2.10 Post-installation

Configuration of various options follows the successful installation. An option can be configured by re-entering the configuration options before booting the new FreeBSD system or after installation using `sysinstall` and selecting **Configure**.

2.10.1 Network Device Configuration

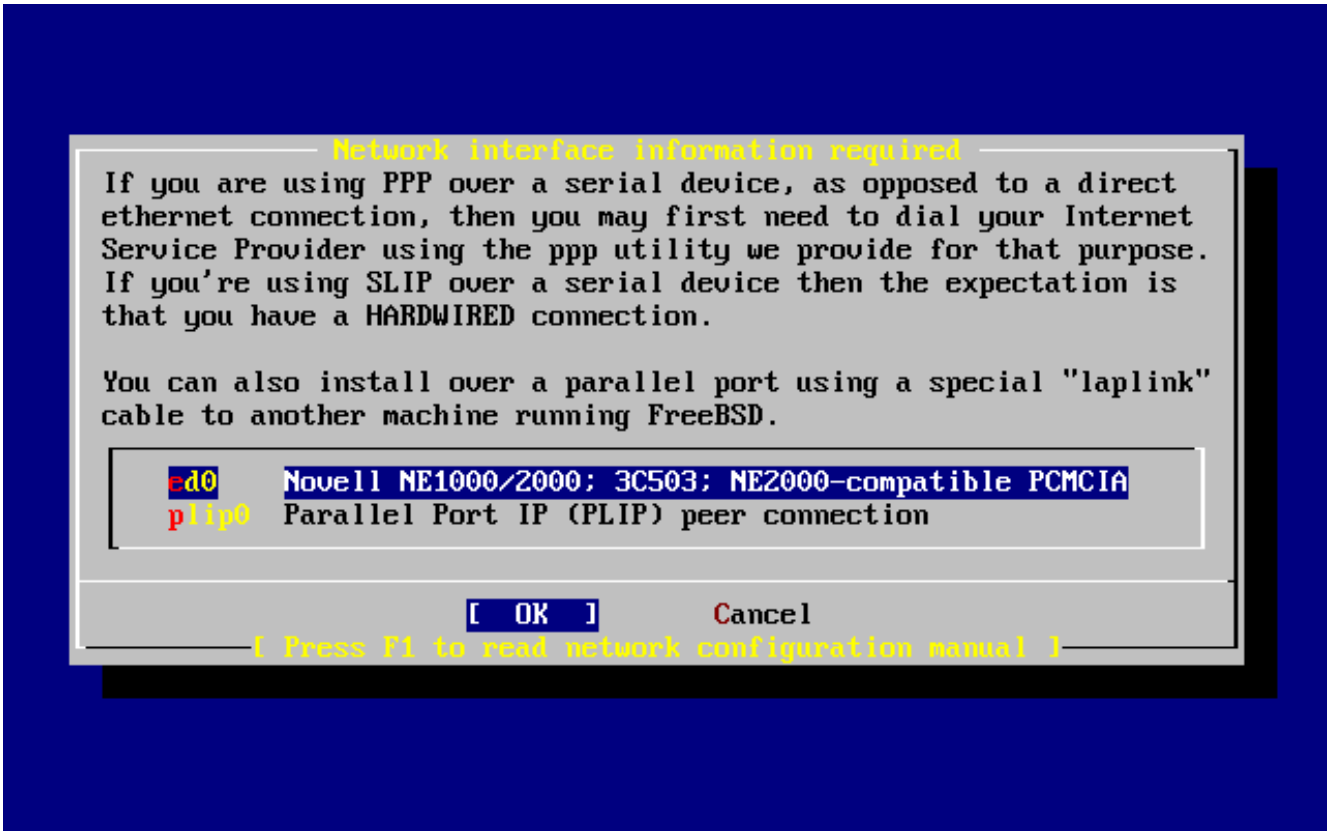
If you previously configured PPP for an FTP install, this screen will not display and can be configured later as described above.

For detailed information on Local Area Networks and configuring FreeBSD as a gateway/router refer to the Advanced Networking chapter.

```
                    User Confirmation Requested
Would you like to configure any Ethernet or PPP network devices?

                          [ Yes ]   No
```

To configure a network device, select [Yes] and press **Enter**. Otherwise, select [No] to continue.

Figure 2-29. Selecting an Ethernet Device



Select the interface to be configured with the arrow keys and press **Enter**.

```
                    User Confirmation Requested
Do you want to try IPv6 configuration of the interface?

                              Yes    [ No ]
```

In this private local area network, the current Internet type protocol (IPv4) was sufficient and [No] was selected with the arrow keys and **Enter** pressed.

If you are connected to an existing IPv6 network with an RA server, then choose [Yes] and press **Enter**. It will take several seconds to scan for RA servers.

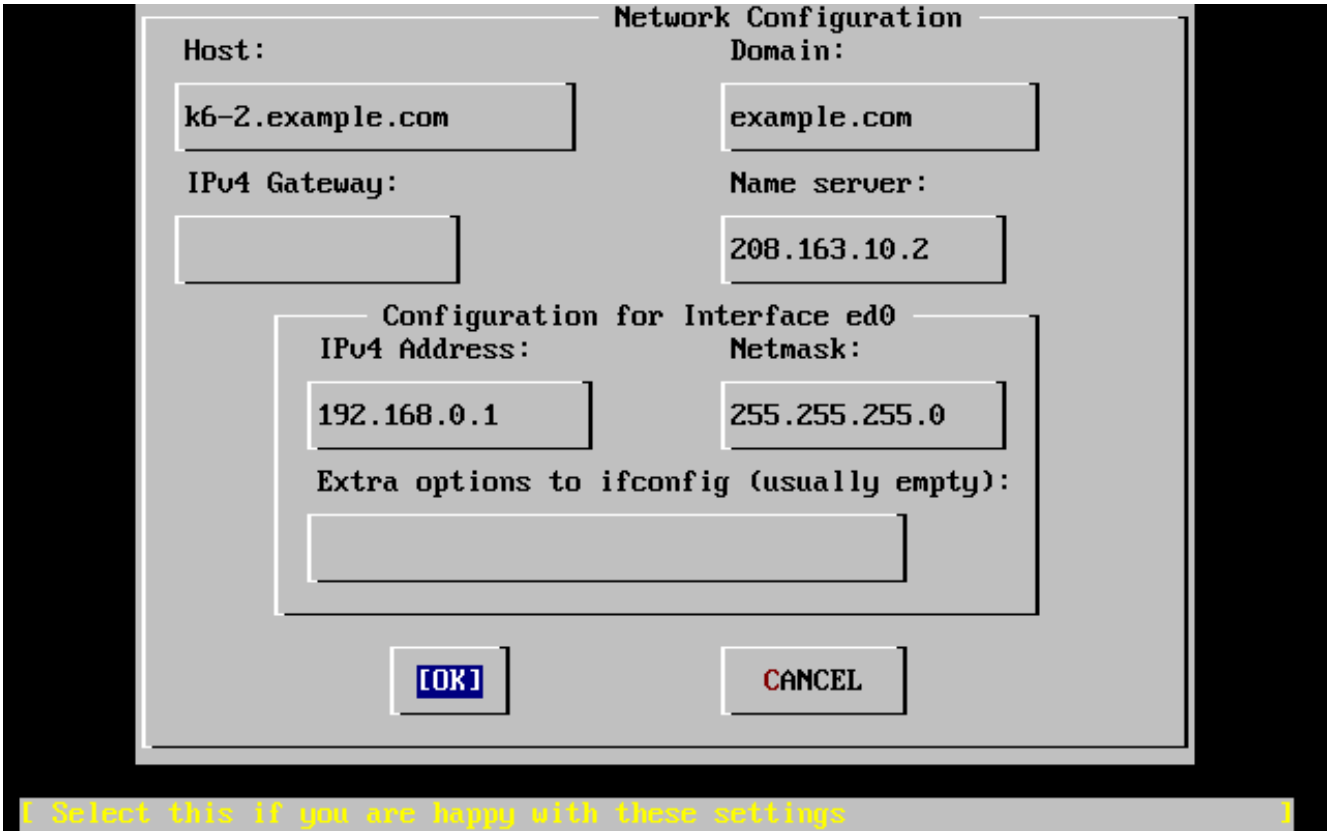
```
                    User Confirmation Requested
Do you want to try DHCP configuration of the interface?

                              Yes    [ No ]
```

If DHCP (Dynamic Host Configuration Protocol) is not required select [No] with the arrow keys and press **Enter**.

Selecting [Yes] will execute **dhclient**, and if successful, will fill in the network configuration information automatically. Refer to Section 29.5 for more information.

The following Network Configuration screen shows the configuration of the Ethernet device for a system that will act as the gateway for a Local Area Network.

Figure 2-30. Set Network Configuration for ed0



Use **Tab** to select the information fields and fill in appropriate information:

Host

The fully-qualified hostname, such as `k6-2.example.com` in this case.

Domain

The name of the domain that your machine is in, such as `example.com` for this case.

IPv4 Gateway

IP address of host forwarding packets to non-local destinations. You must fill this in if the machine is a node on the network. *Leave this field blank* if the machine is the gateway to the Internet for the network. The IPv4 Gateway is also known as the default gateway or default route.

Name server

IP address of your local DNS server. There is no local DNS server on this private local area network so the IP address of the provider's DNS server (`208.163.10.2`) was used.

IPv4 address

The IP address to be used for this interface was `192.168.0.1`

Netmask

The address block being used for this local area network is `192.168.0.0` -

`192.168.0.255` with a netmask of `255.255.255.0`.

Extra options to ifconfig

Any interface-specific options to `ifconfig` you would like to add. There were none in this case.

Use **Tab** to select [OK] when finished and press **Enter**.

```
                    User Confirmation Requested
      Would you like to bring the ed0 interface up right now?

                              [ Yes ]   No
```

Choosing [Yes] and pressing **Enter** will bring the machine up on the network and be ready for use. However, this does not accomplish much during installation, since the machine still needs to be rebooted.

2.10.2 Configure Gateway

```
                    User Confirmation Requested
     Do you want this machine to function as a network gateway?

                              [ Yes ]    No
```

If the machine will be acting as the gateway for a local area network and forwarding packets between other machines then select [Yes] and press **Enter**. If the machine is a node on a network then select [No] and press **Enter** to continue.

2.10.3 Configure Internet Services

```
                    User Confirmation Requested
  Do you want to configure inetd and the network services that it provides?

                                Yes   [ No ]
```

If [No] is selected, various services such **telnetd** will not be enabled. This means that remote users will not be able to **telnet** into this machine. Local users will still be able to access remote machines with **telnet**.

These services can be enabled after installation by editing `/etc/inetd.conf` with your favorite text editor. See Section 29.2.1 for more information.

Select [Yes] if you wish to configure these services during install. An additional confirmation will display:

```
                    User Confirmation Requested
 The Internet Super Server (inetd) allows a number of simple Internet
 services to be enabled, including finger, ftp and telnetd.  Enabling
 these services may increase risk of security problems by increasing
 the exposure of your system.

 With this in mind, do you wish to enable inetd?

                              [ Yes ]   No
```

Select [Yes] to continue.

```
                      User Confirmation Requested
inetd(8) relies on its configuration file, /etc/inetd.conf, to determine
which of its Internet services will be available.  The default FreeBSD
inetd.conf(5) leaves all services disabled by default, so they must be
specifically enabled in the configuration file before they will
function, even once inetd(8) is enabled.  Note that services for
IPv6 must be separately enabled from IPv4 services.

Select [Yes] now to invoke an editor on /etc/inetd.conf, or [No] to
use the current settings.

                              [ Yes ]   No
```

Selecting [Yes] will allow adding services by deleting the # at the beginning of a line.

Figure 2-31. Editing `inetd.conf`

```
^[ (escape) menu  ^y search prompt  ^k delete line   ^p prev li   ^g prev page
^o ascii code     ^x search         ^l undelete line ^n next li   ^v next page
^u end of file    ^a begin of line  ^w delete word   ^b back 1 char
^t top of text    ^e end of line    ^r restore word  ^f forward 1 char
^c command        ^d delete char    ^j undelete char ^z next word
=====line 1 col 0 lines from top 1 ============================================
# $FreeBSD: src/etc/inetd.conf,v 1.73.10.2.4.1 2010/06/14 02:09:06 kensmith Exp
#
# Internet server configuration database
#
# Define *both* IPv4 and IPv6 entries for dual-stack support.
# To disable a service, comment it out by prefixing the line with '#'.
# To enable a service, remove the '#' at the beginning of the line.
#
#ftp    stream  tcp     nowait  root    /usr/libexec/ftpd       ftpd -l
#ftp    stream  tcp6    nowait  root    /usr/libexec/ftpd       ftpd -l
#ssh    stream  tcp     nowait  root    /usr/sbin/sshd          sshd -i -4
#ssh    stream  tcp6    nowait  root    /usr/sbin/sshd          sshd -i -6
#telnet stream  tcp     nowait  root    /usr/libexec/telnetd    telnetd
#telnet stream  tcp6    nowait  root    /usr/libexec/telnetd    telnetd
#shell  stream  tcp     nowait  root    /usr/libexec/rshd       rshd
#shell  stream  tcp6    nowait  root    /usr/libexec/rshd       rshd
#login  stream  tcp     nowait  root    /usr/libexec/rlogind    rlogind
#login  stream  tcp6    nowait  root    /usr/libexec/rlogind    rlogind
file "/etc/inetd.conf", 118 lines
```

After adding the desired services, pressing **Esc** will display a menu which will allow exiting and saving the changes.

2.10.4 Enabling SSH login

```
                    User Confirmation Requested
                 Would you like to enable SSH login?
                          Yes       [  No  ]
```

Selecting [Yes] will enable sshd(8), the daemon program for **OpenSSH**. This will allow secure remote access to your machine. For more information about **OpenSSH** see Section 14.11.

2.10.5 Anonymous FTP

```
                        User Confirmation Requested
Do you want to have anonymous FTP access to this machine?

                                Yes    [ No ]
```

2.10.5.1 Deny Anonymous FTP

Selecting the default [No] and pressing **Enter** will still allow users who have accounts with passwords to use FTP to access the machine.

2.10.5.2 Allow Anonymous FTP

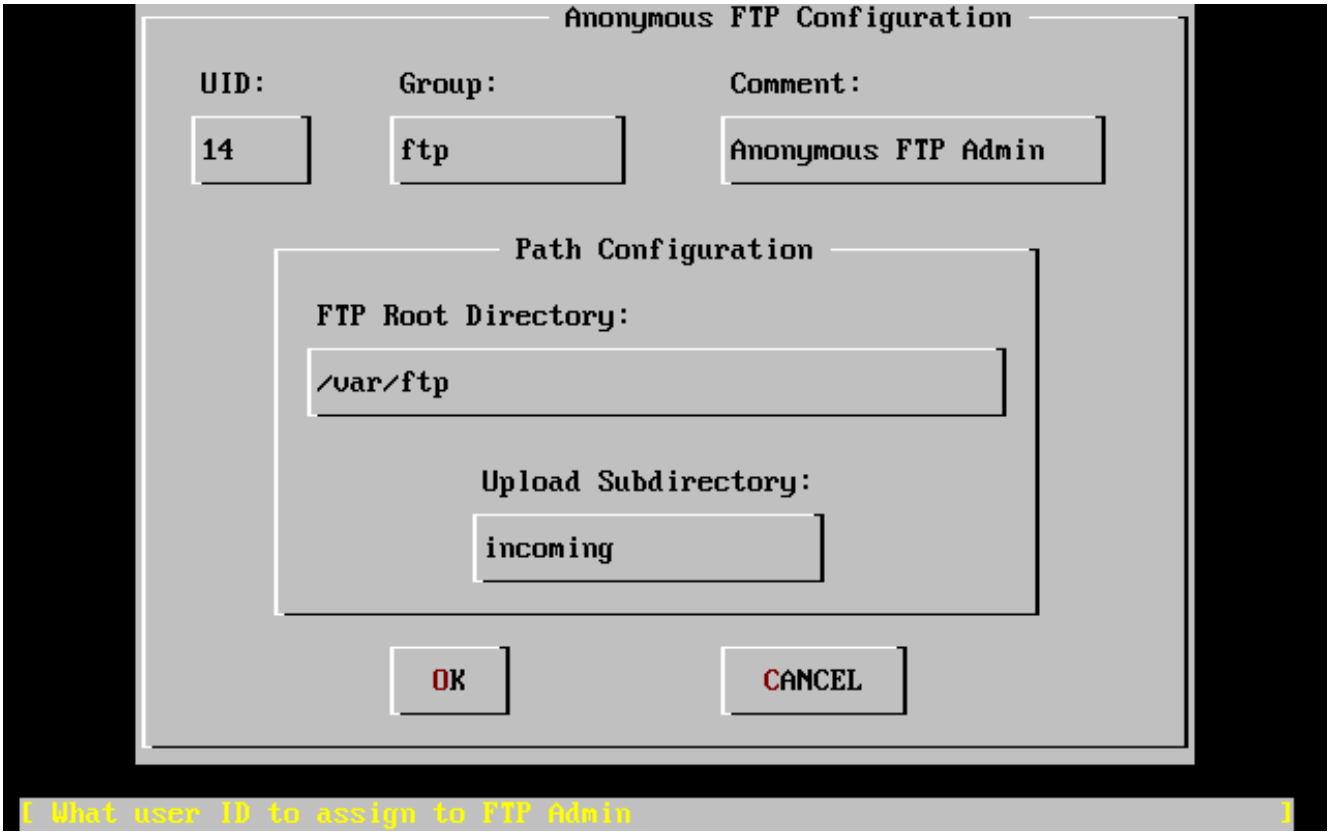
Anyone can access your machine if you elect to allow anonymous FTP connections. The security implications should be considered before enabling this option. For more information about security see Chapter 14.

To allow anonymous FTP, use the arrow keys to select [Yes] and press **Enter**. An additional confirmation will display:

```
                        User Confirmation Requested
Anonymous FTP permits un-authenticated users to connect to the system
FTP server, if FTP service is enabled.  Anonymous users are
restricted to a specific subset of the file system, and the default
configuration provides a drop-box incoming directory to which uploads
are permitted.  You must separately enable both inetd(8), and enable
ftpd(8) in inetd.conf(5) for FTP services to be available.  If you
did not do so earlier, you will have the opportunity to enable inetd(8)
again later.

If you want the server to be read-only you should leave the upload
directory option empty and add the -r command-line option to ftpd(8)
in inetd.conf(5)

Do you wish to continue configuring anonymous FTP?

                           [ Yes ]         No
```

This message informs you that the FTP service will also have to be enabled in `/etc/inetd.conf` if you want to allow anonymous FTP connections, see Section 2.10.3. Select [Yes] and press **Enter** to continue; the following screen will display:

Figure 2-32. Default Anonymous FTP Configuration



Use **Tab** to select the information fields and fill in appropriate information:

UID

> The user ID you wish to assign to the anonymous FTP user. All files uploaded will be owned by this ID.

Group

> Which group you wish the anonymous FTP user to be in.

Comment

> String describing this user in `/etc/passwd`.

FTP Root Directory

> Where files available for anonymous FTP will be kept.

Upload Subdirectory

> Where files uploaded by anonymous FTP users will go.

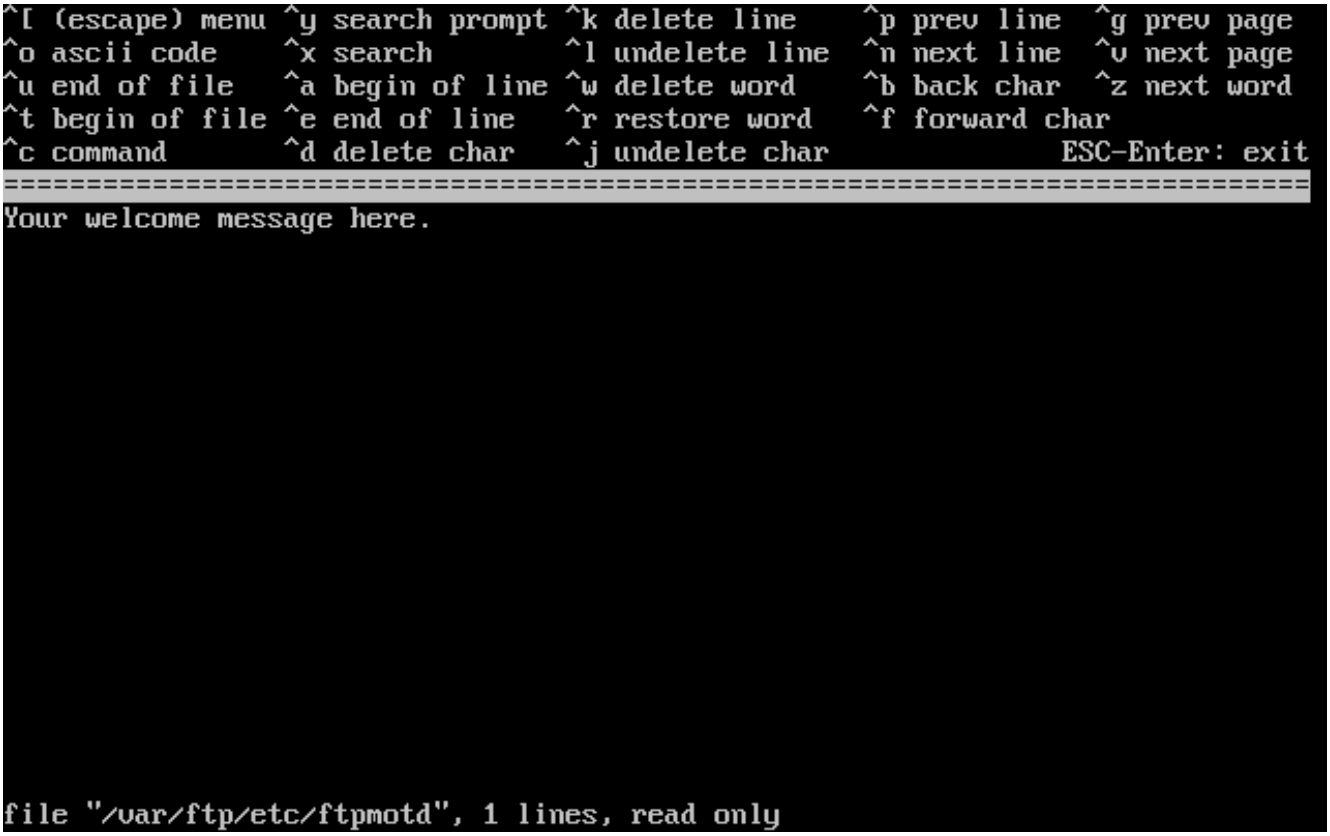
The FTP root directory will be put in `/var` by default. If you do not have enough room there for the anticipated FTP needs, the `/usr` directory could be used by setting the FTP root directory to `/usr/ftp`.

When you are satisfied with the values, press **Enter** to continue.

```
                    User Confirmation Requested
Create a welcome message file for anonymous FTP users?

                          [ Yes ]    No
```

If you select [Yes] and press **Enter**, an editor will automatically start allowing you to edit the message.

Figure 2-33. Edit the FTP Welcome Message



This is a text editor called ee. Use the instructions to change the message or change the message later using a text editor of your choice. Note the file name/location at the bottom of the editor screen.

Press **Esc** and a pop-up menu will default to **a) leave editor**. Press **Enter** to exit and continue. Press **Enter** again to save changes if you made any.

2.10.6 Configure Network File System

Network File System (NFS) allows sharing of files across a network. A machine can be configured as a server, a client, or both. Refer to Section 29.3 for a more information.

2.10.6.1 NFS Server

```
                    User Confirmation Requested
Do you want to configure this machine as an NFS server?

                          Yes    [ No ]
```

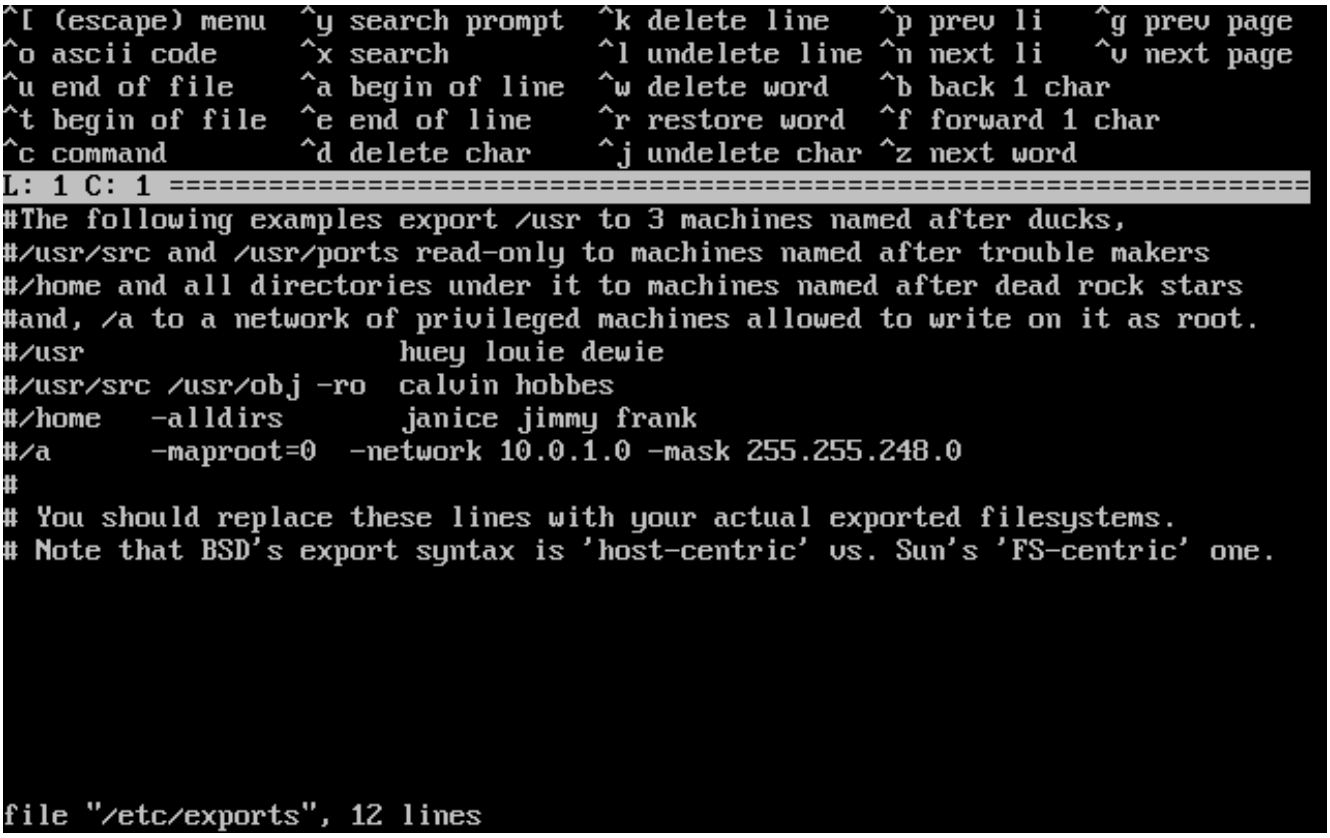
If there is no need for a Network File System server, select [No] and press **Enter**.

If [Yes] is chosen, a message will pop-up indicating that the `exports` file must be created.

```
                                Message
Operating as an NFS server means that you must first configure an
/etc/exports file to indicate which hosts are allowed certain kinds of
access to your local filesystems.
Press [Enter] now to invoke an editor on /etc/exports
                                [ OK ]
```

Press **Enter** to continue. A text editor will start allowing the `exports` file to be created and edited.

Figure 2-34. Editing `exports`



Use the instructions to add the actual exported filesystems now or later using a text editor of your choice. Note the file name/location at the bottom of the editor screen.

Press **Esc** and a pop-up menu will default to **a) leave editor**. Press **Enter** to exit and continue.

2.10.6.2 NFS Client

The NFS client allows your machine to access NFS servers.

```
                        User Confirmation Requested
  Do you want to configure this machine as an NFS client?

                                Yes   [ No ]
```

With the arrow keys, select [Yes] or [No] as appropriate and press **Enter**.

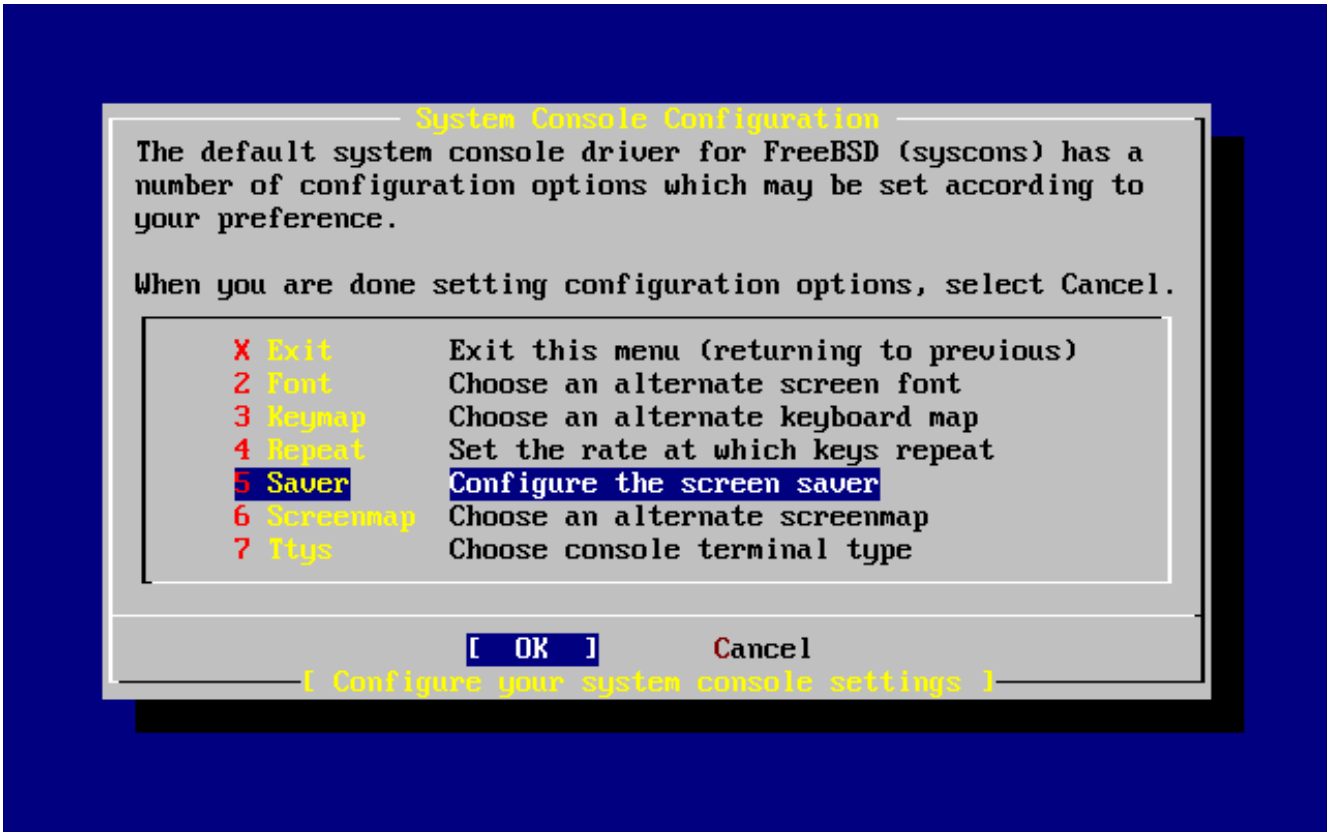
2.10.7 System Console Settings

There are several options available to customize the system console.

```
                    User Confirmation Requested
Would you like to customize your system console settings?

                              [ Yes ]  No
```

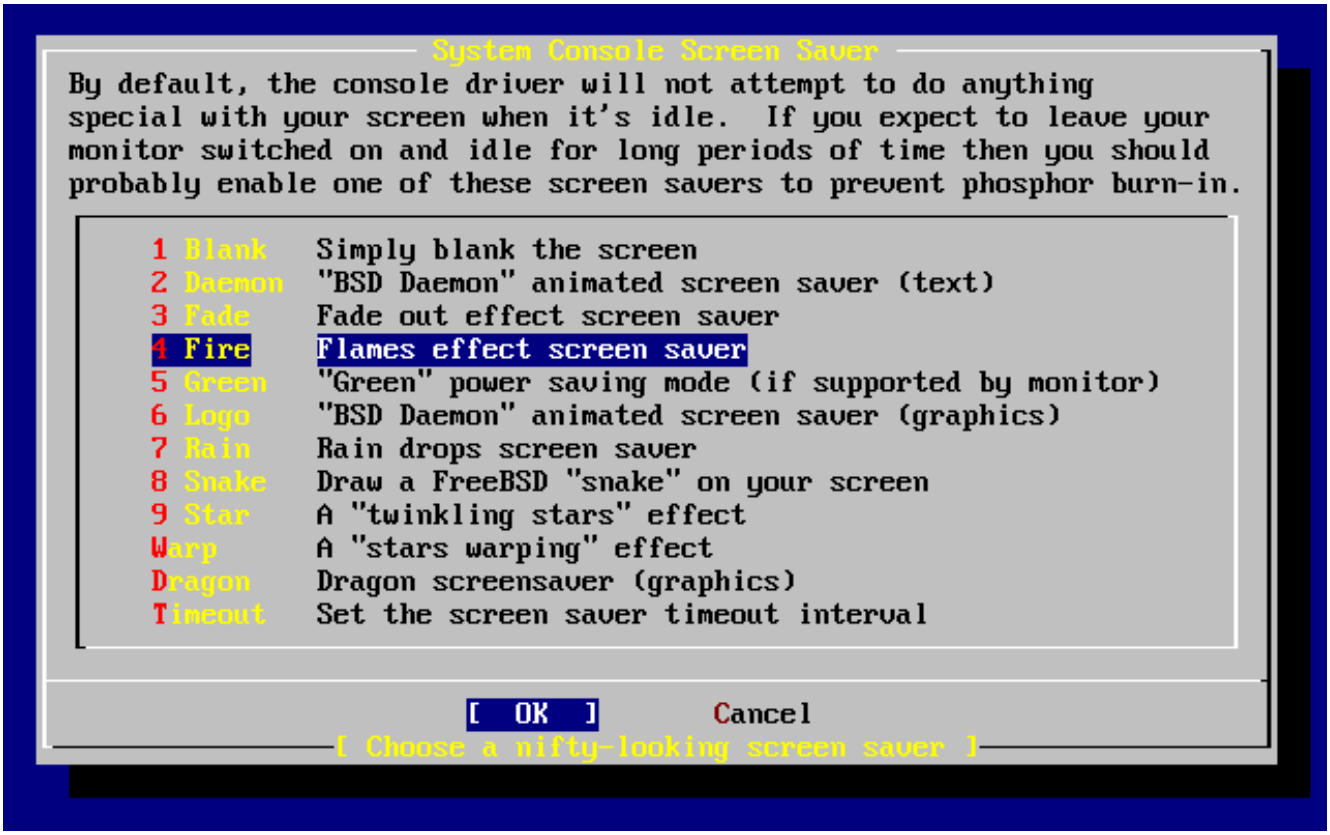
To view and configure the options, select [Yes] and press **Enter**.

Figure 2-35. System Console Configuration Options



A commonly used option is the screen saver. Use the arrow keys to select **Saver** and then press **Enter**.

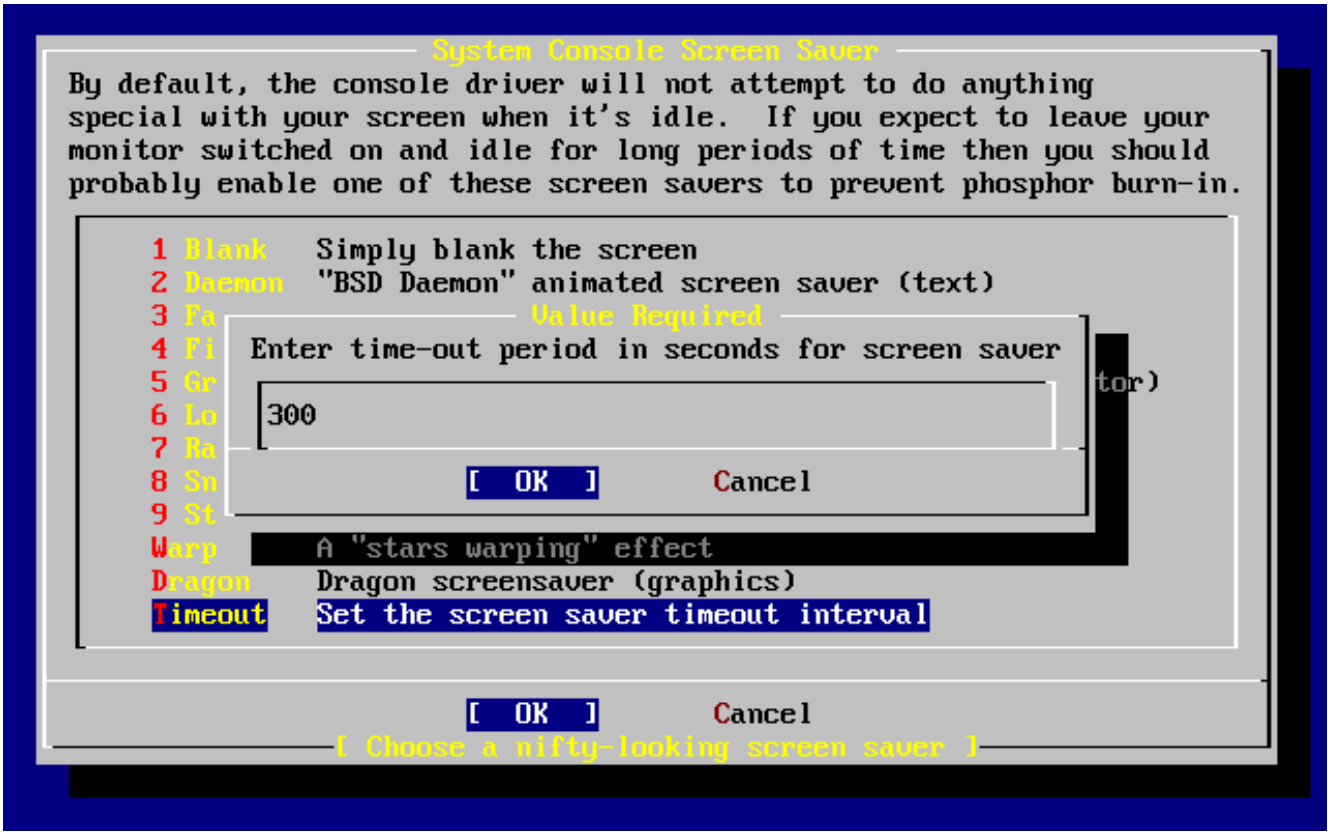
Figure 2-36. Screen Saver Options



Select the desired screen saver using the arrow keys and then press **Enter**. The System Console Configuration menu will redisplay.

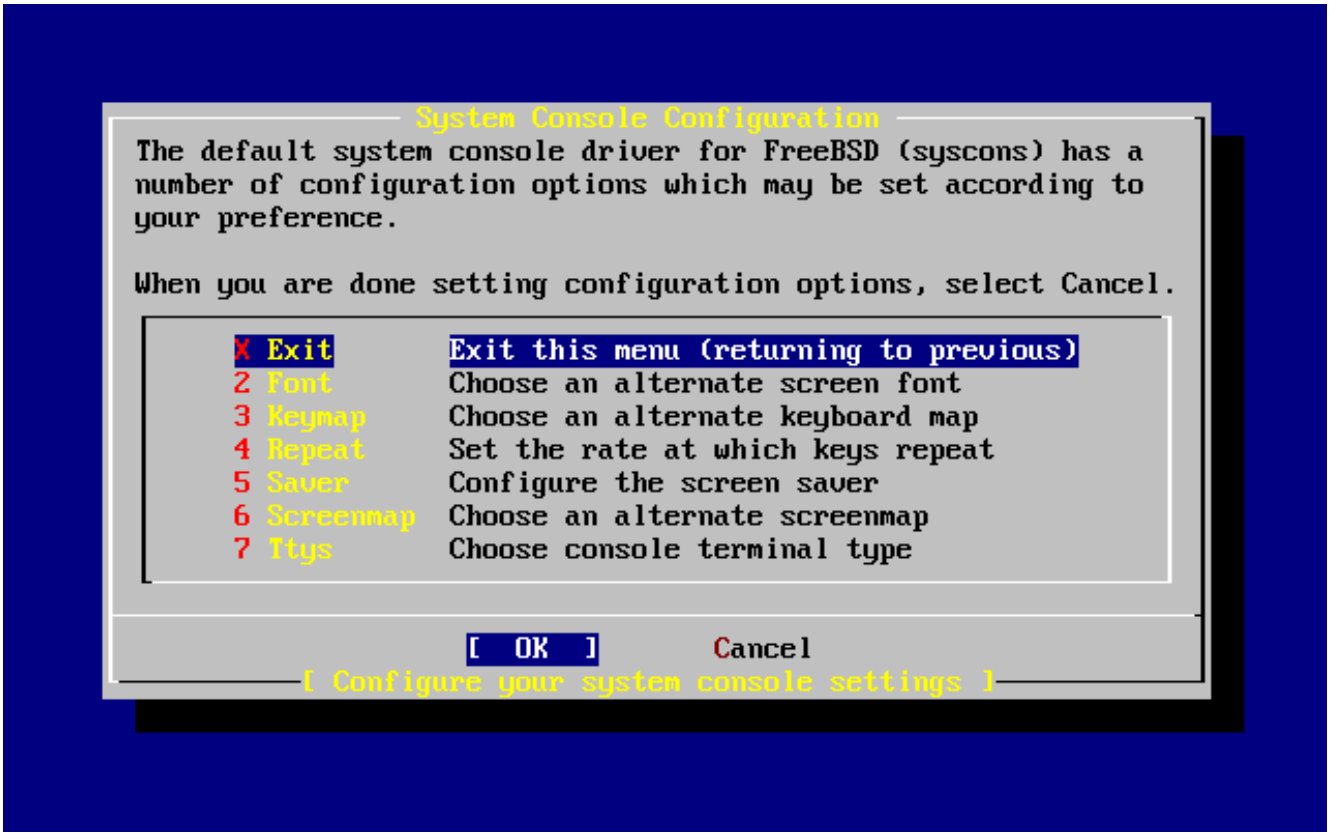
The default time interval is 300 seconds. To change the time interval, select **Saver** again. At the Screen Saver Options menu, select **Timeout** using the arrow keys and press **Enter**. A pop-up menu will appear:

Figure 2-37. Screen Saver Timeout



The value can be changed, then select [OK] and press **Enter** to return to the System Console Configuration menu.

Figure 2-38. System Console Configuration Exit



Selecting **Exit** and pressing **Enter** will continue with the post-installation configurations.

2.10.8 Setting the Time Zone

Setting the time zone for your machine will allow it to automatically correct for any regional time changes and perform other time zone related functions properly.

The example shown is for a machine located in the Eastern time zone of the United States. Your selections will vary according to your geographical location.

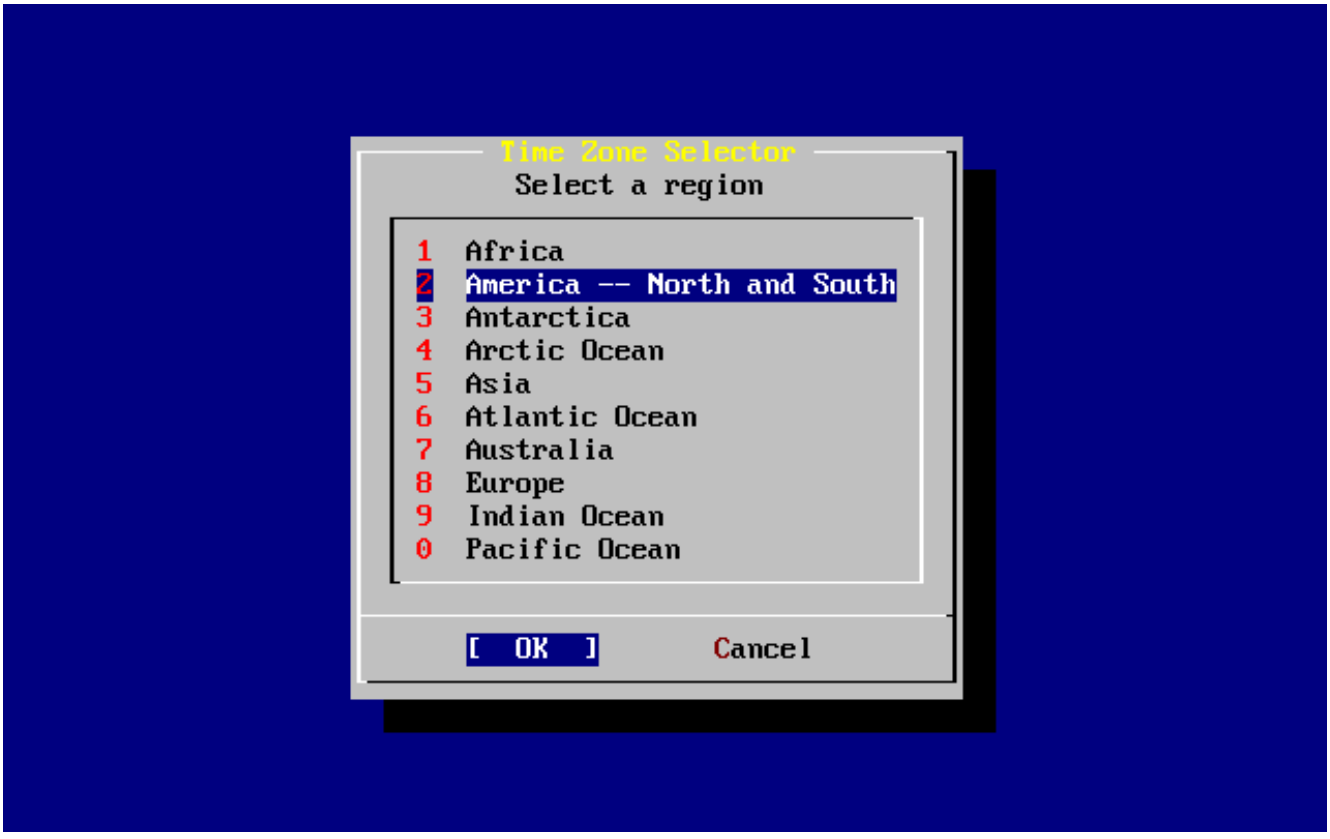
```
                    User Confirmation Requested
Would you like to set this machine's time zone now?

                          [ Yes ]   No
```

Select [Yes] and press **Enter** to set the time zone.

```
                          User Confirmation Requested
Is this machine's CMOS clock set to UTC? If it is set to local time
or you don't know, please choose NO here!

                                  Yes   [ No ]
```

Select [Yes] or [No] according to how the machine's clock is configured and press **Enter**.

Figure 2-39. Select Your Region



The appropriate region is selected using the arrow keys and then pressing **Enter**.

Figure 2-40. Select Your Country

Select the appropriate country using the arrow keys and press **Enter**.

Figure 2-41. Select Your Time Zone

The appropriate time zone is selected using the arrow keys and pressing **Enter**.

```
                        Confirmation
Does the abbreviation 'EDT' look reasonable?

                        [ Yes ]   No
```

Confirm the abbreviation for the time zone is correct. If it looks okay, press **Enter** to continue with the post-installation configuration.

2.10.9 Linux Compatibility

> **Note:** This part only applies to FreeBSD 7.X installation, if you install FreeBSD 8.X this screen will not be proposed.

```
                    User Confirmation Requested
Would you like to enable Linux binary compatibility?

                        [ Yes ]   No
```

Selecting [Yes] and pressing **Enter** will allow running Linux software on FreeBSD. The install will add the appropriate packages for Linux compatibility.

If installing by FTP, the machine will need to be connected to the Internet. Sometimes a remote ftp site will not have all the distributions like the Linux binary compatibility. This can be installed later if necessary.

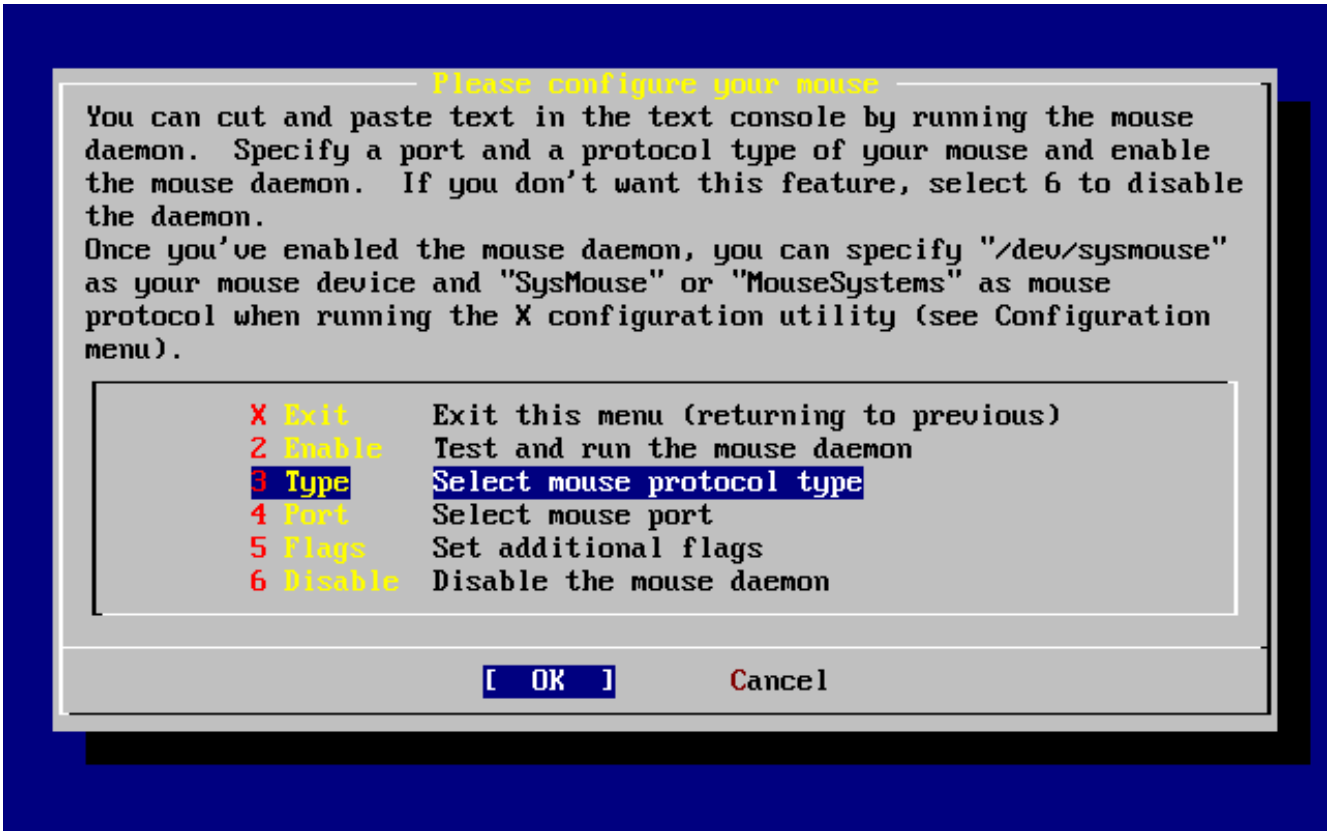
2.10.10 Mouse Settings

This option will allow you to cut and paste text in the console and user programs with a 3-button mouse. If using a 2-button mouse, refer to manual page, moused(8), after installation for details on emulating the 3-button style. This example depicts a non-USB mouse configuration (such as a PS/2 or COM port mouse):

```
                    User Confirmation Requested
Does this system have a PS/2, serial, or bus mouse?

                        [ Yes ]    No
```

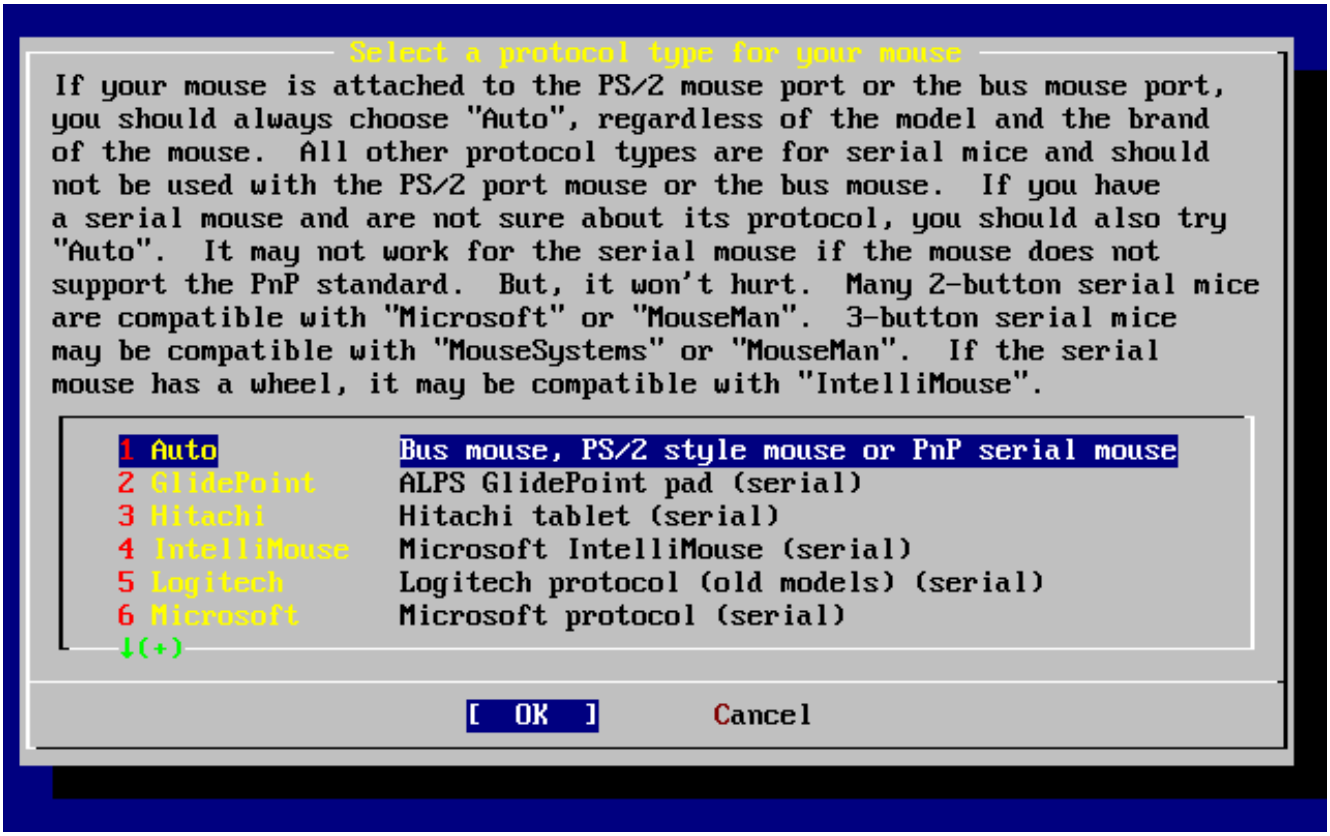
Select [Yes] for a PS/2, serial or bus mouse, or [No] for a USB mouse and press **Enter**.

Figure 2-42. Select Mouse Protocol Type



Use the arrow keys to select **Type** and press **Enter**.

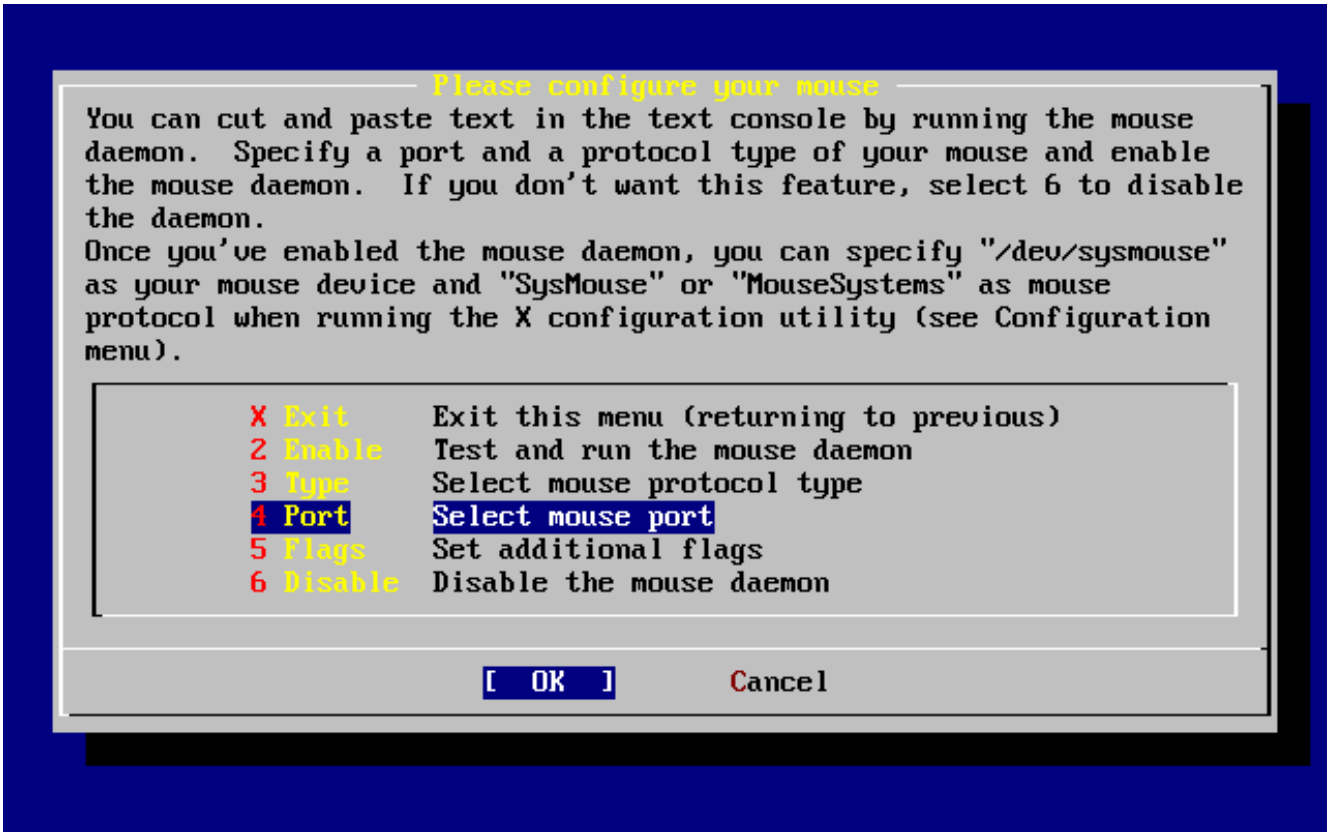
Figure 2-43. Set Mouse Protocol



The mouse used in this example is a PS/2 type, so the default **Auto** was appropriate. To change protocol, use the arrow keys to select another option. Ensure that [OK] is highlighted and press

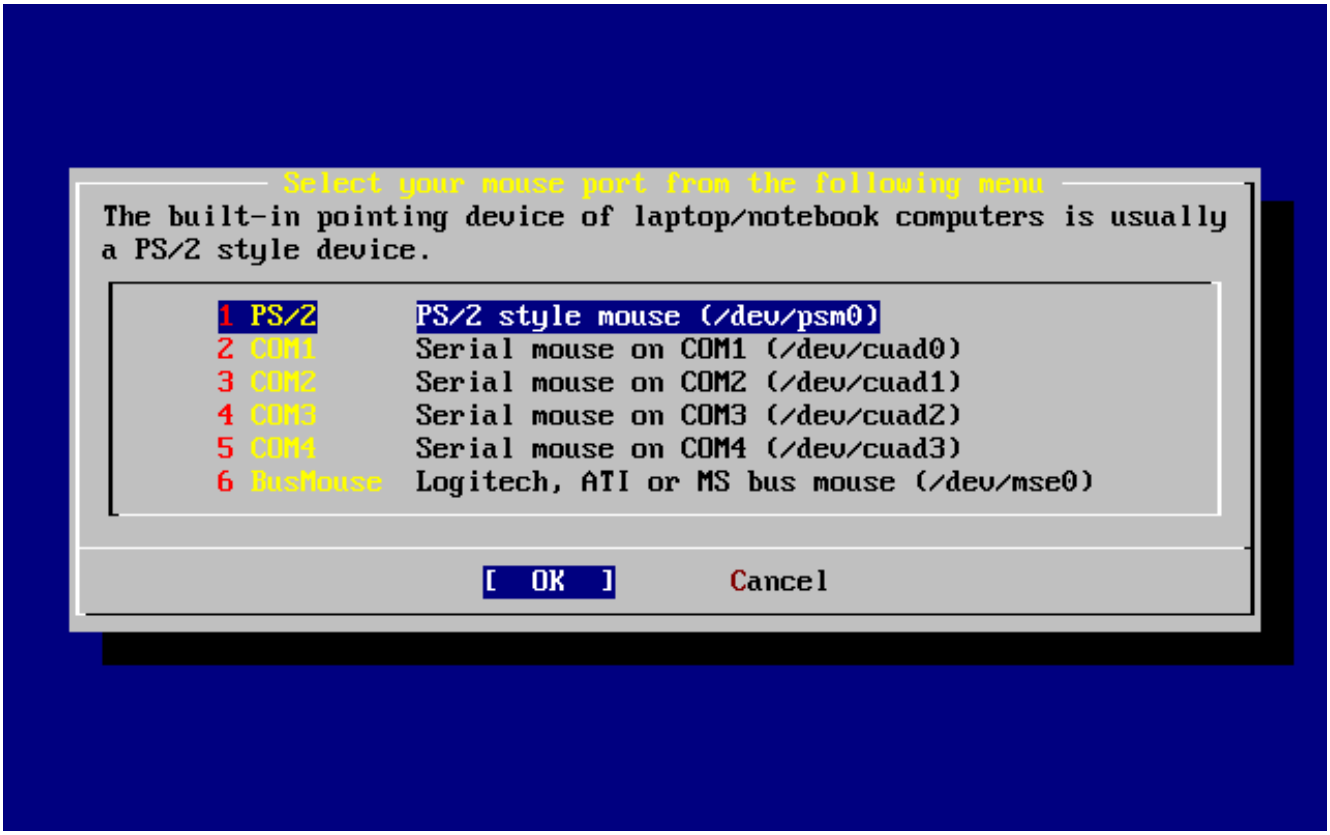
Enter to exit this menu.

Figure 2-44. Configure Mouse Port



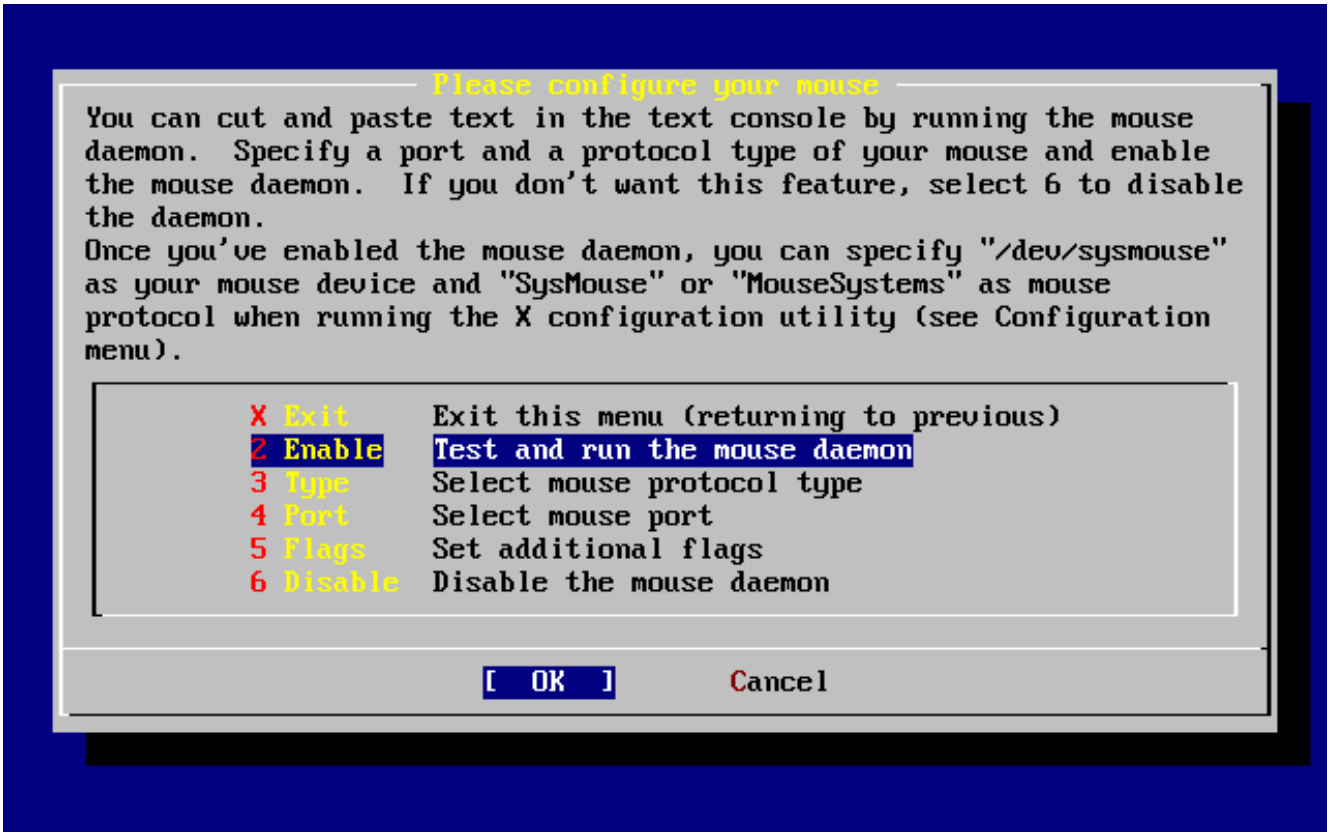
Use the arrow keys to select **Port** and press **Enter**.

Figure 2-45. Setting the Mouse Port



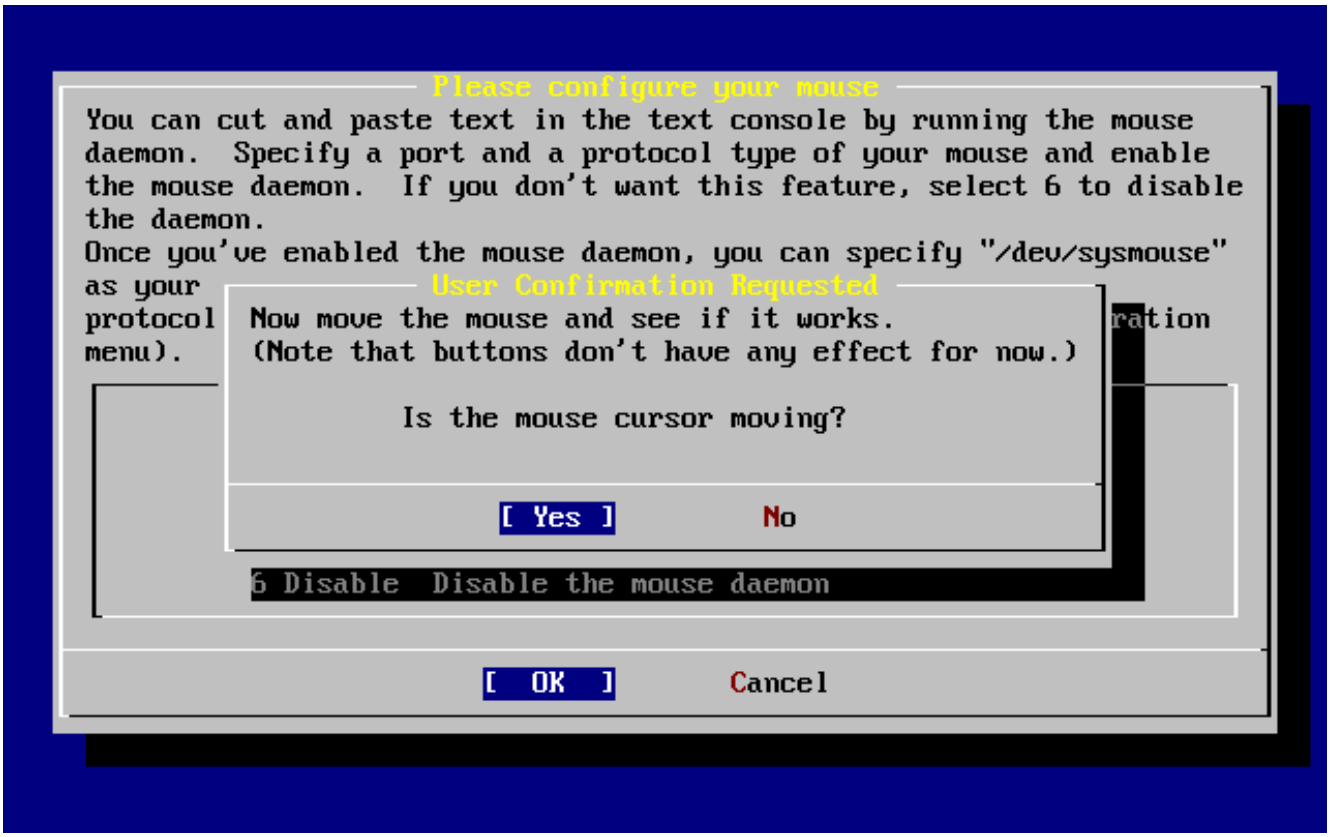
This system had a PS/2 mouse, so the default **PS/2** was appropriate. To change the port, use the arrow keys and then press **Enter**.

Figure 2-46. Enable the Mouse Daemon



Last, use the arrow keys to select **Enable**, and press **Enter** to enable and test the mouse daemon.

Figure 2-47. Test the Mouse Daemon



Move the mouse around the screen and verify the cursor shown responds properly. If it does, select [Yes] and press **Enter**. If not, the mouse has not been configured correctly -- select [No] and try using different configuration options.

Select **Exit** with the arrow keys and press **Enter** to return to continue with the post-installation configuration.

2.10.11 Install Packages

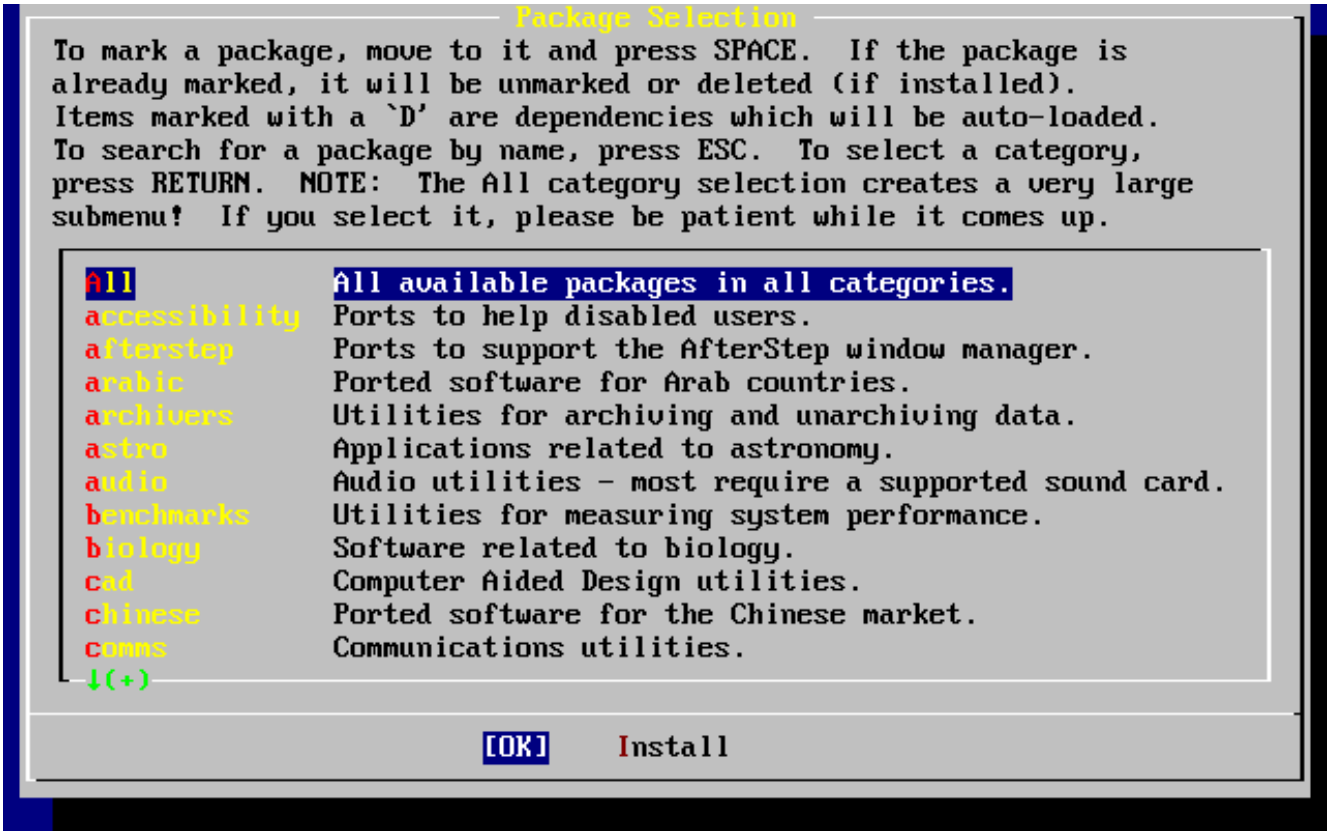
Packages are pre-compiled binaries and are a convenient way to install software.

Installation of one package is shown for purposes of illustration. Additional packages can also be added at this time if desired. After installation `sysinstall` can be used to add additional packages.

```
                    User Confirmation Requested
The FreeBSD package collection is a collection of hundreds of
ready-to-run applications, from text editors to games to WEB servers
and more. Would you like to browse the collection now?

                              [ Yes ]   No
```

Selecting [Yes] and pressing **Enter** will be followed by the Package Selection screens:

Figure 2-48. Select Package Category

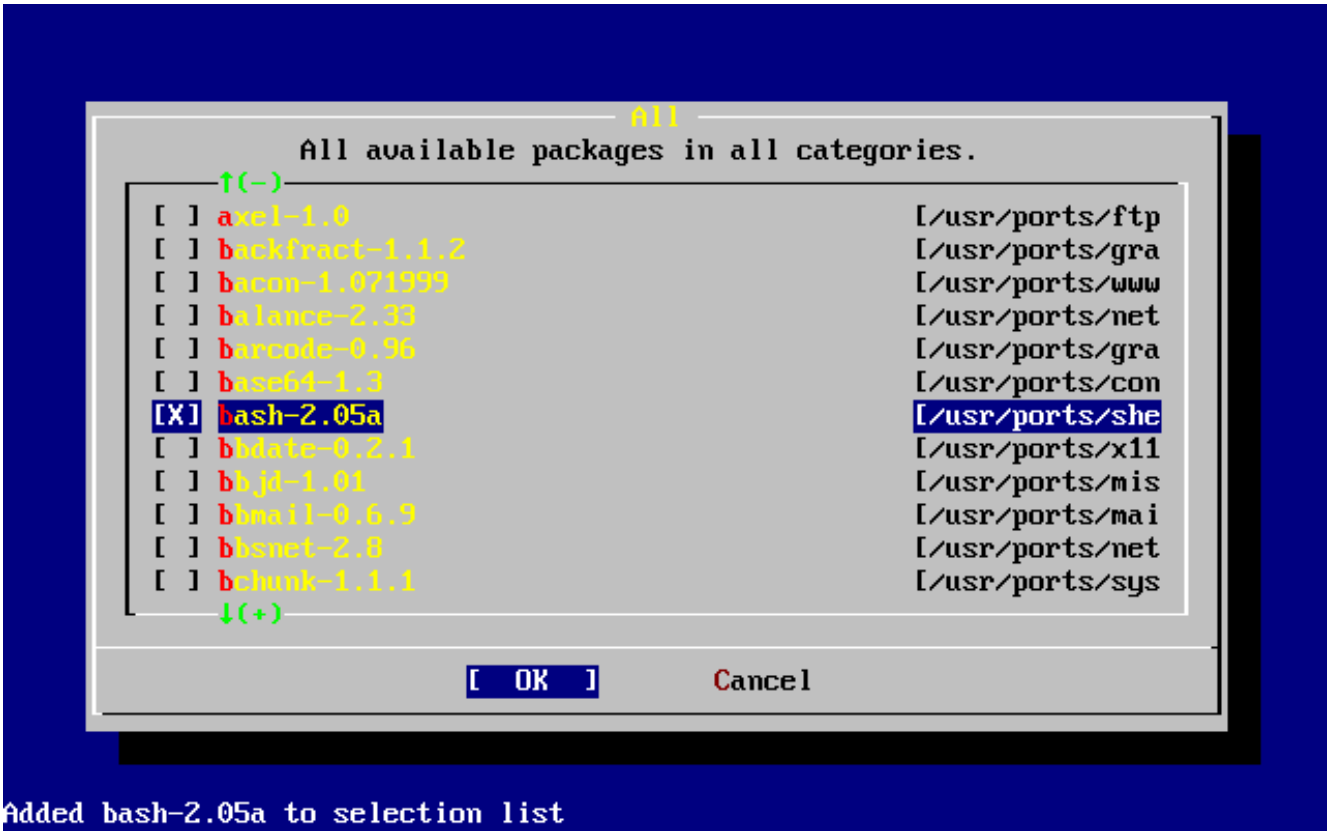


Only packages on the current installation media are available for installation at any given time.

All packages available will be displayed if **All** is selected or you can select a particular category. Highlight your selection with the arrow keys and press **Enter**.

A menu will display showing all the packages available for the selection made:

Figure 2-49. Select Packages



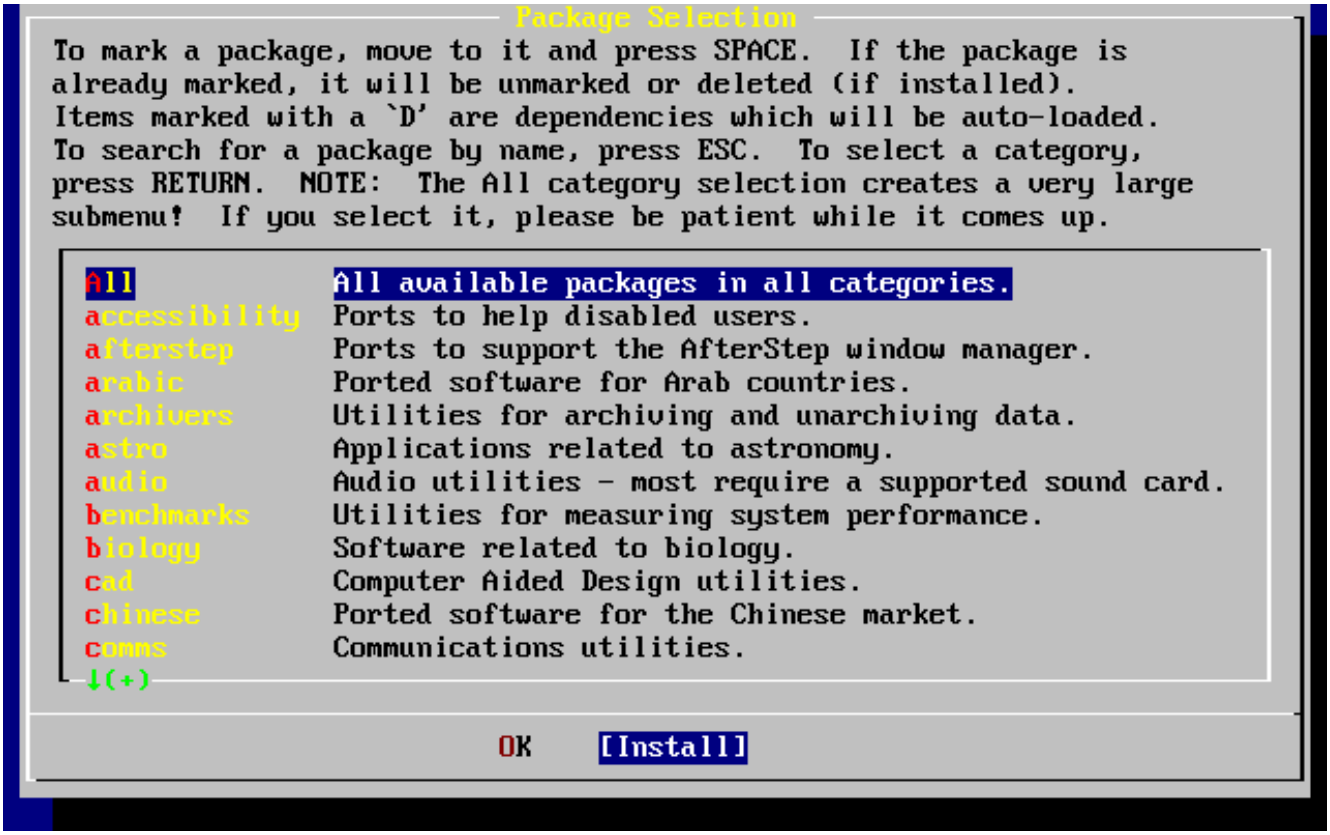
The **bash** shell is shown selected. Select as many as desired by highlighting the package and pressing the **Space** key. A short description of each package will appear in the lower left corner of the screen.

Pressing the **Tab** key will toggle between the last selected package, [OK], and [Cancel].

When you have finished marking the packages for installation, press **Tab** once to toggle to the [OK] and press **Enter** to return to the Package Selection menu.

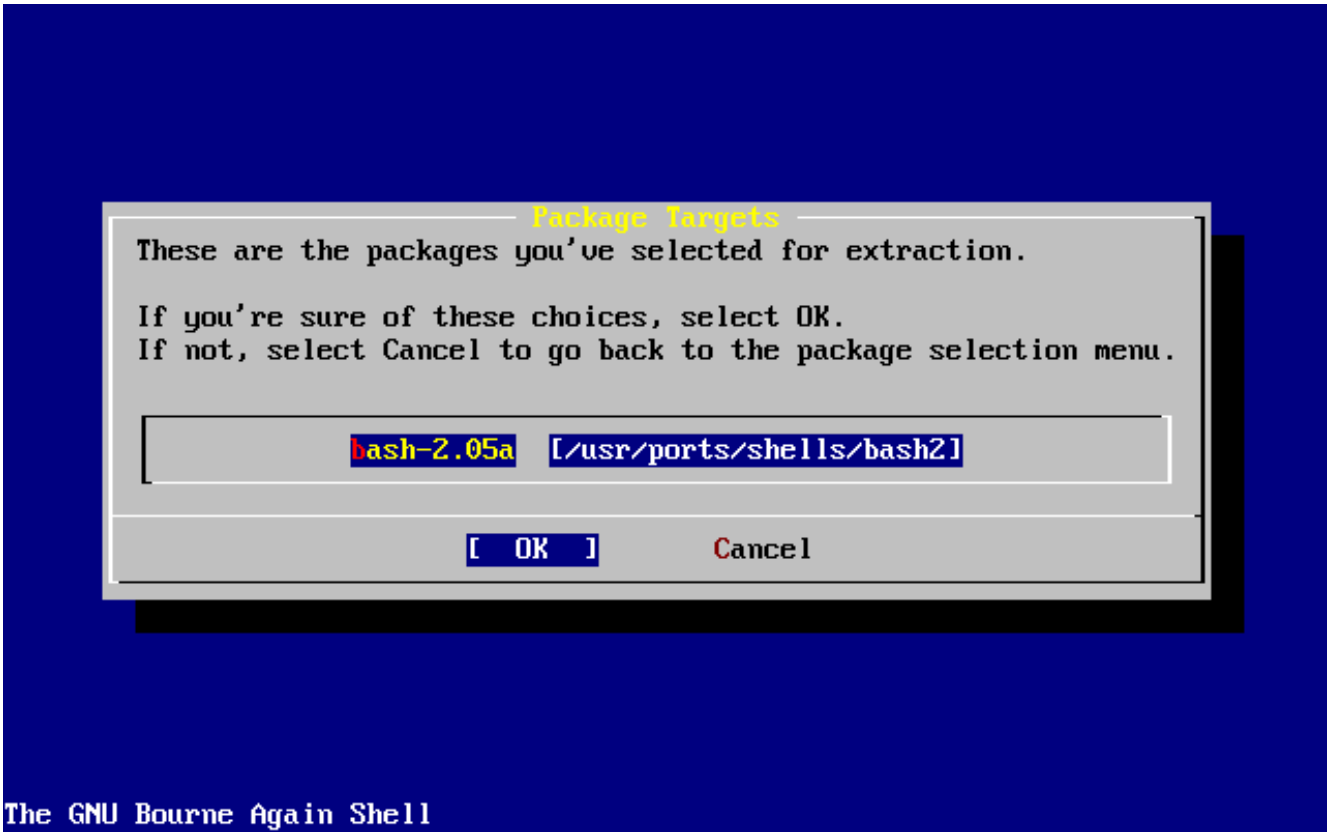
The left and right arrow keys will also toggle between [OK] and [Cancel]. This method can also be used to select [OK] and press **Enter** to return to the Package Selection menu.

Figure 2-50. Install Packages



Use the **Tab** and arrow keys to select [Install] and press **Enter**. You will then need to confirm that you want to install the packages:

Figure 2-51. Confirm Package Installation



Selecting [OK] and pressing **Enter** will start the package installation. Installing messages will

appear until completed. Make note if there are any error messages.

The final configuration continues after packages are installed. If you end up not selecting any packages, and wish to return to the final configuration, select Install anyways.

2.10.12 Add Users/Groups

You should add at least one user during the installation so that you can use the system without being logged in as `root`. The root partition is generally small and running applications as `root` can quickly fill it. A bigger danger is noted below:

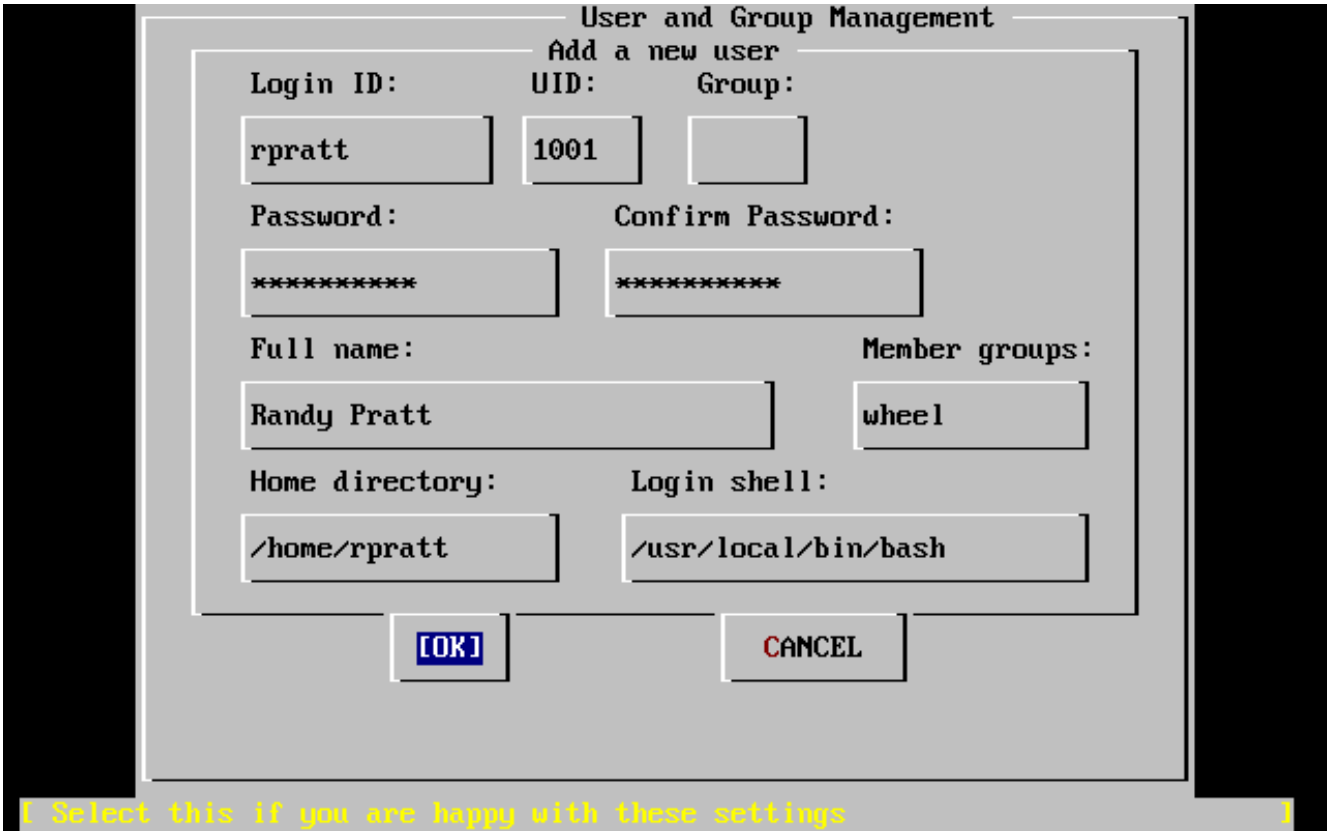
```
                    User Confirmation Requested
Would you like to add any initial user accounts to the system? Adding
at least one account for yourself at this stage is suggested since
working as the "root" user is dangerous (it is easy to do things which
adversely affect the entire system).

                              [ Yes ]   No
```

Select [Yes] and press **Enter** to continue with adding a user.

Figure 2-52. Select User

Select **User** with the arrow keys and press **Enter**.

Figure 2-53. Add User Information



The following descriptions will appear in the lower part of the screen as the items are selected with **Tab** to assist with entering the required information:

Login ID

The login name of the new user (mandatory).

UID

The numerical ID for this user (leave blank for automatic choice).

Group

The login group name for this user (leave blank for automatic choice).

Password

The password for this user (enter this field with care!).

Full name

The user's full name (comment).

Member groups

The groups this user belongs to (i.e. gets access rights for).

Home directory

The user's home directory (leave blank for default).

Login shell

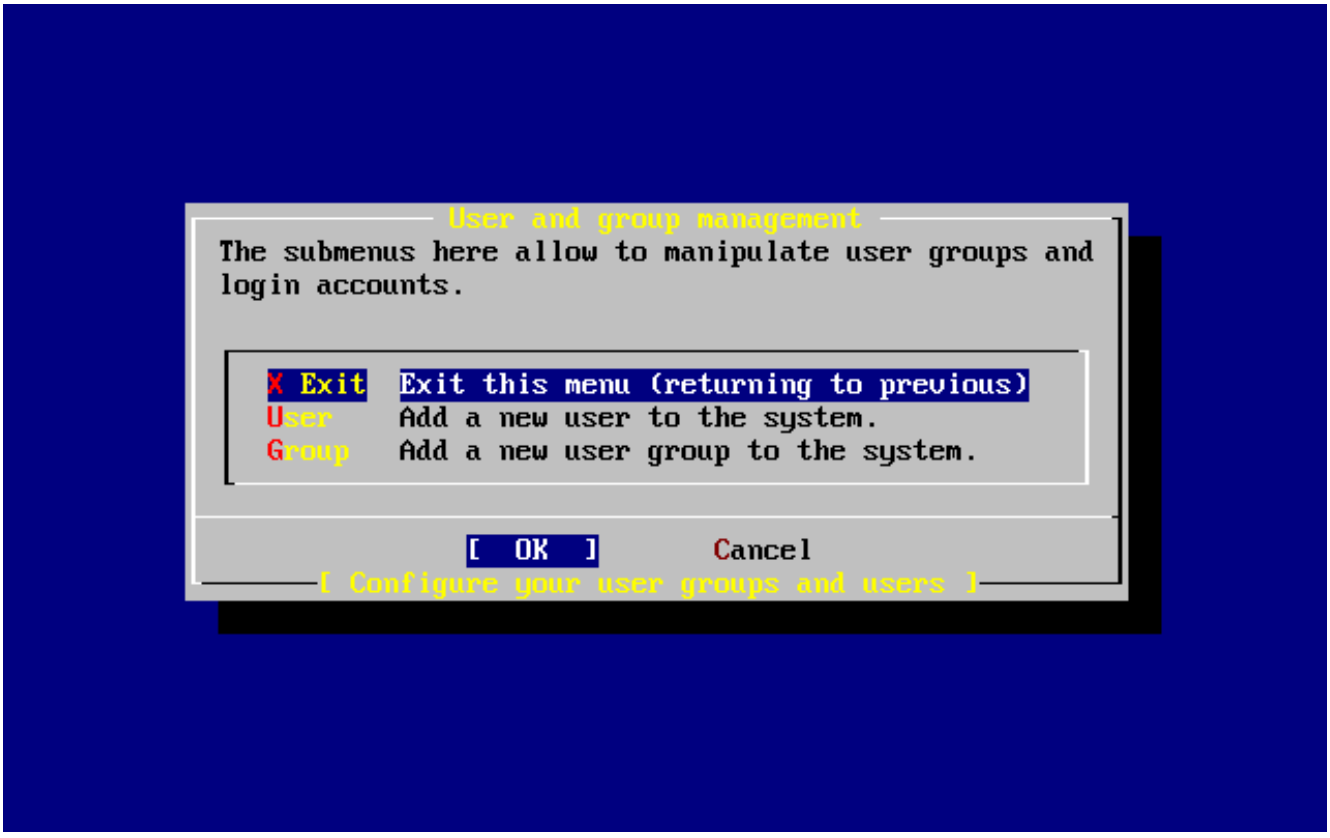
The user's login shell (leave blank for default, e.g. `/bin/sh`).

The login shell was changed from `/bin/sh` to `/usr/local/bin/bash` to use the **bash** shell that was previously installed as a package. Do not try to use a shell that does not exist or you will not be able to login. The most common shell used in the BSD-world is the C shell, which can be indicated as `/bin/tcsh`.

The user was also added to the `wheel` group to be able to become a superuser with `root` privileges.

When you are satisfied, press [OK] and the User and Group Management menu will redisplay:

Figure 2-54. Exit User and Group Management



Groups can also be added at this time if specific needs are known. Otherwise, this may be accessed through using `sysinstall` after installation is completed.

When you are finished adding users, select **Exit** with the arrow keys and press **Enter** to continue the installation.

2.10.13 Set the `root` Password

```
                        Message
Now you must set the system manager's password.
This is the password you'll use to log in as "root".

                        [ OK ]
```

```
                [ Press enter or space ]
```

Press **Enter** to set the `root` password.

The password will need to be typed in twice correctly. Needless to say, make sure you have a way of finding the password if you forget. Notice that the password you type in is not echoed, nor are asterisks displayed.

```
New password:
Retype new password :
```

The installation will continue after the password is successfully entered.

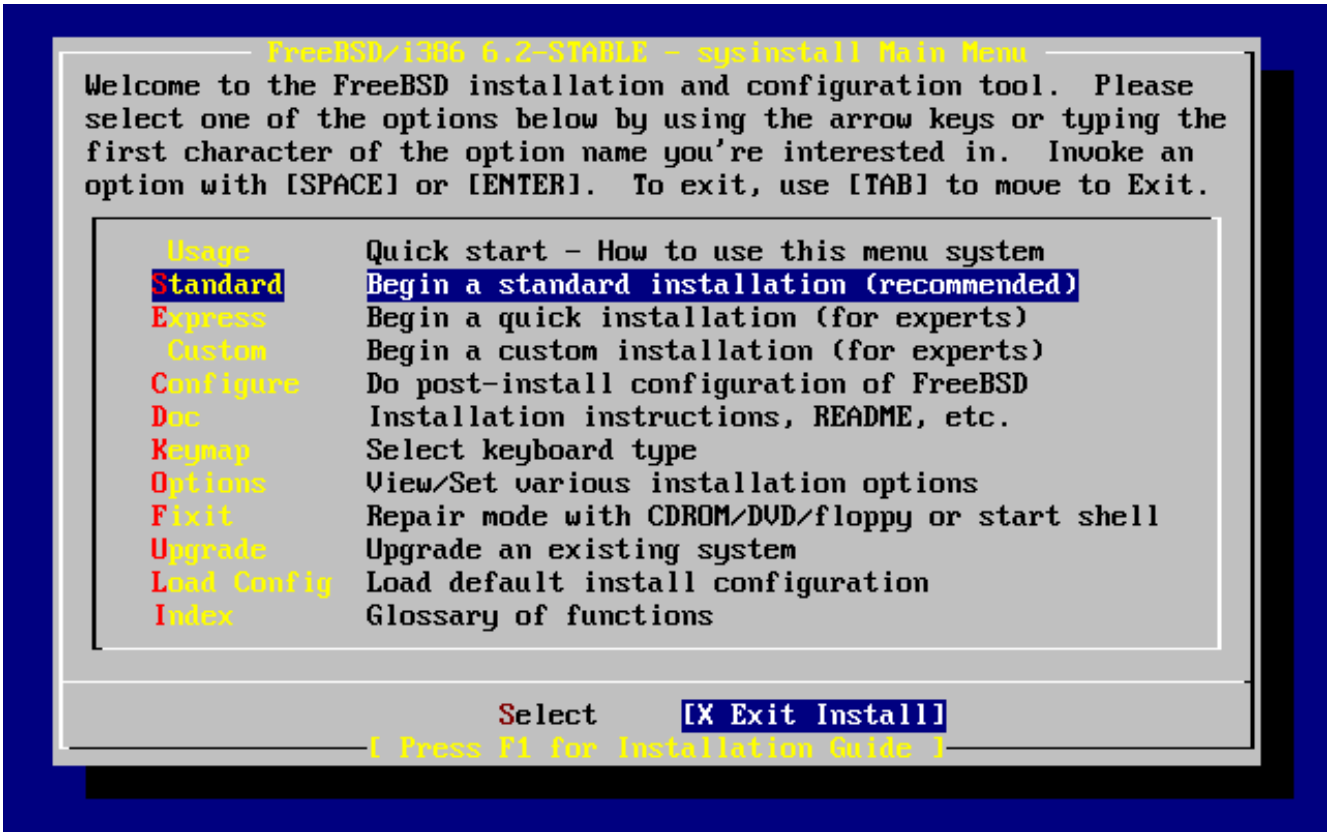
2.10.14 Exiting Install

If you need to configure additional network services or any other configuration, you can do it at this point or after installation with `sysinstall`.

```
                      User Confirmation Requested
Visit the general configuration menu for a chance to set any last
options?

                                Yes   [ No ]
```

Select [No] with the arrow keys and press **Enter** to return to the Main Installation Menu.

Figure 2-55. Exit Install



Select [X Exit Install] with the arrow keys and press **Enter**. You will be asked to confirm exiting the installation:

```
                    User Confirmation Requested
Are you sure you wish to exit? The system will reboot.

                              [ Yes ]   No
```

Select [Yes]. If you are booting from the CDROM drive the following message will remind you to remove the disk:

```
                     Message
Be sure to remove the media from the drive.

                     [ OK ]
            [ Press enter or space ]
```

The CDROM drive is locked until the machine starts to reboot then the disk can be removed from drive (quickly). Press [OK] to reboot.

The system will reboot so watch for any error messages that may appear, see Section 2.10.16 for more details.

2.10.15 Configure Additional Network Services

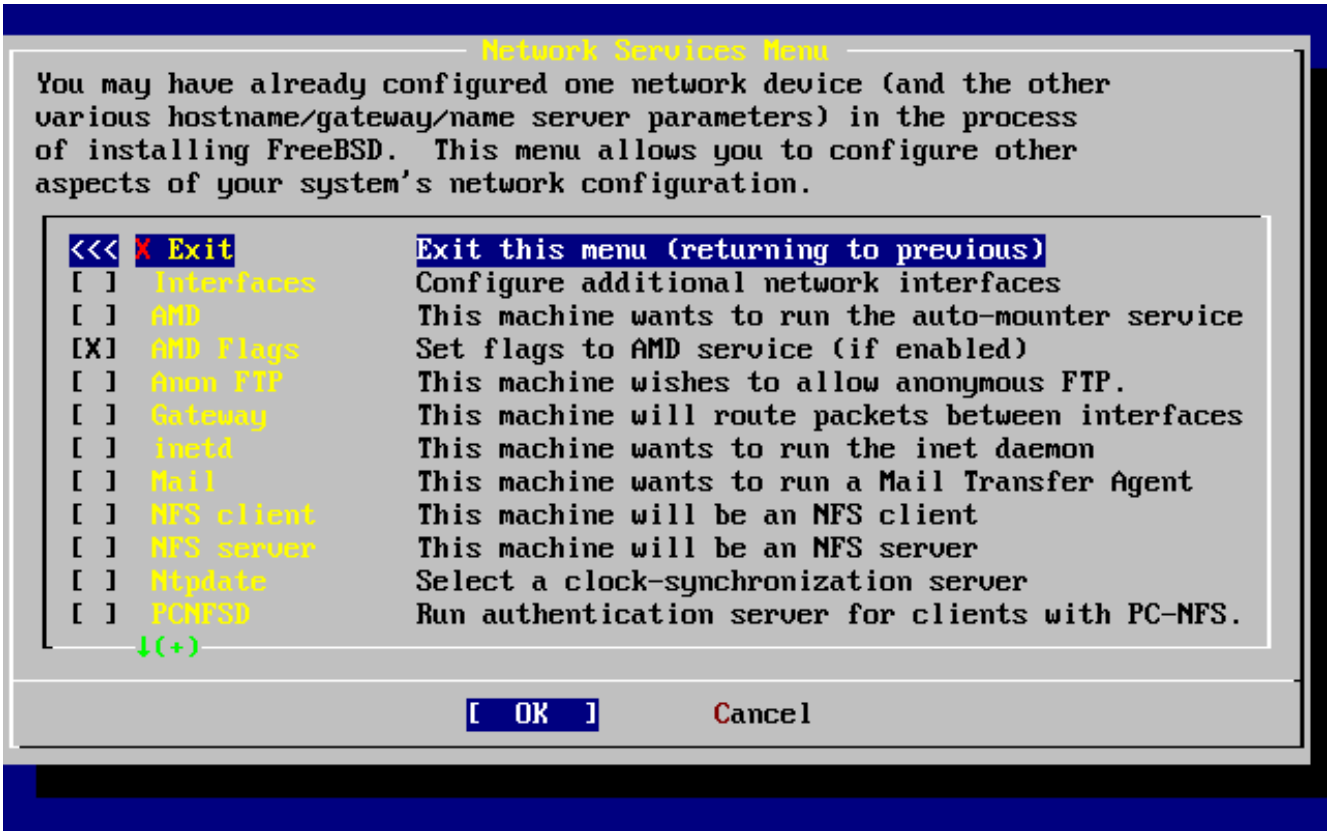
Contributed by Tom Rhodes.

Configuring network services can be a daunting task for new users if they lack previous knowledge in this area. Networking, including the Internet, is critical to all modern operating systems including FreeBSD; as a result, it is very useful to have some understanding FreeBSD's extensive networking capabilities. Doing this during the installation will ensure users have some understanding of the various services available to them.

Network services are programs that accept input from anywhere on the network. Every effort is made to make sure these programs will not do anything “harmful”. Unfortunately, programmers are not perfect and through time there have been cases where bugs in network services have been exploited by attackers to do bad things. It is important that you only enable the network services you know that you need. If in doubt it is best if you do not enable a network service until you find out that you do need it. You can always enable it later by re-running **sysinstall** or by using the features provided by the `/etc/rc.conf` file.

Selecting the **Networking** option will display a menu similar to the one below:

Figure 2-56. Network Configuration Upper-level



The first option, **Interfaces**, was previously covered during the Section 2.10.1, thus this option can safely be ignored.

Selecting the **AMD** option adds support for the BSD automatic mount utility. This is usually used in conjunction with the NFS protocol (see below) for automatically mounting remote file systems. No special configuration is required here.

Next in line is the **AMD Flags** option. When selected, a menu will pop up for you to enter specific AMD flags. The menu already contains a set of default options:

```
-a /.amd_mnt -l syslog /host /etc/amd.map /net /etc/amd.map
```

The `-a` option sets the default mount location which is specified here as `/.amd_mnt`. The `-l` option specifies the default `log` file; however, when `syslogd` is used all log activity will be sent to the system log daemon. The `/host` directory is used to mount an exported file system from a remote host, while `/net` directory is used to mount an exported file system from an IP address. The `/etc/amd.map` file defines the default options for AMD exports.

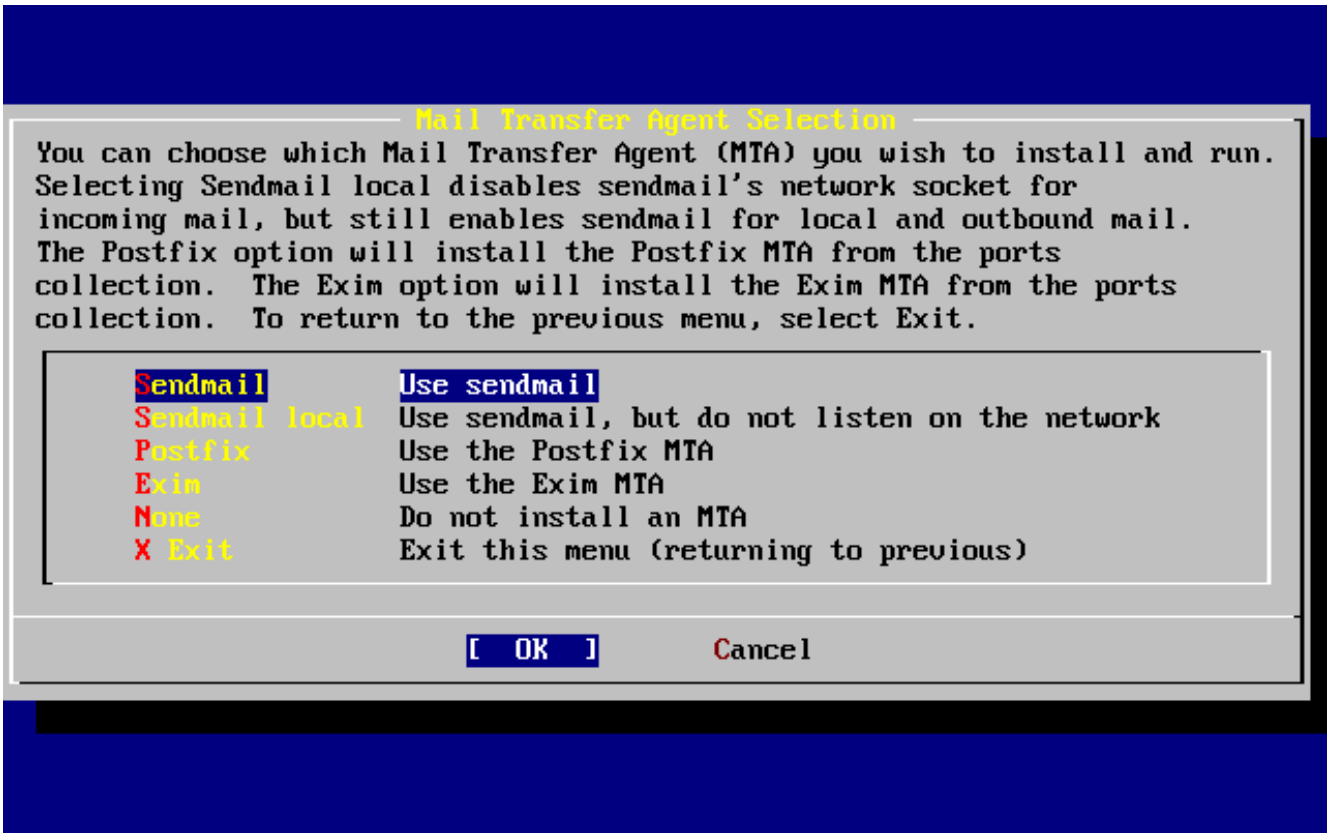
The **Anon FTP** option permits anonymous FTP connections. Select this option to make this machine an anonymous FTP server. Be aware of the security risks involved with this option. Another menu will be displayed to explain the security risks and configuration in depth.

The **Gateway** configuration menu will set the machine up to be a gateway as explained previously. This can be used to unset the **Gateway** option if you accidentally selected it during the installation process.

The **Inetd** option can be used to configure or completely disable the inetd(8) daemon as discussed above.

The **Mail** option is used to configure the system's default MTA or Mail Transfer Agent. Selecting this option will bring up the following menu:

Figure 2-57. Select a default MTA



Here you are offered a choice as to which MTA to install and set as the default. An MTA is nothing more than a mail server which delivers email to users on the system or the Internet.

Selecting **Sendmail** will install the popular **sendmail** server which is the FreeBSD default. The **Sendmail local** option will set **sendmail** to be the default MTA, but disable its ability to receive incoming email from the Internet. The other options here, **Postfix** and **Exim** act similar to **Sendmail**. They both deliver email; however, some users prefer these alternatives to the **sendmail** MTA.

After selecting an MTA, or choosing not to select an MTA, the network configuration menu will appear with the next option being **NFS client**.

The **NFS client** option will configure the system to communicate with a server via NFS. An NFS server makes file systems available to other machines on the network via the NFS protocol. If this is a stand-alone machine, this option can remain unselected. The system may require more configuration later; see Section 29.3 for more information about client and server configuration.

Below that option is the **NFS server** option, permitting you to set the system up as an NFS server. This adds the required information to start up the RPC remote procedure call services. RPC is used to coordinate connections between hosts and programs.

Next in line is the **Ntpdate** option, which deals with time synchronization. When selected, a menu like the one below shows up:

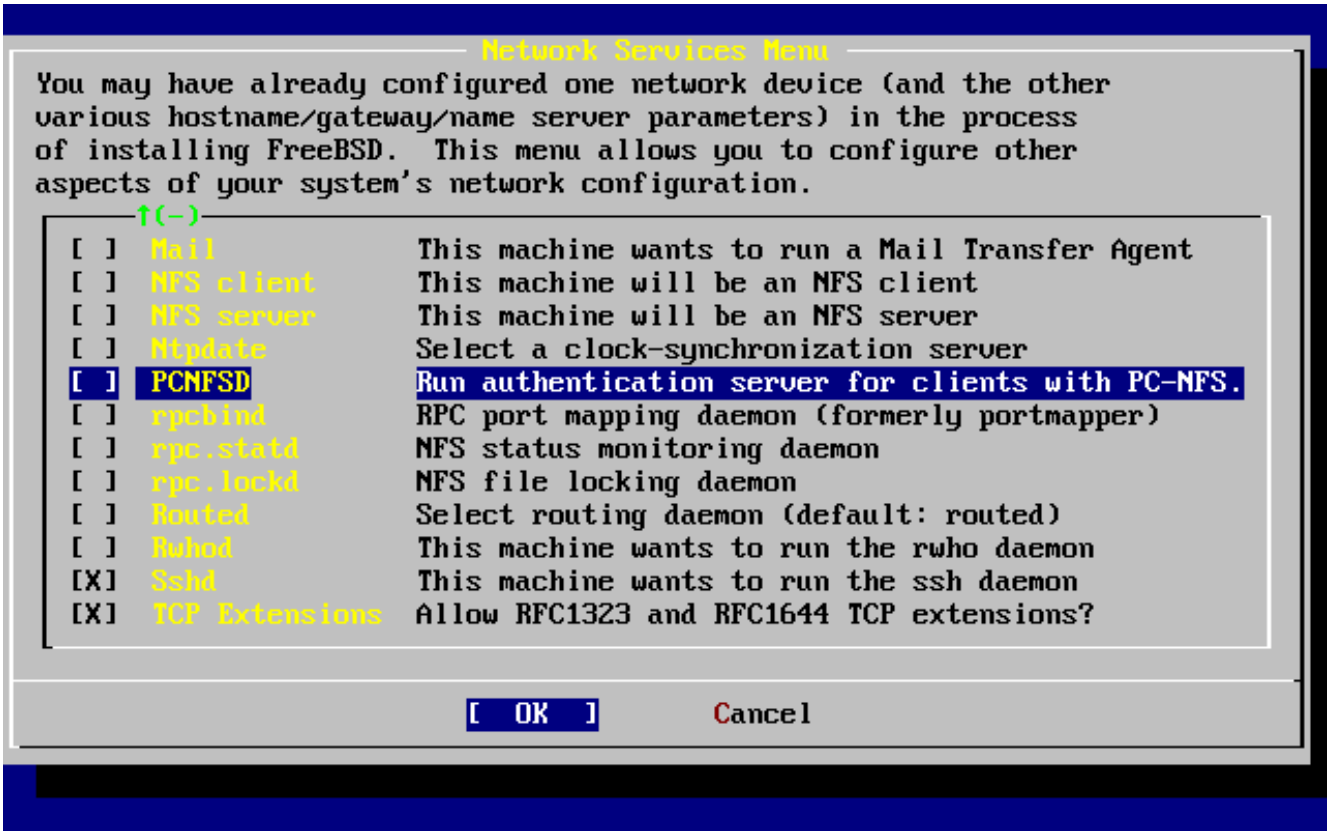
Figure 2-58. Ntpdate Configuration

From this menu, select the server which is the closest to your location. Selecting a close one will make the time synchronization more accurate as a server further from your location may have more connection latency.

The next option is the PCNFSD selection. This option will install the net/pcnfsd package from the Ports Collection. This is a useful utility which provides NFS authentication services for systems which are unable to provide their own, such as Microsoft's MS-DOS® operating system.

Now you must scroll down a bit to see the other options:

Figure 2-59. Network Configuration Lower-level



The rpcbind(8), rpc.statd(8), and rpc.lockd(8) utilities are all used for Remote Procedure Calls (RPC). The `rpcbind` utility manages communication between NFS servers and clients, and is required for NFS servers to operate correctly. The **rpc.statd** daemon interacts with the **rpc.statd** daemon on other hosts to provide status monitoring. The reported status is usually held in the `/var/db/statd.status` file. The next option listed here is the **rpc.lockd** option, which, when selected, will provide file locking services. This is usually used with **rpc.statd** to monitor what hosts are requesting locks and how frequently they request them. While these last two options are marvelous for debugging, they are not required for NFS servers and clients to operate correctly.

As you progress down the list the next item here is **Routed**, which is the routing daemon. The routed(8) utility manages network routing tables, discovers multicast routers, and supplies a copy of the routing tables to any physically connected host on the network upon request. This is mainly used for machines which act as a gateway for the local network. When selected, a menu will be presented requesting the default location of the utility. The default location is already defined for you and can be selected with the **Enter** key. You will then be presented with yet another menu, this time asking for the flags you wish to pass on to **routed**. The default is `-q` and it should already appear on the screen.

Next in line is the **Rwhod** option which, when selected, will start the rwhod(8) daemon during system initialization. The `rwhod` utility broadcasts system messages across the network periodically, or collects them when in "consumer" mode. More information can be found in the ruptime(1) and rwho(1) manual pages.

The next to the last option in the list is for the sshd(8) daemon. This is the secure shell server for **OpenSSH** and it is highly recommended over the standard **telnet** and FTP servers. The **sshd** server is used to create a secure connection from one host to another by using encrypted connections.

Finally there is the **TCP Extensions** option. This enables the TCP Extensions defined in RFC 1323 and RFC 1644. While on many hosts this can speed up connections, it can also cause some connections to be dropped. It is not recommended for servers, but may be beneficial for stand alone machines.

Now that you have configured the network services, you can scroll up to the very top item which is **X Exit** and continue on to the next configuration item or simply exit **sysinstall** in selecting **X Exit** twice then [X Exit Install].

2.10.16 FreeBSD Bootup

2.10.16.1 FreeBSD/i386 Bootup

If everything went well, you will see messages scroll off the screen and you will arrive at a login prompt. You can view the content of the messages by pressing **Scroll-Lock** and using **PgUp** and **PgDn**. Pressing **Scroll-Lock** again will return to the prompt.

The entire message may not display (buffer limitation) but it can be viewed from the command line after logging in by typing `dmesg` at the prompt.

Login using the username/password you set during installation (`rpratt`, in this example). Avoid logging in as `root` except when necessary.

Typical boot messages (version information omitted):

```
Copyright (c) 1992-2002 The FreeBSD Project.
Copyright (c) 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994
        The Regents of the University of California. All rights reserved.

Timecounter "i8254"  frequency 1193182 Hz
CPU: AMD-K6(tm) 3D processor (300.68-MHz 586-class CPU)
  Origin = "AuthenticAMD"  Id = 0x580  Stepping = 0
  Features=0x8001bf<FPU,VME,DE,PSE,TSC,MSR,MCE,CX8,MMX>
  AMD Features=0x80000800<SYSCALL,3DNow!>
real memory  = 268435456 (262144K bytes)
config> di sn0
config> di lnc0
config> di le0
config> di ie0
config> di fe0
config> di cs0
config> di bt0
config> di aic0
config> di aha0
config> di adv0
config> q
avail memory = 256311296 (250304K bytes)
Preloaded elf kernel "kernel" at 0xc0491000.
Preloaded userconfig_script "/boot/kernel.conf" at 0xc049109c.
md0: Malloc disk
Using $PIR table, 4 entries at 0xc00fde60
npx0: <math processor> on motherboard
npx0: INT 16 interface
pcib0: <Host to PCI bridge> on motherboard
pci0: <PCI bus> on pcib0
pcib1: <VIA 82C598MVP (Apollo MVP3) PCI-PCI (AGP) bridge> at device 1.0 on pci0
pci1: <PCI bus> on pcib1
pci1: <Matrox MGA G200 AGP graphics accelerator> at 0.0 irq 11
isab0: <VIA 82C586 PCI-ISA bridge> at device 7.0 on pci0
isa0: <ISA bus> on isab0
atapci0: <VIA 82C586 ATA33 controller> port 0xe000-0xe00f at device 7.1 on pci0
```

```
ata0: at 0x1f0 irq 14 on atapci0
ata1: at 0x170 irq 15 on atapci0
uhci0: <VIA 83C572 USB controller> port 0xe400-0xe41f irq 10 at device 7.2 on pci0
usb0: <VIA 83C572 USB controller> on uhci0
usb0: USB revision 1.0
uhub0: VIA UHCI root hub, class 9/0, rev 1.00/1.00, addr 1
uhub0: 2 ports with 2 removable, self powered
chip1: <VIA 82C586B ACPI interface> at device 7.3 on pci0
ed0: <NE2000 PCI Ethernet (RealTek 8029)> port 0xe800-0xe81f irq 9 at
device 10.0 on pci0
ed0: address 52:54:05:de:73:1b, type NE2000 (16 bit)
isa0: too many dependant configs (8)
isa0: unexpected small tag 14
fdc0: <NEC 72065B or clone> at port 0x3f0-0x3f5,0x3f7 irq 6 drq 2 on isa0
fdc0: FIFO enabled, 8 bytes threshold
fd0: <1440-KB 3.5" drive> on fdc0 drive 0
atkbdc0: <keyboard controller (i8042)> at port 0x60-0x64 on isa0
atkbd0: <AT Keyboard> flags 0x1 irq 1 on atkbdc0
kbd0 at atkbd0
psm0: <PS/2 Mouse> irq 12 on atkbdc0
psm0: model Generic PS/2 mouse, device ID 0
vga0: <Generic ISA VGA> at port 0x3c0-0x3df iomem 0xa0000-0xbffff on isa0
sc0: <System console> at flags 0x1 on isa0
sc0: VGA <16 virtual consoles, flags=0x300>
sio0 at port 0x3f8-0x3ff irq 4 flags 0x10 on isa0
sio0: type 16550A
sio1 at port 0x2f8-0x2ff irq 3 on isa0
sio1: type 16550A
ppc0: <Parallel port> at port 0x378-0x37f irq 7 on isa0
ppc0: SMC-like chipset (ECP/EPP/PS2/NIBBLE) in COMPATIBLE mode
ppc0: FIFO with 16/16/15 bytes threshold
ppbus0: IEEE1284 device found /NIBBLE
Probing for PnP devices on ppbus0:
plip0: <PLIP network interface> on ppbus0
lpt0: <Printer> on ppbus0
lpt0: Interrupt-driven port
ppi0: <Parallel I/O> on ppbus0
ad0: 8063MB <IBM-DHEA-38451> [16383/16/63] at ata0-master using UDMA33
ad2: 8063MB <IBM-DHEA-38451> [16383/16/63] at ata1-master using UDMA33
acd0: CDROM <DELTA OTC-H101/ST3 F/W by OIPD> at ata0-slave using PIO4
Mounting root from ufs:/dev/ad0s1a
swapon: adding /dev/ad0s1b as swap device
Automatic boot in progress...
/dev/ad0s1a: FILESYSTEM CLEAN; SKIPPING CHECKS
/dev/ad0s1a: clean, 48752 free (552 frags, 6025 blocks, 0.9% fragmentation)
/dev/ad0s1f: FILESYSTEM CLEAN; SKIPPING CHECKS
/dev/ad0s1f: clean, 128997 free (21 frags, 16122 blocks, 0.0% fragmentation)
/dev/ad0s1g: FILESYSTEM CLEAN; SKIPPING CHECKS
/dev/ad0s1g: clean, 3036299 free (43175 frags, 374073 blocks, 1.3% fragmentation)
/dev/ad0s1e: filesystem CLEAN; SKIPPING CHECKS
/dev/ad0s1e: clean, 128193 free (17 frags, 16022 blocks, 0.0% fragmentation)
Doing initial network setup: hostname.
ed0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        inet 192.168.0.1 netmask 0xffffff00 broadcast 192.168.0.255
        inet6 fe80::5054::5ff::fede:731b%ed0 prefixlen 64 tentative scopeid 0x1
        ether 52:54:05:de:73:1b
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384
        inet6 fe80::1%lo0 prefixlen 64 scopeid 0x8
        inet6 ::1 prefixlen 128
        inet 127.0.0.1 netmask 0xff000000
Additional routing options: IP gateway=YES TCP keepalive=YES
routing daemons:.
additional daemons: syslogd.
Doing additional network setup:.
Starting final network daemons: creating ssh RSA host key
Generating public/private rsa1 key pair.
Your identification has been saved in /etc/ssh/ssh_host_key.
Your public key has been saved in /etc/ssh/ssh_host_key.pub.
The key fingerprint is:
cd:76:89:16:69:0e:d0:6e:f8:66:d0:07:26:3c:7e:2d root@k6-2.example.com
 creating ssh DSA host key
Generating public/private dsa key pair.
```

```
Your identification has been saved in /etc/ssh/ssh_host_dsa_key.
Your public key has been saved in /etc/ssh/ssh_host_dsa_key.pub.
The key fingerprint is:
f9:a1:a9:47:c4:ad:f9:8d:52:b8:b8:ff:8c:ad:2d:e6 root@k6-2.example.com.
setting ELF ldconfig path: /usr/lib /usr/lib/compat /usr/X11R6/lib
/usr/local/lib
a.out ldconfig path: /usr/lib/aout /usr/lib/compat/aout /usr/X11R6/lib/aout
starting standard daemons: inetd cron sshd usbd sendmail.
Initial rc.i386 initialization:.
rc.i386 configuring syscons: blank_time screensaver moused.
Additional ABI support: linux.
Local package initialization:.
Additional TCP options:.

FreeBSD/i386 (k6-2.example.com) (ttyv0)

login: rpratt
Password:
```

Generating the RSA and DSA keys may take some time on slower machines. This happens only on the initial boot-up of a new installation. Subsequent boots will be faster.

If the X server has been configured and a Default Desktop chosen, it can be started by typing `startx` at the command line.

2.10.17 FreeBSD Shutdown

It is important to properly shutdown the operating system. Do not just turn off power. First, become a superuser by typing `su` at the command line and entering the `root` password. This will work only if the user is a member of the `wheel` group. Otherwise, login as `root` and use `shutdown -h now`.

```
The operating system has halted.
Please press any key to reboot.
```

It is safe to turn off the power after the shutdown command has been issued and the message "Please press any key to reboot" appears. If any key is pressed instead of turning off the power switch, the system will reboot.

You could also use the **Ctrl**+**Alt**+**Del** key combination to reboot the system, however this is not recommended during normal operation.