies a *mode*, followed without intervening spaces by optional *flags*, perhaps followed by additional arguments and *files*. The three possible *modes* are:

```
c      connect the two systems so they can communicate.
r      receive files from the other system.
s      send each file to the other system.
```

kermit normally uses a default communication line at a default baud rate; the defaults vary on different COHERENT systems. It normally strips leading directory information from the pathname of each *file* it sends and converts the name to upper case; it converts the file name to lower case when receiving. The following *flags* modify its normal behavior.

a Specify complete pathnames for sending and receiving files; used only with *s* mode. The **a** flag requires file names in pairs: first the file to be sent, then the receiving file. For example, the command

```
kermit sa /usr/joe/stuff.c /usr/tom/src/thing.c
```

sends the file */usr/joe/stuff.c* but specifies its name as */usr/tom/src/thing.c* for the receiving system. The target directory must exist on the receiving system. The **a** flag implies the **f** and **x** flags described below.

b *baud*

Set the baud rate to *baud*.

d Debug mode. Tells kermit to print messages (on the standard output, not the standard error) that describe its actions.

e *esc* Change the escape character from the default '^' to the given *esc*; used only with *c* mode. The escape character marks commands to kermit *c* while it is running, as described below.

f Suppress file name case conversion.

h Host mode. Tells kermit to use the same line for file transfer and for communication; used with either *r* or *s* mode on the remote system only. When used with the **h** flag, kermit resets the line modes properly when it completes a file transfer. If the **h** flag is not used, it will probably leave

the remote system line in raw no-echo mode.

- l** **Image mode.** Tells **kermit** to send a full eight-bit byte for each character; this is necessary to transfer binary (non-ASCII) files. If the **l** flag is used when sending, it should also be used on the receiving system.
- l line** Use *line* to connect the two systems. For example, the command `kermit clb /dev/tty50 1200` tells **kermit** to use line `tty50` at 1200 baud instead of the default line and baud rate.
- m** **Macintosh mode.** Necessary when sending files to an Apple Macintosh; used only with **s** mode.
- t** **Tymnet mode.** Allows Tymnet to keep up with file transmission.
- x** Allows the specification of a complete pathname for the receiving file; used only with **s** mode. For example, the command

```
kermit sx mydir/stuff
```

sends the file `mydir/stuff` to `mydir/stuff` on the receiving system. The target directory must exist on the receiving system and the user must have write permission in it.

kermit c recognizes two escape sequences. The default escape character '^' can be changed with the **e** flag, as noted above.

- ^c** Exit from **kermit** and break the connection between the two systems. Note that this notation does *not* mean <ctrl-C>; rather, you must literally type a carat '^' and then the letter 'c'.
- ^s** Suspend **kermit** on the host system but do not hang up the line.

Unlike some file transfer protocols, **kermit** requires that the user invoke **kermit** on both the sending and receiving systems to transfer a file. As shown in the example below, the user normally uses **kermit c** to connect to the remote system, invokes **kermit** with the **h** flag in either send or receive mode on the remote system only, types '^s' to suspend the local **kermit c**, and finally invokes **kermit** in receive or send mode on the local system.

The following example demonstrates the use of **kermit**. The example assumes the user is already logged in on the local system. The communication line is `/dev/a10` and runs at 300 baud. The user wants to transfer `locfile` to the remote system and `remfile` from the remote system. System names are in *italics* on the left, user input is in Roman, system responses are in **bold**, and remarks are in parentheses.

```
local      kermit clb /dev/a10 300      (connect to remote system)
local      kermit: connected...      (type a carriage return)
remote     Coherent login:           (perform login procedure)
remote     kermit shi remfile        (send from remote)
remote     )S~_@X#T                  (part of protocol, ignore)
remote     ^s                         (suspend local kermit)
local      kermit: suspended.
```



```

local   kermit rilb /dev/a10 300      (receive on local)
local   kermit: Receiving REMFILE as remfile
local   kermit: done.
local   kermit clb /dev/a10 300      (connect again)
remote  kermit rhi                    (receive on remote)
remote  ^s                            (suspend local kermit)
local   kermit: suspended.
local   kermit silb /dev/a10 300 locfile (send from local)
local   kermit: Sending locfile as LOCFILE
local   kermit: done.
local   kermit clb /dev/a10 300      (connect again)
remote  <ctrl-D>                      (log off the remote system)
remote  Coherent login:
remote  ^c                            (disconnect local kermit)
local   kermit: disconnected.

```

SEE ALSO

"Kermit: A File-Transfer Protocol for Universities," *BYTE*, June 1984 pp. 255 ff., July 1984 pp. 143 ff.

DIAGNOSTICS

kermit may print the following error messages:

- Aborting with following error from remote host:
 - problem on receiving system.
- Bad line speed: illegal baud rate.
- Cannot create *name*: receiving system cannot create *name*.
- Cannot open file *name*: sending system cannot open *name*.
- Cannot open *line*: wrong *line* number.
- No line specified for connection: *line* argument missing.
- Receive failed: file not received.
- Send failed: file not sent.
- Speed setting not implemented: incorrect baud rate.
- Yes, I'm still here...: connect command repeated.

NOTES

If you type **kermit c** and get the message **kermit connected** but the remote system does not respond, check the line that connects the two systems and the ability of the remote system to accept a login on the line.

Remember always to log off the remote system when done; **kermit** will not do it for you. If you do not log off, the next person dialing into the remote system over the same line will be logged in as you, without having to go through any password procedure.

The file transfer protocol uses small (96 character) checksummed packets, with ACK/NAK responses from the receiving system. The timeout period is five seconds, and **kermit** does ten retries before it abandons an attempted file transfer.

The **kermit** protocol was developed at the Columbia University Center for Computing Activities.

Tymnet is a trademark of Tymshare, Inc. Macintosh is a trademark of Apple Computer Corp.

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User Reaction Report

To keep this manual and COHERENT free of bugs and facilitate future improvements, we would appreciate receiving your reactions. Please fill in the appropriate sections below, detach and mail to us. Thank you.

Mark Williams Company
1430 W. Wrightwood Avenue
Chicago, IL 60614

Name:

Company:

Address:

Phone:

Date:

Version and hardware used:

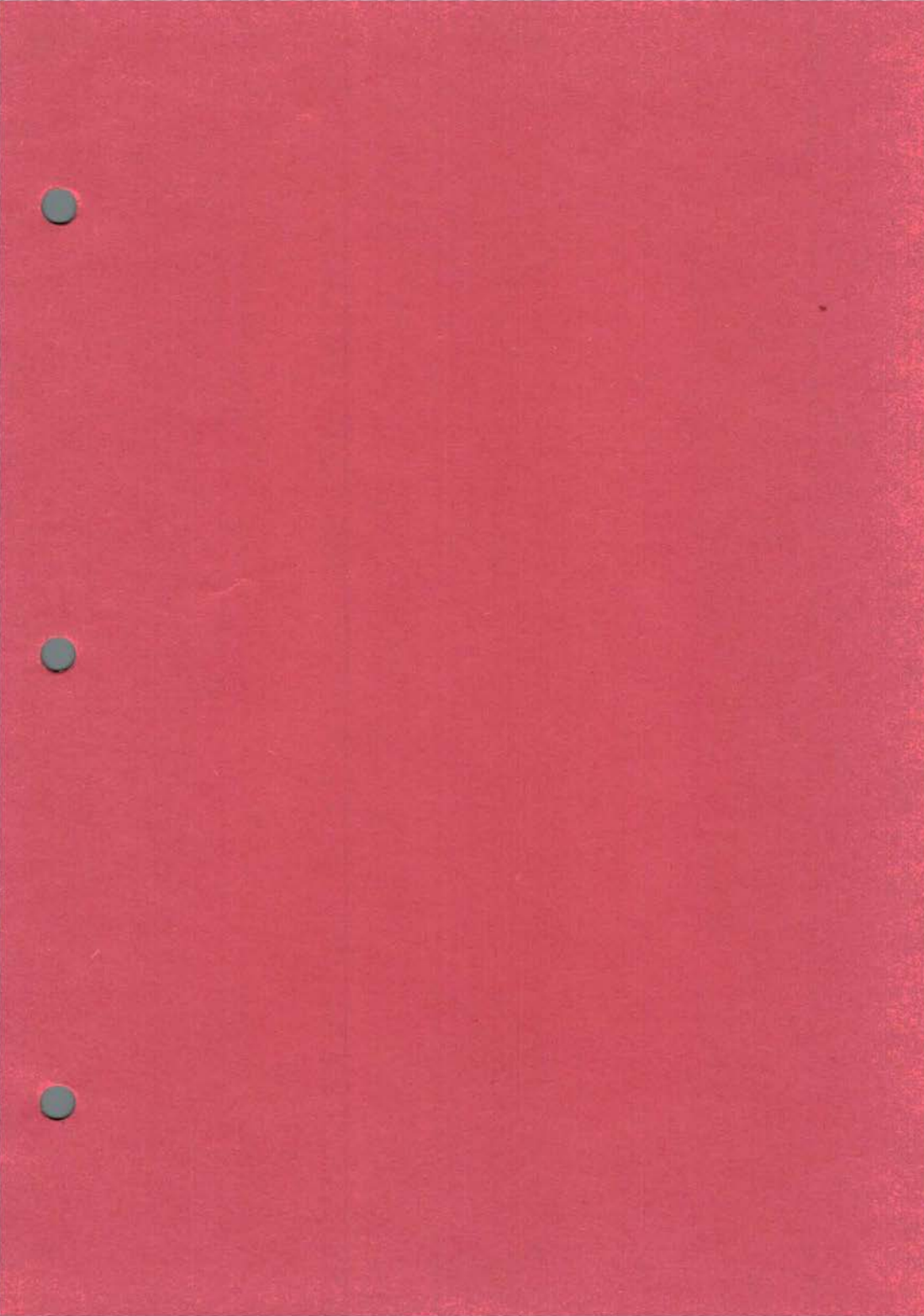
Did you find any errors in the manual?

Can you suggest any improvements to the manual?

Did you find any bugs in the software?

Can you suggest improvements or enhancements to the software?

Additional comments:



Corrections for

"C O H E R E N T Version 0.7.3 Preliminary Release Notes"

Page 5:

Near Center of the page,

"/dev/wd2"

should read

"/dev/hd2"

Page 8:

Section near the bottom of the page reading

"...standard time zone is Eastern Standard
Time (EDT), your daylight-savings time zone
is Easter..."

should read

"...standard time zone is Eastern Standard
Time (EST), your daylight-savings time zone
is Eastern..."

fdformat

fdformat

NAME

fdformat - format a floppy disk

USAGE

/etc/fdformat filesystem

DESCRIPTION

fdformat formats a floppy disk. This action will erase the previous contents of the disk.

Only the superuser may use fdformat.

EXAMPLES

/etc/fdformat /dev/fd1

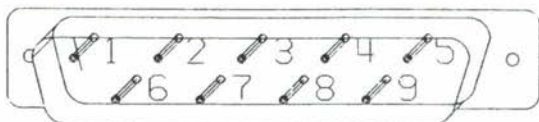
This command will format a disk in the built in drive.

DIAGNOSTICS

"I/O error" for a bad floppy, write protected floppy, or no floppy in drive.

Mouse connector

MALE DB-9

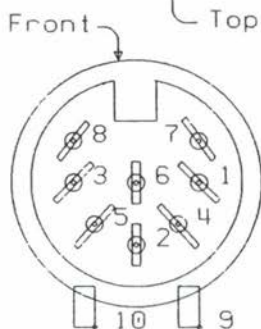
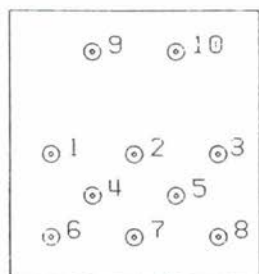


PIN	Description
1	Y(A) quadrature
2	X(A) quadrature
3	Y(B) quadrature
4	X(B) quadrature
5	BUTTON(2)
6	BUTTON(1)
7	+5
8	GND
9	BUTTON(3)

Monochrome video connector

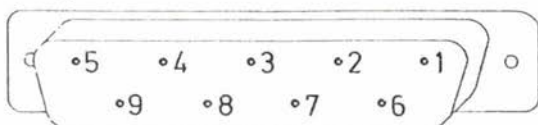
DIN-8

PIN	Description
1	-ECL Video out
2	GND
3	GND
4	+ECL Intensity
5	Vertical sync
6	GND
7	+ECL Video out
8	Horizontal sync
9	GND
10	GND



Character-Mode Video Connector

Female DB-9



PIN	Description
1	GND
2	GND
3	Not used
4	Not used
5	Not used
6	•Intensity
7	•Video
8	•Horizontal
9	-Vertical

RS 232 CONNECTOR

PIN	SIGNAL NAME
1	CHASSIS GROUND
2	TxD
3	RxD
4	RTS
5	CTS
6	DSR
7	SIGNAL GROUND
8	DCD
20	DTR

PRINTER CONNECTOR

PIN	SIGNAL NAME
1	_CDS
2	_JD0
3	CD1
4	CD2
5	CD3
6	CD4
7	CD5
8	CD6
9	CD7
10	_CACK
11	CRSY
18-25	GROUND

NOTES:

- The printer connector has the same pinout as the printer connector on the IBM PC.
- Both connectors are female DB25.

1

