

# **FORWARD**

## **TECHNOLOGY INCORPORATED**

### **SYSTEM INSTALLATION AND SET-UP GUIDE 3000**

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FORWARD TECHNOLOGY  
GATEWAY SYSTEM 3000

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August 15, 1983

# I. INSPECTION INSTRUCTIONS

The following procedure should be followed PRIOR to applying power to the unit.

Check to see that ALL CIRCUIT BOARDS are seated securely and that ALL CABLES are secure.

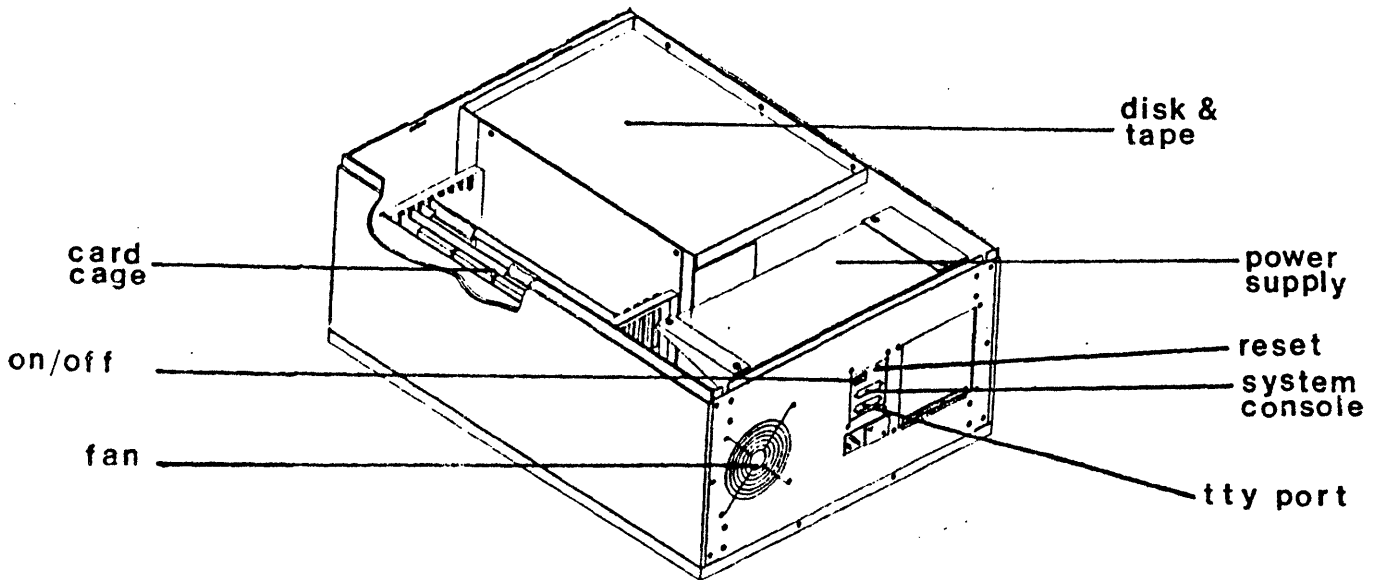
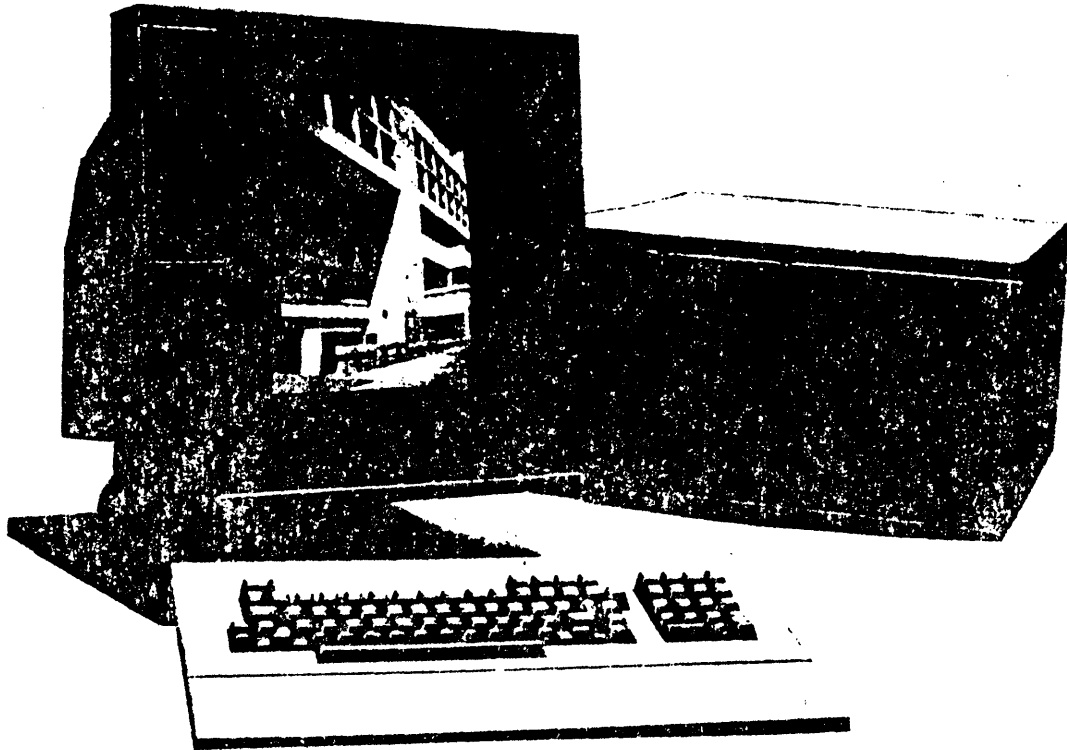


Figure 1 -- Forward Technology System 3000

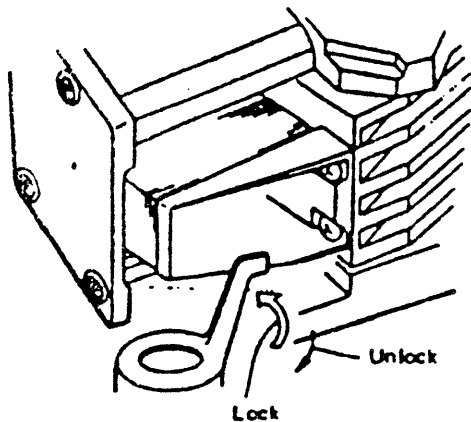
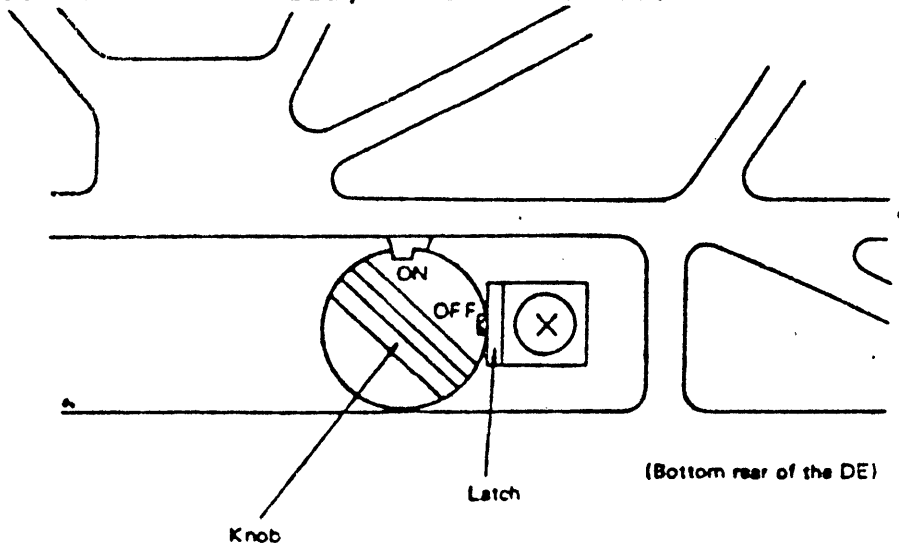
## II. UNLOCKING DISK HEADS

The following procedure should be followed to expose the DISK DRIVE LOCK:

1. Remove left side panel of the Desk Top Computer (DTC) to expose the DISK DRIVE LOCK inspection hole.
2. Turn DISK DRIVE LOCK from the ON position to the OFF position (See the diagrams in Figure 2)

NOTE: The actuator is locked during shipment; if it rotates when the disks are shipped, the heads and the disk may be damaged. The detent in the actuator should hold the actuator in place. If the actuator is not in the ON position when disk is received and Procedure III will not go to completion--call Factory.

3. Proceed to Section III, Boot Procedure.



Note: Turn the knob manually or with a coin and check that the convex portion of the latch meshes with the concave portion.

ON: Lock  
OFF: Unlock

Figure 2 -- Disk Drive Lock

### III. PROCEDURE FOR BOOTING UP SYSTEM

NOTE: Do NOT power up the system until an EIA RS-232 cable has been connected between the system console port and an ASCII terminal.

1. Configure an ASCII RS-232 terminal for 9600 baud, 8 data bits, one stop bit, and no parity. The cable should have "straight through" signal lines for pins 2, 3, and 7 only. If the terminal requires additional signals for Clear To Send (CTS) or Carrier Detect (CD), use a null modem cable configuration.
2. Plug the unit power cord into a standard grounded three prong socket with 110 volts AC/60 Hz for domestic machines and 220 volts AC/50 Hz for foreign installations.

NOTE: If connecting to a power source other than that specified on the SYSTEM SERIAL NUMBER TAG, power jumpers within the unit MUST be changed or damage will occur!!!

3. Apply power to the computer element by moving the power switch to the ON position. The power switch is located on the rear of the unit.
4. Press the RESET switch.

NOTE: The reset switch is located in the same area as the System ON/OFF switch.

5. Your system will perform the following operations:
  - a. Initialize the Graphics Terminal (if present).
  - b. Perform a diagnostic check of the FT-68X (allow 15 seconds).
  - c. Boot up the Xenix Operating System from the appropriate physical device.

NOTE: If you wish to change the physical boot device, consult the chart labeled J2 Connector Jumper Settings.

6. Your system has been configured at the factory to boot from the System Disk.

To Boot from the Disk:

- a. The power on or reset switch will start the prom execution of the boot and will boot from the device which

the J2 (CPU) connector is jumpered for. To boot from the disk, jumper pins 3 to 4 only.

- b. The boot program will announce the loading procedure and version # of the proms.
  - c. This will start the kernel. If you have a 768KB, local extended memory, you may then enter a "y" to run the test.
  - d. When the test is complete and passed, the single user system is up and running.
7. Your system will display basic system information concerning the size of local and multibus memory and display the version number of the XENIX operating system. This banner will be followed by a "fti> " prompt.
  8. To mount the multiuser version of XENIX and display basic date and time information, enter a "CTRL D."

#### IV. PROCEDURE TO GRACEFULLY SHUT DOWN THE SYSTEM

1. Login to root directory on the system console.
2. Enter the command.

```
fti> /etc/haltsys
```

NOTE: Your system will execute the haltsys command and display the following message:

```
***NORMAL SYSTEM SHUTDOWN***
```

3. You then have 60 seconds to turn off the system power if you do not want to Boot system again.

V. FT-68X J2 JUMPER DIAGRAMS



Figure 3 -- Top View of FT-68X Connectors

	J2 PIN NUMBERS							
BOOT DEVICE	1	3	5	7	9	11	13	15
SYSTEM DISC	0	X	0	0	0	0	0	0
ARCHIVE TAPE	0	0	X	0	0	0	0	0
CIPHER TAPE	0	0	0	X	0	0	0	0
B-PORT ON 68X	0	0	0	0	X	0	0	0
SYSTEM DISC standalone prog	X	X	0	0	0	0	0	0

where X = Jumper In  
0 = Jumper Out

Additional Jumpers:

Pin Number	Description
17	X = Skip power-up diagnostics
19	X = Verbose boot-up
31	X = Stay in diagnostic monitor do not "boot"

J2 Conector Jumper Settings On the FT-68X  
Figure 4



## VI. LOADING XENIX-1/2" TAPE

### Instructions for Version 2.2 XENIX - System 3000 ROOT and USR File Systems

1. To Build the ROOT (/) file system from scratch:
  - a. Load the BOOT tape into the tape drive (NOTE: make sure drive is ONLINE).
  - b. Set jumpers on the CPU J2 connector for boot from Cipher Tape. (Jumpers Pins 7 to 8 & 19 to 20) See Figure 4 - FT-68X J2 Jumper Diagram.
  - c. Power on the system and push reset button. Make sure that port A of the CPU (System Console) is connected to an ASCII terminal.
  - d. When the tape is loaded the system will prompt you with

Load standalone program or kernel  
:

- e. If this is a virgin disk, or it needs to be reformatted, load the FORMATTER program.

To load the routine; at the prompt type in:

cp(0,1)[CR]

The tape will load the routine into memory and prompt with:

Loaded, hit return

To begin execution; type a carriage return ([CR]). (see manual page for program usage)

- f. The next step is to layout the ROOT file system by running the MKFS program. The program will prompt you for the necessary parameters.

Load standalone program or kernel

: cp(0,2)[CR]

Loaded, hit return [CR]

file system size: 14280[CR]

file system: ip(0,0)[CR]

- g. The next step is to load the RESTOR program. The program will prompt you for the restor device and destination file system. NOTE: This program will take about 10 minutes to complete.

```
Load standalone program or kernel
: cp(0,3) [CR]
Loaded, hit return [CR]
```

Load the ROOT file system dump tape in the tape drive.

```
tape? cp(0,0) [CR]
disk? ip(0,0) [CR]
last chance before scribbling on disk. [CR]
```

- h. When you have completed the building of the ROOT file system. Put the BOOT tape back into the tape drive and reboot by pushing the system reset button.
- i. You must now boot up the "/xenix" kernel and clean the ROOT file system.

```
Load standalone program or kernel
: [CR]
ip(0,0)xenix
Loaded, hit return [CR]
```

- j. If you have the extended 768KB local memory option, the kernel will ask you if you would like to run the memory test. If you select to run the test, it will take approximately 2 minutes.
- k. The kernel will ask you if you wish to "clean" the file system. You should always respond affirmatively.

```
Do you wish to clean the file system? (y/n) y[CR]
```

- l. When the clean process is completed, set the date on the system. Refer to Xenix Manual, Volume I, for instructions. The syntax of the date command is, "date [[YY]MMDD]HHmm[.ss]".

```
where YY is year
      MM is month
      DD is day
      HH is hour
      mm is minute
      ss is second
```

For example:

```
fti> date 8308150930 [CR]
```

- m. To load the boot blocks to the disk drive.

```
fti> copy.boots[CR]
```

- 2. To install the /dev/usr and /dev/u file systems:

- a. A shell script has been supplied to build the /dev/usr and /dev/u file systems. The shell script is run by typing in:

```
fti> nodes.new[CR]
```

This program will build and clean the two file systems.

- b. To restore the USR files, mount the USR dump tape into the tape drive and execute:

```
fti> restor rf /dev/rmt1 /dev/usr[CR]  
Last chance before scribbling on /dev/usr. [CR]
```

- c. The USR file system must now be cleaned before going to the multi-user state, type:

```
fti> fsck -y -t /dev/fsck /dev/usr[CR]
```

3. To boot system from disk.

- a. Stop system execution and turn off the system by typing:

```
fti> /etc/haltsys[CR]
```

- c. Restore the J2 jumpers to boot from disk. (Jumper Pin 3 to 4)

## VII. LOADING XENIX-1/4" CARTRIDGE TAPE

### Instructions for Version 2.2 XENIX - System 3000 ROOT and USR File Systems

1. To Build the ROOT (/) file system from scratch:
  - a. Load the BOOT tape into the tape drive.
  - b. Set jumpers on the CPU J2 connector for boot from 1/4" Cartridge Tape. (Jumpers Pins 5 to 6 & 19 to 20) See Figure 4 - FT-68X J2 Jumper Diagram.
  - c. Power on the system and push reset button. Make sure that port A of the CPU (System Console) is connected to an ASCII terminal.
  - d. When the tape is loaded the system will prompt you with  
Load standalone program or kernel  
:
  - e. If this is a virgin disk, or it needs to be reformatted, load the FORMATTER tape into the tape drive.

To load the routine; at the prompt type in:

```
rt(0,0)[CR]
```

The tape will load the routine into memory and prompt with:

```
Loaded, hit return
```

To begin execution; type a carriage return ([CR]). (see manual page for program usage). **ENTER "F" TO FORMAT, TAKES ≈ 15 MIN.**  
**H= help menu.**

- f. Replace the BOOT tape into the tape drive and reset the processor by pushing the system reset button. The next step is to layout the ROOT file system by loading the MKFS tape into the tape drive. The program will prompt you for the necessary parameters.

```
Load standalone program or kernel
```

```
: rt(0,0)[CR]
```

```
Loaded, hit return [CR]
```

```
file system size: 14280[CR]
```

```
file system: ip(0,0)[CR]
```

- g. Replace the BOOT tape into the tape drive and again reset the processor. Then load the RESTOR tape into the tape drive. The program will prompt you for the restor device and destination file system. NOTE: This program will

take about 15 minutes to complete.

```
Load standalone program or kernel
: rt(0,0)[CR]
Loaded, hit return [CR]
```

Load the ROOT file system dump tape in the tape drive.

```
tape? rt(0,0)[CR]
disk? ip(0,0)[CR]
last chance before scribbling on disk. [CR]
```

h. When you have completed the building of the ROOT file system. Put the BOOT tape back into the tape drive and reboot the processor.

i. You must now boot up the "/xenix" kernel and clean the ROOT file system.

```
Load standalone program or kernel
: [CR]
ip(0,0)xenix
Loaded, hit return [CR]
```

j. If you have the extended 768KB local memory option, the kernel will ask you if you would like to run the memory test. If you select to run the test, it will take approximately 2 minutes.

k. The kernel will ask you if you wish to "clean" the file system. You should always respond affirmatively.

```
Do you wish to clean the file system? (y/n) y[CR]
```

l. When the clean process is completed, set the date on the system. Refer to Xenix Manual, Volume I, for instructions. The syntax of the date command is, "date [[YY]MMDD]HHmm[.ss]".

```
where YY is year
      MM is month
      DD is day
      HH is hour
      mm is minute
      ss is second
```

For example:

```
fti> date 8308150930 [CR]
```

m. To load the boot blocks to the disk drive.

```
fti> copy.boots[CR]
```

2. To install the /dev/usr and /dev/u file systems:

- a. A shell script has been supplied to build the /dev/usr and /dev/u file systems. The shell script is run by typing in:

```
fti> nodes.new[CR]
```

This program will build and clean the two file systems.

*TAKES ≈ 5 min.*

- b. To restor the USR files, mount the USR dump tape into the tape drive and execute:

```
fti> restor rf /dev/rrt0 /dev/usr[CR]
```

Last chance before scribbling on /dev/usr. [CR]

*TAKES ≈ 20 min.*

- c. The USR file system must now be cleaned before going to the multi-user state, type:

```
fti> fsck -y -t /dev/fsck /dev/usr[CR]
```

3. To boot system from disk.

- a. Stop system execution and turn off the system by typing:

```
fti> /etc/haltsys[CR]
```

- c. Restore the J2 jumpers to boot from disk. (Jumper Pin 3 to 4)

## VIII. DUMPING XENIX - 1/2" TAPE

### 1. To Create a DUMP of the ROOT File System.

a. Mount 1/2" tape in drive and insure that it is ONLINE and WRITE ENABLED. Approximately all systems can dump the ROOT file system to a single 600', 1/2" tape.

b. Make sure system is in single user mode by typing:

```
fti> kill -1 1[CR]
```

c. To dump the ROOT File System type in:

```
fti> dump 0fu /dev/rmt1 /dev/rroot[CR]
```

### 2. Create a DUMP of the /USR and /U File Systems

a. Mount 1/2" tape in drive and insure that it is ONLINE and WRITE ENABLED.

NOTE: If /usr or /u file systems are too large for 2400 ft. tapes, refer to XENIX Manuals for instructions on multi-tape dumps.

b. Type in:

```
fti> dump 0fu /dev/rmt1 /dev/rusr[CR]
```

```
fti> dump 0fu /dev/rmt1 /dev/ru[CR]
```

## IX. DUMPING XENIX - 1/4" TAPE

### 1. To Create a DUMP of the ROOT File System.

a. Mount 1/4" cartridge in tape drive, making sure that the cartridge is OFF SAFE.

b. Make sure system is in single user mode by typing:

```
fti> kill -1 1[CR]
```

c. Type in:

```
fti> dump 0fu /dev/rvt0 /dev/rroot[CR]
```

### 2. Create a DUMP of the /USR and /U File Systems

a. Mount 1/4" cartridge in Archive drive. Make sure that cartridge is OFF SAFE.

NOTE: if /usr or /u file systems are too large for 1/4" cartridge tapes, refer to Xenix Manuals for instructions on multi-tape dumps.

b. Type in:

```
fti> dump 0fsu /dev/rvt0 1000 /dev/rusr[CR]
```

```
fti> dump 0fsu /dev/rvt0 1000 /dev/ru[CR]
```



## Instructions for Installing Multiuser XENIX

- . Connect the appropriate octal hardware.
- . Bring the system up to single user.
- . Make sure the following underlined entries are in the /etc/ttys file. If not add them with vi.

```
12console  
02tty01  
12tty10  
12tty11  
12tty12  
12tty13  
12tty14  
12tty15  
12tty16  
12tty17  
12ttyp0  
12ttyp1  
12ttyp2  
12ttyp3
```

NOTE: IT MAY BE NECESSARY TO VERIFY THAT THE HOST SYSTEM PROPERLY IDENTIFIES WHAT TYPE OF TERMINAL EMULATION IS BEING USED. CHECK .PROFILE FOR TERM=?.

EXAMPLES: TERM=av  
          =vt52  
          =vt100

```
cd /sys/conf
```

Make sure that xenixconf has the underlined "c8" entry with no preceding asterisk. If there is an asterisk, remove it with vi.

```
*  
*  
* Devices  
* To add a device to the kernel remove the * and make xenix.  
*  
* The Fujitsu/Interphase 2180 device is ip.  
ip 1  
* The console device off of the CPU (68X) is co.  
co 1  
* The minor numbers for the following filesystems needed is:  
root ip C  
pipe ip C  
swap ip 1 1 7139  
*The Rimfire/Archive device is rt.  
rt 1  
*UNET Devices are: me, ptc, pts, uu_, up_ and ud_.  
me 1  
ptc 1  
pts 1  
uu_ 1  
up_ 1  
*Cipher/Tapemaster is the cp device.  
*cp 1  
*The CDC Octal card is the c8 device and the 2nd Octal card device is c2.  
c8 1  
*c2 1  
*keyboard 1  
*  
* Local parameters  
*
```

```
daylight 1
cmask 0
```

\* Tunable Parameters

\* Dont change them unless you're sure you know what you're doing!

\* buffers can change up to 60 for more multibus memory. Note: buffers must be divisable by 4. 4-512 byte buffers per 2K page.

```
buffers 40
procs 140
mounts 4
inodes 120
files 120
clists 150
locks 100
```

Type "make xenix" for a non-UNET xenix or

→type "make Uxenix" for a UNET xenix

Wait until Xenix is created - usually takes a minute or two.

- cp xenix /xenix
- cd /dev

Make sure the following underlined entries are present in /dev. If they aren't create them with a sequence of commands like the following.

```
total 41
drwxrwxrwx 2 root      192 Nov  7  1983 UNET
brw-r--r-- 1 root      1,  7 Dec 31  1969 all
brw-r--r-- 1 root      1,  6 Mar 19  1984 boot
crw--w--w- 1 root      0,  0 Jan  7 07:23 console
crw-rw-rw- 2 root      3,  2 Dec 18 10:16 cua0
crw--w--w- 2 root      1,  7 Jan  7 09:50 cu10
crw-rw-rw- 1 root      0,  9 May 21  1982 gty01
crw-r--r-- 1 sys       3,  1 Dec 28  1983 kmem
crw-rw-rw- 2 root     19,  0 Jan  7 09:50 lp
crw-r--r-- 1 sys       3,  0 Apr 14  1982 mem
crw-rw-rw- 2 root     19,  0 Jan  7 09:50 mlp0
crw-rw-rw- 2 root      3,  2 Dec 18 10:16 null
crw-rw-rw- 1 root      8,  0 Nov 15 12:49 pty0
crw-rw-rw- 1 root      8,  1 Jul 19 11:34 pty1
crw-rw-rw- 1 root      8,  2 Nov  7  1983 pty2
crw-rw-rw- 1 root      8,  3 Nov  7  1983 pty3
crw-r--r-- 1 root      5,  7 Dec 31  1969 rall
brw-r--r-- 1 root      1,  0 Jul 31 01:20 root
crw-r--r-- 1 root      5,  0 Feb 21  1983 rroot
crw-rw-rw- 1 root     13,  0 Jan  7 04:25 rrt0
brw-rw-rw- 1 root      3,  0 Oct  2 17:12 rt0
crw-r--r-- 1 root      5,  3 Jul 31 07:50 ru
crw-r--r-- 1 root      5,  2 Jul 31 07:49 rusr
brw-r--r-- 1 sys       1,  1 Apr  2  1982 swap
crw-rw-rw- 1 root      2,  0 Nov 14  1982 tty
crw-rw-rw- 1 root      0,  1 May 30  1984 tty01
crw--w--w- 1 jims      1,  0 Jan  7 09:50 tty10
crw--w--w- 1 root      1,  1 Jan  4 17:04 tty11
crw-rw-rw- 1 root      1,  2 Mar 26  1984 tty12
crw--w--w- 1 root      1,  3 Dec 18 10:17 tty13
crw--w--w- 1 melani 1,  4 Jan  4 13:03 tty14
crw--w--w- 1 root      1,  5 Dec 17 11:14 tty15
crw-rw-rw- 1 root      1,  6 Apr 11  1984 tty16
crw--w--w- 2 root      1,  7 Jan  7 09:50 tty17
crw--w--w- 1 root      9,  0 Nov 15 12:49 ttyp0
```

```

crw--w--w- 1 root 9, 2 Mar 12 1984 tty2
crw--w--w- 1 root 9, 3 Mar 12 1984 tty3
brw-r--r-- 1 root 1, 3 Dec 23 1983 u
-rwxr-x--- 1 root 2048C Nov 10 1983 umt1
brw-r--r-- 1 root 1, 2 Nov 28 1983 usr

```

```

/etc/mknod tty10 c 1 0
/etc/mknod tty11 c 1 1
/etc/mknod tty12 c 1 2
/etc/mknod tty13 c 1 3
/etc/mknod tty14 c 1 4
/etc/mknod tty15 c 1 5
/etc/mknod tty16 c 1 6
/etc/mknod tty17 c 1 7

```

THESE ARE THE COMMANDS TO ENTER.

/etc/haltsys - Reboot and go multiuser.

Test each port by plugging in a terminal and doing the "who" command after logging in. If the terminal port printouts (from "who") don't match the physical port that you are plugged into, the cabling is wrong - fix it.

## Instructions for Installing Cipher 1/2" Tape

1. Connect the appropriate hardware. Remembering the controller board must go between the last controller and the processor.
2. Bring the system up single user.
3. `cd sys/conf`
4. Make sure that `xenixconf` has the underlined "cp" entry with no preceding asterisk. If there is an asterisk, remove it with `vi`.

```
*
*
* Devices
* To add a device to the kernel remove the * and make xenix.
*
* The Fujitsu/Interphase 2189 device is ip.
ip      1
* The console device off of the CPU (68X) is co.
co      1
* The minor numbers for the following filesystems needed is:
root    ip      0
pipe    ip      C
swap    ip      1
* The Rimfire/Archive device is rt.
rt      1
* UNET Devices are: me, ptc, pts, uu_, up_ and ud_.
me      1
ptc     1
pts     1
uu_     1
up_     1
ud_     1
* Cipher/Tapemaster is the cp device.
cp      1
* The CDC Octal card is the c8 device and the 2nd Octal card device
* is c2.
*c8     1
*c2     1
*keyboard      1
*
*      Local parameters
*
timezone      (5*60)
daylight      1
cmask        C
*
*      Tunable Parameters
*
*      Dont change them unless you're sure you know what you're doing!
*
* buffers can change up to 60 for more multibus memory. Note: buffers
* must be divisable by 4. 4-512 byte buffers per 2K page.
buffers      40
procs        140
mounts       4
inodes       120
files        120
```

```
clists      150
locks      100
```

6. Type "make xenix" for a non-UNET xenix  
or  
type "make Uxenix" for a UNET xenix.  
Wait until Xenix is created - usually takes a minute or two.
7. cp xenix /xenix
8. cd /dev
9. Type in the following commands in the /dev directory.  

```
/etc/mknod mt1 b 2 0
/etc/mknod nrmt1 c 6 128
/etc/mknod rmt1 c 6 0
/etc/mknod umt1 b 2 32
/etc/mknod unrmt1 c 6 160
/etc/mknod urmt1 c 6 32
```
10. /etc/haltsys - Reboot and go multiuser.
11. Test the tape drive by writing and reading a tape using the command:  

```
tar cvbf /dev/rmt1 /dev/rusr
tar xvbf /dev/rmt1 /dev/rusr
```

## NOTES :

The command, install.cp does the same routine as step 9 above. install.cp is in shells directory.

When trying to run a system with both a cipher and casset tape drives, The cpu must be configured to handle 4 buss masters - DISK, CIPHER, RIMFIRE, CPU in that priority. That is to refer to MOD. INSTRUCTIONS, CPU, 1/2" TAPE OPTION, DRWNG# 10-0028-00, (FTI)

When copying from tape to tape identify ~~whether~~ dd or tar format.

examples:

```
dd if=/dev/rmt0 of=/dev/rmt1 bs=1b
where bs= block size. see: man dd | more.
```