

BlueCat Linux Board Support Guide

BlueCat Linux 4.0

DOC-0509-01

For Force CPCI-735/736 Boards

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The *BlueCat Linux Board Support Guide for Force CPCI-735/736 Boards* provides information about the BlueCat Linux Board Support Package (BSP) for the Force CPCI-735/736 boards, which are based on the Intel Pentium III Mobile processor.

Throughout this Board Support Guide (BSG), the BSP is referred to as the “*cpci735*” and the board as the “*Force CPCI-735/736*.”

The chapters of this BSG provide the information listed below:

- **Chapter 1** is an overview of this BSG’s individual chapters.
- **Chapter 2** describes BlueCat Linux downloading and booting procedures for the Force CPCI-735/736 board using the BlueCat Linux OS loader.
- **Chapter 3** details configuration of the prebuilt BlueCat Linux kernel contained in the *cpci735* BSP.
- **Chapter 4** in this guide lists the BlueCat Linux demo systems included in the *cpci735* BSP.
- **Chapter 5** lists the device drivers supported by the *cpci735* BSP.

Downloading and Booting BlueCat Linux on the Target

This chapter provides instructions for downloading a BlueCat Linux demo system from a cross development host onto the target, and then booting the demo system on the target board.

Prerequisites

This document is a guide to downloading and booting BlueCat Linux systems onto the user's target board. Scenarios that use demo systems included in the BlueCat Linux distribution are presented. A basic familiarity with the target board hardware and operation is required to use this guide. The user must also have an understanding of system administration for the particular cross development host on which BlueCat Linux and the Board Support Package (BSP) are installed. It is assumed that the user has the manufacturer's documentation for the target board as well as system administration reference material for the cross development host.

Before downloading and booting BlueCat Linux on the target board, it is assumed that the default BlueCat Linux Force CPCI-735/736 configuration and the cpci735 BSP have been installed on the development host. The user must:

1. Install the BlueCat Linux i386 Core onto the cross development host, as described in the "Installing the Default Configuration" section in Chapter 1, "Installation" of the *BlueCat Linux User's Guide*.
2. Install the cpci735 BSP onto the cross development host as detailed in the "Installing Target Board Support" section of Chapter 1, "Introduction and Installation" in the *BlueCat Linux User's Guide*.
3. Activate support for the cpci735 BSP as detailed in the "Activating Support for a Target Board" section of Chapter 1, "Introduction and Installation" in the *BlueCat Linux User's Guide*.

Download and Boot Procedure Overview

The Force CPCI-735/736 is in most aspects compatible with the conventional Pentium PC in that it provides support for a standard set of boot options, such as an IDE hard disk and a floppy. When deployed in field, however, storage devices such as a hard disk or a floppy are not always installed on the Force CPCI-735/736. This is especially true of a board installed into a non-system controller cPCI slot.

To overcome this feature of the Force CPCI-735/736 and provide for a convenient boot mechanism, the procedure for downloading and booting a BlueCat Linux system onto a Force CPCI-735/736 target consists of the following main steps:

- Setting up hardware
- Installing of the BlueCat Linux OS loader into the IDE flash of Force CPCI-735/736
- Booting of the BlueCat Linux OS loader from the IDE flash
- Downloading and booting of a BlueCat Linux system from a network or the cPCI backplane using the BlueCat Linux OS loader.

Please refer to Chapter 3, “Downloading and Booting BlueCat Linux” in the *BlueCat Linux User’s Guide* for a discussion of the OS loader.

Setting up Hardware

Connecting Target Board Serial Ports to Host

The target board has one serial port (the COM1 DB9-connector). This port is used by the Phoenix BIOS and the BlueCat Linux embedded system.

This port needs to be connected to the development host. It is recommended to connect the COM1 connector to the COM1 port on the host. Use the serial cable shipped with the Force CPCI-735/736 board to connect to the port. The serial port connected to the target has a baud rate of 9600.

Connecting Target Board Ethernet Card to Host

The Ethernet port on the target board is used to provide a standard network connection for the board and, in particular, to load BlueCat Linux embedded systems onto the board over a network.

The Ethernet port (the `ETH1` RJ45-connector) on the Force CPCI-735/736 board must be used to connect the board to a LAN.

NOTE: The rear transition module makes Ethernet available.

It also required to set up networking on the host system. The user must choose a unique IP address for the development host as well as for the target board. These addresses are referred to as `development_host_IP` and `target_board_IP`, respectively, in the commands that follow. For more information on how to set up networking on the host, please refer to the host operating system documentation.

The DHCP, PXE, and MTFTP services must be enabled on the host.

Target Board Configuration Switches

The target board switches must be set as shown in the table below:

Table 2-1: Force CPCI-735/736 Configuration Switches

Switch	Position	Description
SW2 - 1	On	IDE Flash disk enable
SW2 - 2	On	IDE Flash controller is master

Setting the configuration switches of the board as described above enables IDE Flash disk and configures it as a primary master on the board.

Setting up the Phoenix BIOS

Use the following procedure to set up the Phoenix BIOS to prepare the Force CPCI-735/736 board for BlueCat Linux operations:

1. When the BIOS starts, press **F2** to enter the **PhoenixBIOS Setup Utility**.
2. Select **Advanced** from the menu.

```

PhoenixBIOS Setup Utility

Main   Advanced   Boot   Exit
*****
*                                           * Item Specific Help *
*                                           *****
*                               Setup Warning
*   Setting items on this menu to incorrect values
*   may cause your system to malfunction.
*                                           * Additional setup
*                                           * menus to configure
*   Installed O/S:                [Other]
*   Reset Configuration Data:    [No]
*                                           * console
*                                           *
* > PCI Configuration
* > I/O Device Configuration
* > Advanced Chipset Control
* > Cache Memory
* > POST Options
* > Console Redirection
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*                                           *
*****
F1  Help  ^v  Select Item  -/+  Change Values  F9  Setup Defaults
Esc Exit  <>  Select Menu  Enter  Select > Sub-Menu  F10 Save and Exit
    
```

3. Select the **Console Redirection** option and make settings as shown in the following figure.

```

PhoenixBIOS Setup Utility

Advanced
*****
*                               Console Redirection
*                               * Item Specific Help *
*                               *****
*   Com Port Address          [3F8/IRQ 4]
*                               * If enabled, it will
*                               * use a port on the
*   Baud Rate                 [9600]
*                               * motherboard.
*   Console Type              [VT100]
*   Flow Control              [XON/XOFF]
*   Disable before boot      [No]
*                               *
*                               *
*                               *
*                               *
*                               *
*                               *
*                               *
*                               *
*                               *
*                               *
*                               *
*****
F1  Help  ^v  Select Item  -/+  Change Values  F9  Setup Defaults
Esc Exit  <>  Select Menu  Enter  Select > Sub-Menu  F10 Save and Exit
    
```

4. Press **F10** to save the settings and exit the **PhoenixBIOS Setup Utility**.
5. Reboot the board.

As the result, the Phoenix BIOS redirects output to the serial console.

Installing BlueCat Linux OS Loader into Target IDE Flash

Because the BIOS of the Force CPCI-735/736 does not support an operating system boot over PCI from a cPCI host, the BlueCat Linux OS loader is used to implement a PCI boot option, as well as other flexible boot options. The BlueCat Linux OS loader is a customized configuration of embedded Linux designed specifically to act as an OS booter. The OS loader version in the BlueCat Linux distribution is customized to support booting the Force CPCI-735/736 over PCI from the IOP Manager on the host, as well as the network boot option.

Once the OS loader is installed onto the Force CPCI-735/736, it autoboots the system and waits for a request from the PCI host to download an image. This boot sequence is executed in a *headless* mode, i.e., a console to the Force CPCI-735/736 board is not required.

Alternatively, the user may enter the command line mode of the OS loader and use interactive BLOSH (BlueCat Linux OS Loader Shell) commands to boot the system.

Installation Procedure Overview

The BlueCat Linux OS loader installation procedure includes these major steps:

- Installing and configuring the Dynamic Host Configuration Protocol (DHCP) server
- Installing and configuring the PXE and MTFTP servers
- Booting the OS loader onto the Force CPCI-735/736 board using the PXE Netboot
- Using the installation version of OS loader to install the boot version of the OS loader into the IDE flash disk of the Force CPCI-735/736
- Once the installation is complete, the OS loader boots up from IDE flash disk after a power-up or reset.

NOTE: The installation procedure assumes that Red Hat Linux version 7.1 or higher (recommended version is 7.2) has been already installed on a host machine. The same machine can be used as the DHCP, PXE, and MFTFTP servers.

Configuring the DHCP Server

The DHCP server must be enabled and running to provide PXE Netboot support. The user must perform the following steps to install and configure the DHCP server on a Linux machine:

NOTE: For DHCP to work effectively, the target should be installed as close as possible to the host on the network.

1. Log in as `root` (superuser) and install the `dhcp` RPM package from the Red Hat Linux distribution (version 6.x or higher), if this package has not been installed already:

```
# rpm -ihv dhcp-ver.i386.rpm
```

where `ver` is the version number of `dhcp` (version 2.0-5 or higher).

2. Create the `/etc/dhcpd.conf` file with the following contents:

```
subnet subnet_address netmask subnet_mask {

    option routers default_routers;
    option subnet-mask subnet_mask;
    option domain-name "domain_name";
    option domain-name-servers dns_server;
    allow booting;
    allow bootp;
    option dhcp-class-identifier "PXEClient";

    host pxe-client_hostname {
        hardware ethernet ethernet_address;
        fixed-address ip_address;
    }
}
# End of dhcpd.conf
```

where the following variables are important:

Variable	Description	Example
<i>subnet_address</i>	Subnet address of the server	192.168.1.0
<i>subnet_mask</i>	Subnet mask of the server	255.255.255.0
<i>default_routers</i>	The default router	192.168.1.254
<i>domain_name</i>	Domain Name of the target	int.lynx.com
<i>dns_server</i>	Domain Name Server IP address	207.21.185.10
<i>pxe-client_hostname</i>	Host name of the target	cpci735a
<i>ethernet_address</i>	Ethernet address	00:80:42:0f:ff:7f
<i>ip_address</i>	Internet Protocol address	192.168.1.159

3. Start the DHCP daemon on the Linux host by typing:

```
# /etc/rc.d/init.d/dhcpd start
```

After this procedure is complete, the DHCP server is configured and running on the host.

Installing and Configuring PXE and MTFTP Servers

The user must perform the following steps to install and configure the PXE and MTFTP servers on a Linux machine:

1. Log in as `root` (superuser) and install the `pxe` RPM package from the Red Hat Linux distribution (version 6.x or higher), if this package has not been installed already:

```
# rpm -ihv pxe-0.1-23.i386.rpm
```

2. Edit the `/etc/pxe.conf` file:

A) Set the `[UseDHCPPort]` option to 0.

B) Comment out (place `#` signs at the start of) the following line in the `[Service_Types]` section as follows:

```
13,linux-install
0,BStrap
```

```
# 14linux-boot
#Menu string that will be displayed on the client
#screen after F8 is pressed.
```

In the section [X86PC/UNDI/MENU]

```
13,Remote Install Linux
0,Local Boot
# 14,Remote Boot Linux
```

3. Add the following lines to the `/etc/services` file:

```
mtftp 1759/udp
pxe 67/udp
pxe 4011/udp
```

4. To configure the MTFTP server, do either of the following depending on the Red Hat Linux version installed on the host.

A) For Red Hat Linux version 7.1 or higher:

- Create the `/etc/xinetd.d/mtftp` file with the following contents:

```
service mtftp
{
  disable = no
  socket_type = dgram
  protocol = udp
  user = root
  wait = yes
  server = /usr/sbin/in.mtftpd
  server_args = /tftpboot
}
# End of mtftp
```

- Restart the `xinetd` daemon by typing:

```
# /etc/rc.d/init.d/xinetd restart
```

B) For Red Hat Linux version lower than 7.1:

- Add the following line to the `/etc/inetd.conf` file:

```
mtftp drap udp wait root /usr/sbin/tcpd in.mtftpd /tftpboot
```

- Restart the `inetd` daemon by typing:

```
# /etc/rc.d/init.d/inet restart
```

After this procedure is complete, the MTFTP server is up and running.

5. Start the PXE server by typing:

```
# /etc/rc.d/init.d/pxe start
```

After this procedure is complete, the PXE server is configured and running on the host.

PXE Netboot Configuration on Force CPCI-735/736

To enable the PXE Netboot on the Force CPCI-735/736 board, use the following procedure:

1. When the BIOS starts, press **F2** to enter the **PhoenixBIOS Setup Utility**.
2. Select **Advanced** from the menu.

```

                                PhoenixBIOS Setup Utility
      Main      Advanced      Boot      Exit
*****
*                                     * Item Specific Help *
*                                     *****
*               Setup Warning
* Setting items on this menu to incorrect values *
* may cause your system to malfunction. *
*                                     * Select POST options *
*                                     *
* Installed O/S:                [Other]
* Reset Configuration Data:    [No]
*                                     *
* > PCI Configuration
* > I/O Device Configuration
* > Advanced Chipset Control
* > Cache Memory
* > POST Options
* > Console Redirection
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*****
F1 Help ^v Select Item -/+ Change Values F9 Setup Defaults
Esc Exit <> Select Menu Enter Select > Sub-Menu F10 Save and Exit

```

3. Select the **Post options** option and enable **Network Option ROM** as shown in the following figure.

```

                                PhoenixBIOS Setup Utility
                                Advanced
*****
*                               POST Options                               *
*****
*                               * Item Specific Help                       *
*****
*                               *                                           *
* POST Errors:                  [Disabled]                                *
* SETUP prompt:                 [Enabled]                                 *
* QuickBoot Mode:               [Enabled]                                 *
* Summary screen:               [Enabled]                                 *
* Memory Test:                  [64 MB]                                  *
* Network Option ROM:           [Enabled]                                *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*                               *                                           *
*****
F1  Help   ^v  Select Item  -/+  Change Values   F9  Setup Defaults
Esc Exit   <>  Select Menu  Enter Select > Sub-Menu  F10 Save and Exit

```

4. Press **Esc** to return to the main menu.
5. Select **Boot** from the menu.

- Press the + key to select and move ETH1 on the top of the list.

```

                                PhoenixBIOS Setup Utility
      Main      Advanced      Boot      Exit
*****
*                               * Item Specific Help *
*                               * *****
*      ETH1                               *
*      +Hard Drive                         *
*      ATAPI CD-ROM Drive                  *
*      Removable Devices                   *
*      ETH2                               *
*
*      * Keys used to view or            *
*      * configure devices:              *
*      * <Enter> expands or               *
*      * collapses devices with         *
*      * a + or -                         *
*      * <Ctrl+Enter> expands            *
*      * all                              *
*      * <Shift + l> enables or          *
*      * disables a device.              *
*      * <+> and <-> moves the           *
*      * device up or down.              *
*      * <n> May move removable          *
*      * device between Hard             *
*      * Disk or Removable Disk          *
*      * <d> Remove a device              *
*      * that is not installed.          *
*****
F1 Help  ^v Select Item  -/+ Change Values  F9 Setup Defaults
Esc Exit  <> Select Menu  Enter Select > Sub-Menu  F10 Save and Exit

```

- Press F10 to save settings and exit the PhoenixBIOS Setup Utility.

Installing the BlueCat Linux OS Loader on the Target

NOTE: Do not remove the `linux.0` file. Its size should be 12296 bytes.

```

# $ENV_PREFIX/ ls -l

total 1408
-rwxr-xr-x      1 root      12296 Feb 19 17:23 linux.0
-rw-r--r--      1 root      496691 Feb 19 17:19 linux.1
-rw-r--r--      1 root      202455 Feb 19 17:19 linux.2

```

To install the BlueCat Linux OS loader into the IDE flash disk of the Force CPCI-735/736, do the following:

- On the Linux host, copy the prebuilt binary images of the OS loader to locations where the PXE boot process expects to find them.
 - First, copy the OS loader kernel image, `i_osloader.disk`, to the `/tftpboot/x86PC/UNDI/linux-install/linux.1` file:

```

# cp \
  $BLUECAT_PREFIX/demo/osloader/i_osloader.disk \
  /tftpboot/x86PC/UNDI/linux-install/linux.1

```

- B) Then, copy the OS loader root file system image, `i_osloader.rfs`, to the `/tftpboot/X86PC/UNDI/linux-install/linux.2` file:

```
# cp \  
$BLUECAT_PREFIX/demo/osloader/i_osloader.rfs \  
/tftpboot/X86PC/UNDI/linux-install/linux.2
```

2. While the PXE Netboot is loading the kernel, type the command line, `console=ttyS0,9600`, to pass these parameters to the kernel.

```
Intel UNDI, PXE-2.0 (build 071)  
Copyright (C) 1997,1998,1999 Intel Corporation  
  
DHCP MAC ADDR: 00 80 42 0F FF 7F  
CLIENT IP: 192.168.1.159 MASK: 255.255.255.0 DHCP IP:  
192.168.1.184  
GATEWAY IP: 192.168.1.254  
  
BOOT SERVER IP: 192.168.1.184  
  
Intel Linux NBP, Beta-3 (build 003)  
  
Press any key to enter kernel parameters... (1) ENTER  
Enter kernel parameters: console=ttyS0,9600
```

NOTE: This step is required for a successful installation. If these parameters are not specified, the serial console settings will be incorrect.

3. Reset the Force CPCI-735/736 board. The BIOS starts the PXE Netboot process and downloads the OS loader onto the board:

```
Linux version 2.4.10-1 (root@build1) (gcc version 2.95.3 20010315  
(release)) #8 Wed Dec 19 20:22:01 MSK 2001  
BIOS-provided physical RAM map:003)  
BIOS-e820: 0000000000000000 - 000000000009f800 (usable)  
BIOS-e820: 000000000009f800 - 00000000000a0000 (reserved)  
BIOS-e820: 00000000000eb000 - 00000000000100000 (reserved)  
BIOS-e820: 00000000000100000 - 00000000020000000 (usable)  
BIOS-e820: 000000000fff80000 - 000000000100000000 (reserved)  
On node 0 totalpages: 131072  
zone(0): 4096 pages.  
zone(1): 126976 pages.  
BUG: wrong zone alignment, it will crash  
zone(2): 0 pages.  
Kernel command line: console=ttyS0,9600  
Initializing CPU#0  
Detected 846.817 MHz processor.  
Calibrating delay loop... 1690.82 BogoMIPS  
Memory: 509888k/524288k available (735k kernel code, 14012k  
reserved, 161k data, 68k init, 0k highmem)  
Dentry-cache hash table entries: 65536 (order: 7, 524288 bytes)  
Inode-cache hash table entries: 32768 (order: 6, 262144 bytes)  
Mount-cache hash table entries: 8192 (order: 4, 65536 bytes)  
Buffer-cache hash table entries: 32768 (order: 5, 131072 bytes)  
Page-cache hash table entries: 131072 (order: 7, 524288 bytes)
```

```
CPU: L1 I cache: 16K, L1 D cache: 16K
CPU: L2 cache: 256K
CPU serial number disabled.
Intel machine check architecture supported.
Intel machine check reporting enabled on CPU#0.
CPU: Intel Pentium III (Coppermine) stepping 06
Enabling fast FPU save and restore... done.
Enabling unmasked SIMD FPU exception support... done.
Checking 'hlt' instruction... OK.
POSIX conformance testing by UNIFIX
PCI: PCI BIOS revision 2.10 entry at 0xfda10, last bus=4
PCI: Using configuration type 1
PCI: Probing PCI hardware
Unknown bridge resource 2: assuming transparent
Unknown bridge resource 2: assuming transparent
Unknown bridge resource 2: assuming transparent
PCI: Discovered primary peer bus 04 [IRQ]
PCI: Cannot allocate resource region 7 of bridge 00:04.0
PCI: Cannot allocate resource region 7 of bridge 01:0e.0
PCI: Cannot allocate resource region 8 of bridge 01:0e.0
Linux NET4.0 for Linux 2.4
Based upon Swansea University Computer Society NET3.039
Starting kswapd v1.8
Serial driver version 5.05c (2001-07-08) with MANY_PORTS SHARE_IRQ
SERIAL_PCI enabled
keyboard: Timeout - AT keyboard not present?(ed)
keyboard: Timeout - AT keyboard not present?(f4)
ttyS00 at 0x03f8 (irq = 4) is a 16550A
ttyS01 at 0x02f8 (irq = 3) is a 16550A
block: queued sectors max/low 338864kB/207792kB, 1024 slots per
queue
RAMDISK driver initialized: 16 RAM disks of 4096K size 1024
blocksize
Uniform Multi-Platform E-IDE driver Revision: 6.31
ide: Assuming 33MHz system bus speed for PIO modes; override with
idebus=xx
ServerWorks OSB4: IDE controller on PCI bus 00 dev 79
ServerWorks OSB4: chipset revision 0
ServerWorks OSB4: not 100% native mode: will probe irqs later
hda: SAMSUNG ATA/CF, ATA DISK drive
ide0 at 0x1f0-0x1f7,0x3f6 on irq 14
hda: 62976 sectors (32 MB) w/1KiB Cache, CHS=984/2/32
Partition check:
  hda: hda1 hda2
floppy0: no floppy controllers found
eeepro100.c:v1.09j-t 9/29/99 Donald Becker
http://cesdis.gsfc.nasa.gov/linux/drivers/eeepro100.html
eeepro100.c: $Revision: 1.1 $ 2000/11/17 Modified by Andrey V.
Savochkin <saw@saw.sw.com.sg> and others
eth0: PCI device 8086:1209, 00:80:42:0f:ff:7f, IRQ 11.
  Board assembly 729757-003, Physical connectors present: RJ45
  Primary interface chip i82555 PHY #1.
  General self-test: passed.
  Serial sub-system self-test: passed.
  Internal registers self-test: passed.
  ROM checksum self-test: passed (0xdbd8681d).
eth1: PCI device 8086:1209, 00:80:42:0f:ff:80, IRQ 10.
  Board assembly 729757-003, Physical connectors present: RJ45
  Primary interface chip i82555 PHY #1.
  General self-test: passed.
  Serial sub-system self-test: passed.
  Internal registers self-test: passed.
  ROM checksum self-test: passed (0xdbd8681d).
```

```

NET4: Linux TCP/IP 1.0 for NET4.0
IP Protocols: ICMP, UDP, TCP
IP: routing cache hash table of 4096 buckets, 32Kbytes
TCP: Hash tables configured (established 131072 bind 65536)
RAMDISK: Compressed image found at block 519168
Freeing BlueCat RFS memory: 4096k freed
RAMDISK: ext2 filesystem found at block 0
RAMDISK: Loading 2381 blocks [1 disk] into ram disk... done.
VFS: Mounted root (ext2 filesystem) readonly.
Freeing unused kernel memory: 68k freed
BlueCat Loader Shell
>

```

4. Boot the OS loader on the target board.
5. A successful boot brings up the BLOSH (BlueCat Linux OS Loader Shell) prompt on the target board console (>). Before issuing BLOSH commands, ensure that the `/etc/xinetd.d/tftp` file looks as follows:

```

service tftp
{
    socket_type           = dgram
    protocol              = udp
    wait                  = yes
    user                  = root
    server                = /usr/sbin/in.tftpd
    server_args           = /tftpboot
    disable               = no
}

```

6. Set the BLOSH environment variables, specifying the BlueCat Linux OS loader image as the system to be installed on the target. For example:

```

> set IF eth0
> set IP 192.168.1.159
> set HOST 192.168.1.184
> set KERNEL tftp /tftpboot/osloader.disk
> set FILE tftp /tftpboot/osloader.tar

```

7. Create a partition on the hard disk to hold the kernel. For example:

```

> exec fdisk /dev/hda

hda: hda1 hda2

Command (m for help): p

Disk /dev/hda: 2 heads, 32 sectors, 984 cylinders
Units = cylinders of 64 * 512 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/hda1  *           1           65       2064    83  Linux
/dev/hda2             66          984      29408    83  Linux

```

```

Command (m for help): d
Partition number (1-4): 1

Command (m for help): d
Partition number (1-4): 2

Command (m for help): p

Disk /dev/hda: 2 heads, 32 sectors, 984 cylinders
Units = cylinders of 64 * 512 bytes

    Device Boot      Start         End      Blocks   Id  System

Command (m for help): n
Command action
  e   extended
    p   primary partition (1-4) p
Partition number (1-4): 1
First cylinder (1-984, default 1): 1
Last cylinder or +size or +sizeM or +sizeK (1-984, default 984): +2M

Command (m for help): n
Command action
  e   extended
    p   primary partition (1-4) p
Partition number (1-4): 2
First cylinder (66-984, default 66): 66
Last cylinder or +size or +sizeM or +sizeK (66-984, default 984):
984

Command (m for help): a
Partition number (1-4): 1

Command (m for help): p

Disk /dev/hda: 2 heads, 32 sectors, 984 cylinders
Units = cylinders of 64 * 512 bytes

    Device Boot      Start         End      Blocks   Id  System
/dev/hda1   *           1             65        2064    83  Linux
/dev/hda2                66           984       29408    83  Linux

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
hda: hda1 hda2
hda: hda1 hda2

WARNING: If you have created or modified any DOS 6.x
partitions, please see the fdisk manual page for additional
information.
Syncing disks.

```

8. Create a file system on the newly made partition. For example:

```
> exec mke2fs /dev/hda2
```

```
mke2fs 1.19, 13- hda:Jul-2000 for EXT hda12 FS 0.5b, 95/08 hda2/09
ext2fs_check_if_mount: No such file or directory while determining
whether /dev/hda2 is mounted.
```

```
hda: hda1 hda2
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
7360 inodes, 29408 blocks
1470 blocks (5.00%) reserved for the super user
First data block=1
4 block groups
8192 blocks per group, 8192 fragments per group
1840 inodes per group
Superblock backups stored on blocks:
    8193, 24577
```

```
Writing inode tables: done
Writing superblocks and filesystem accounting information: done
```

9. Mount the partition on the hard disk:

```
> mount /dev/hda2 /mnt
```

```
hda: hda1 hda2
hda: hda1 hda2
```

10. Untar the root file system and copy it from the TFTP server:

```
> cd /mnt
```

```
> ntar
```

```
getting /tftpboot/osloader.tar
.....
.....
Received 470016
```

11. Unmount the partition on the IDE flash disk:

```
> cd /
```

```
> umount /mnt
```

12. Copy the kernel image, specifying the root file system.

```
> mkboot -b -r /dev/hda2 /dev/hda
```

```
hda: hda1 hda2
output: /dev/hda: IDE disk
getting /tftpboot/osloader.disk
.....
.....
Received 496500
Boot device      : 128
Geometry         : 32x2
Kernel           : 969 sectors (484K)
Root filesystem  : /dev/hda2 (03:02)
RFS              : none
Command line     : none
```

- Reset the target board. This boots the BlueCat Linux system on the target from the IDE Flash disk:

```
> sync
> sync
> reset
```

Restarting system.

The above procedure installs the boot version of the BlueCat Linux OS loader into the IDE flash disk of the Force CPCI-735/736 board. Once this procedure is complete, the OS loader boots up from the IDE flash disk after a power-up/reset.

Setting IDE Flash Disk as First Boot Device

After installing the OS loader, perform the following steps to set the IDE flash disk as the first boot device.

- When the BIOS starts, press **F2** to enter the **PhoenixBIOS Setup Utility**.
- Select **Boot** from the menu.
- Press the **+** key to select and move **Hard Drive** to the top of the list.

```

                                PhoenixBIOS Setup Utility
Main      Advanced      Boot      Exit
*****
*                               * Item Specific Help *
*                               *****
*   +Hard Drive                 *
*   ETH1                        *
*   ATAPI CD-ROM Drive         *
*   Removable Devices          *
*   ETH2                        *
*                               *
*                               * Keys used to view or  *
*                               * configure devices:   *
*                               * <Enter> expands or     *
*                               * collapses devices with *
*                               * a + or -              *
*                               * <Ctrl+Enter> expands   *
*                               * all                    *
*                               * <Shift + l> enables or *
*                               * disables a device.     *
*                               * <+> and <-> moves the  *
*                               * device up or down.     *
*                               * <n> May move removable *
*                               * device between Hard    *
*                               * Disk or Removable Disk *
*                               * <d> Remove a device    *
*                               * that is not installed. *
*                               *
*****
F1  Help  ^v  Select Item  -/+  Change Values  F9  Setup Defaults
Esc Exit  <>  Select Menu  Enter  Select > Sub-Menu  F10 Save and Exit

```

4. Press **F10** to save the settings and exit the **PhoenixBIOS Setup Utility**.

Using BlueCat Linux OS Loader on Force CPCI-735/736

As soon as the OS loader boots up on the Force CPCI-735/736 board, the standard BlueCat Linux OS loader shell prompt (>) is displayed on the console device. To interact with the OS loader, use standard OS loader commands.

Booting a Demo System over a Network

The following set of commands show how to boot a BlueCat Linux system onto the Force CPCI-735/736 from a TFTP host. For more information on OS loader commands and environment variables, see “BLOSH Environment Variables” and “BLOSH Command Reference” in the *BlueCat Linux User’s Guide*.

```
BlueCat Loader Shell
> set IF eth0
> set IP 192.168.1.159
> set HOST 192.168.1.184
> set KERNEL tftp /tftpboot/developer.kernel
> set RFS tftp /tftpboot/developer.rfs
> set CMD ramdisk_size=10240 console=ttyS0,9600
> boot

getting /tftpboot/developer.kernel
.....
Received 437060
getting /tftpboot/developer.rfs
.....
.....
.....
.....
.....
.....
.....
.....
.....
Switching to new kernel...
Linux version 2.4.10-1 (root@build1) (gcc version 2.95.3 20010315
(release)) #9 Wed Dec 19 21:15:24 MSK 2001
BIOS-provided physical RAM map:
  BIOS-e820: 0000000000000000 - 000000000009f800 (usable)
  BIOS-e820: 000000000009f800 - 00000000000a0000 (reserved)
  BIOS-e820: 00000000000eb000 - 0000000000100000 (reserved)
  BIOS-e820: 0000000000100000 - 0000000020000000 (usable)
  BIOS-e820: 00000000fff80000 - 0000000100000000 (reserved)
```

```
On node 0 totalpages: 131072
zone(0): 4096 pages.
zone(1): 126976 pages.
zone(2): 0 pages.
Kernel command line: ramdisk_size=10240 console=ttyS0,9600
Initializing CPU#0
Detected 697.401 MHz processor.
Console: colour VGA+ 80x25
Calibrating delay loop... 1392.64 BogoMIPS
Memory: 511560k/524288k available (640k kernel code, 12340k reserved, 143k
data, 60k init, 0k highmem)
Dentry-cache hash table entries: 65536 (order: 7, 524288 bytes)
Inode-cache hash table entries: 32768 (order: 6, 262144 bytes)
Mount-cache hash table entries: 8192 (order: 4, 65536 bytes)
Buffer-cache hash table entries: 32768 (order: 5, 131072 bytes)
Page-cache hash table entries: 131072 (order: 7, 524288 bytes)
CPU: L1 I cache: 16K, L1 D cache: 16K
CPU: L2 cache: 256K
Intel machine check architecture supported.
Intel machine check reporting enabled on CPU#0.
CPU: Intel Pentium III (Coppermine) stepping 06
Enabling fast FPU save and restore... done.
Enabling unmasked SIMD FPU exception support... done.
Checking 'hlt' instruction... OK.
POSIX conformance testing by UNIFIX
PCI: PCI BIOS revision 2.10 entry at 0xfda10, last bus=4
PCI: Using configuration type 1
PCI: Probing PCI hardware
Unknown bridge resource 2: assuming transparent
Unknown bridge resource 2: assuming transparent
Unknown bridge resource 2: assuming transparent
PCI: Discovered primary peer bus 04 [IRQ]
PCI: Cannot allocate resource region 7 of bridge 00:04.0
PCI: Cannot allocate resource region 7 of bridge 01:0e.0
PCI: Cannot allocate resource region 8 of bridge 01:0e.0
Linux NET4.0 for Linux 2.4
Based upon Swansea University Computer Society NET3.039
Starting kswapd v1.8
pty: 256 Unix98 pty's configured
keyboard: Timeout - AT keyboard not present?(ed)
keyboard: Timeout - AT keyboard not present?(f4)
Serial driver version 5.05c (2001-07-08) with MANY_PORTS SHARE_IRQ
SERIAL_PCI enabled
ttyS00 at 0x03f8 (irq = 4) is a 16550A
ttyS01 at 0x02f8 (irq = 3) is a 16550A
block: queued sectors max/low 339960kB/208888kB, 1024 slots per queue
RAMDISK driver initialized: 16 RAM disks of 10240K size 1024 blocksize
eeepro100.c:v1.09j-t 9/29/99 Donald Becker
http://cesdis.gsfc.nasa.gov/linux/drivers/eeepro100.html
eeepro100.c: $Revision: 1.36 $ 2000/11/17 Modified by Andrey V. Savochkin
<saw@saw.sw.com.sg> and others
eth0: PCI device 8086:1209, 00:80:42:0f:ff:7f, IRQ 11.
  Board assembly 729757-003, Physical connectors present: RJ45
  Primary interface chip i82555 PHY #1.
  General self-test: passed.
  Serial sub-system self-test: passed.
  Internal registers self-test: passed.
  ROM checksum self-test: passed (0xdbd8681d).
eth1: PCI device 8086:1209, 00:80:42:0f:ff:80, IRQ 10.
  Based (0xdbd8681d).
eth1: PCI device 8086:1209, 00:80:42:0f:ff:80, IRQ 10.
  Board assembly 729757-003, Physical connectors present: RJ45
  Primary interface chip i82555 PHY #1.
```

```
General self-test: passed.
Serial sub-system self-test: passed.
Internal registers self-test: passed.
ROM checksum self-test: passed (0xdbd8681d).
NET4: Linux TCP/IP 1.0 for NET4.0
IP Protocols: ICMP, UDP, TCP
IP: routing cache hash table of 4096 buckets, 32Kbytes
TCP: Hash tables configured (established 131072 bind 65536)
NET4: Unix domain sockets 1.0/SMP for Linux NET4.0.
RAMDISK: Compressed image found at block 521736
Freeing BlueCat RFS memory: 2552k freed
VFS: Mounted root (ext2 filesystem).
Freeing unused kernel memory: 60k freed
INIT: version 2.78 booting
INIT:
myhostname login:
```

Booting a Demo System from the cPCI Host

The Force CPCI-735/736 installed into a non-system controller CPCI slot can be booted from the IOP Manager on the cPCI host. Refer to description of `mmsg_minet` demo system for a sample system demonstrating how to configure the IOP Manager on the host.

Typically, no user interaction or console device is required. At the time that the OS loader enters the user interface, it spawns a thread supporting the PCI boot protocol.

As soon as a request to boot a BlueCat Linux image is initiated by IOP Manager on the cPCI host, the OS loader boots the image onto Force CPCI-735/736 over PCI.

```
BlueCat Loader Shell
>
Connecting to host... OK
Allocating buffer... OK
  Buffer start = 0x11000000
  Buffer size = 0x08000000
Copying image... OK
  Kernel size = 478720
  Rootfs size = 1131008
Switching to new kernel...
Linux version 2.4.10-1 (root@build1) (gcc version 2.95.3 20010315
(release)) #25 Thu Dec 20 12:28:27 MSK 2001
BIOS-provided physical RAM map:
  BIOS-e820: 0000000000000000 - 000000000009f800 (usable)
  BIOS-e820: 000000000009f800 - 00000000000a0000 (reserved)
  BIOS-e820: 00000000000eac00 - 0000000000100000 (reserved)
  BIOS-e820: 0000000000100000 - 0000000020000000 (usable)
  BIOS-e820: 00000000fff80000 - 0000000100000000 (reserved)
On node 0 totalpages: 131072
zone(0): 4096 pages.
zone(1): 126976 pages.
zone(2): 0 pages.
Kernel command line:
Initializing CPU#0
Detected 697.368 MHz processor.
Console: colour *CGA 80x25
```

```
Calibrating delay loop... 1392.64 BogoMIPS
Memory: 508812k/524288k available (702k kernel code, 15088k reserved, 152k
data, 64k init, 0k highmem)
Dentry-cache hash table entries: 65536 (order: 7, 524288 bytes)
Inode-cache hash table entries: 32768 (order: 6, 262144 bytes)
Mount-cache hash table entries: 8192 (order: 4, 65536 bytes)
Buffer-cache hash table entries: 32768 (order: 5, 131072 bytes)
Page-cache hash table entries: 131072 (order: 7, 524288 bytes)
CPU: L1 I cache: 16K, L1 D cache: 16K
CPU: L2 cache: 256K
Intel machine check architecture supported.
Intel machine check reporting enabled on CPU#0.
CPU: Intel Pentium III (Coppermine) stepping 06
Enabling fast FPU save and restore... done.
Enabling unmasked SIMD FPU exception support... done.
Checking 'hlt' instruction... OK.
POSIX conformance testing by UNIFIX
PCI: PCI BIOS revision 2.10 entry at 0xfda10, last bus=1
PCI: Using configuration type 1
PCI: Probing PCI hardware
PCI: Discovered primary peer bus 01 [IRQ]
Linux NET4.0 for Linux 2.4
Based upon Swansea University Computer Society NET3.039
Starting kswapd v1.8
Serial driver version 5.05c (2001-07-08) with MANY_PORTS SHARE_IRQ
SERIAL_PCI enabled
keyboard: Timeout - AT keyboard not present?(ed)
keyboard: Timeout - AT keyboard not present?(f4)
ttyS00 at 0x03f8 (irq = 4) is a 16550A
ttyS01 at 0x02f8 (irq = 3) is a 16550A
block: queued sectors max/low 337746kB/206674kB, 1024 slots per queue
RAMDISK driver initialized: 16 RAM disks of 8192K size 1024 blocksize
SCSI subsystem driver Revision: 1.00
NET4: Linux TCP/IP 1.0 for NET4.0
IP Protocols: ICMP, UDP, TCP
IP: routing cache hash table of 4096 buckets, 32Kbytes
TCP: Hash tables configured (established 131072 bind 65536)
RAMDISK: Compressed image found at block 523180
Freeing BlueCat RFS memory: 1108k freed
VFS: Mounted root (ext2 filesystem).
Freeing unused kernel memory: 64k freed
Network is configured as follows:

Target IP address: 1.0.3.47

init-2.04#
```


The cpci735 BSP comes with a default BlueCat Linux kernel. This kernel has a number of parameters with user-configurable options. These parameters (shown below), and the default configuration of their options are shown in this chapter.

Table 3-1: Kernel Configuration Parameters

Configuration Parameter	Table Number and Page
Code Maturity Level Options	Table 3-2 on page 27
Loadable Module Support	Table 3-3 on page 27
Processor Type and Features	Table 3-4 on page 27
General Setup	Table 3-5 on page 28
Memory Technology Devices (MTD)	Table 3-6 on page 29
Parallel Port Support	Table 3-7 on page 29
Plug and Play Configuration	Table 3-8 on page 30
Block Devices	Table 3-9 on page 30
Multi-Device Support (RAID and LVM)	Table 3-10 on page 31
Networking Options	Table 3-11 on page 32
QoS and/or Fair Queueing	Table 3-12 on page 33
Telephony Support	Table 3-13 on page 33
ATA/IDE/MFM/RLL Support	Table 3-14 on page 33
IDE, ATA and ATAPI Block Devices	Table 3-15 on page 34
SCSI Support	Table 3-16 on page 35
Fusion MPT Device Support	Table 3-17 on page 35
IEEE 1394 (FireWire) Support	Table 3-18 on page 36

Table 3-1: Kernel Configuration Parameters (Continued)

Configuration Parameter	Table Number and Page
I2O Support	Table 3-19 on page 36
Network Device Support	Table 3-20 on page 36
ARCnet Devices	Table 3-21 on page 37
Appletalk Devices	Table 3-22 on page 37
Ethernet (10 or 100 Mbit)	Table 3-23 on page 37
Ethernet (1000 Mbit)	Table 3-24 on page 39
Wireless LAN (non-ham radio)	Table 3-25 on page 40
Token Ring Devices	Table 3-26 on page 40
Wan Interfaces	Table 3-27 on page 40
Amateur Radio Support	Table 3-28 on page 40
IrDA (infrared) Support	Table 3-29 on page 41
ISDN Subsystem	Table 3-30 on page 41
Old CD-ROM drivers (not SCSI, not IDE)	Table 3-31 on page 41
Input Core Support	Table 3-32 on page 42
Character Devices	Table 3-33 on page 42
Serial Drivers	Table 3-34 on page 43
I2C Support	Table 3-35 on page 43
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Joysticks	Table 3-38 on page 44
Watchdog Cards	Table 3-39 on page 44
Ftape, Floppy Tape Device Driver	Table 3-40 on page 44
Multimedia Devices	Table 3-41 on page 44
File Systems	Table 3-42 on page 45
Network File Systems	Table 3-43 on page 46
Partition Types	Table 3-44 on page 47
Native Language Support	Table 3-45 on page 47

Table 3-1: Kernel Configuration Parameters (Continued)

Configuration Parameter	Table Number and Page
Console Drivers	Table 3-46 on page 49
Frame-buffer Support	Table 3-47 on page 49
USB Support	Table 3-49 on page 52
USB Serial Converter Support	Table 3-50 on page 54
Bluetooth Support	Table 3-51 on page 54
Kernel Hacking	Table 3-52 on page 54
Modular Advanced Power Management	Table 3-53 on page 54
Messenger Support	Table 3-54 on page 54

Table 3-2: Code Maturity Level Options

Option	Value	Description
CONFIG_EXPERIMENTAL	Y	Prompt for development and/or incomplete code/drivers

Table 3-3: Loadable Module Support

Option	Value	Description
CONFIG_MODULES	Y	Enable loadable module support
CONFIG_MODVERSIONS	Y	Set version information on all symbols for modules
CONFIG_KMOD	Y	Kernel module loader

Table 3-4: Processor Type and Features

Option	Value	Description
CONFIG_MPENTIUMIII	Y	Pentium III/Celeron (Coppermine) Processor family
CONFIG_TOSHIBA	N	Toshiba Laptop support
CONFIG_BLUECAT_CPCI735	Y	Force CPCI-735/736 support

Table 3-4: Processor Type and Features (Continued)

Option	Value	Description
CONFIG_MICROCODE	N	/dev/cpu/microcode - Intel IA32 CPU microcode support
CONFIG_X86_MSR	N	/dev/cpu/*/msr - Model-specific register support
CONFIG_X86_CPUID	N	/dev/cpu/*/cpuid - CPU information support
CONFIG_NOHIGHMEM	OFF	High Memory support
CONFIG_MATH_EMULATION	N	Math emulation
CONFIG_MTRR	N	MTRR (Memory Type Range Register) support
CONFIG_SMP	N	Symmetric multi-processing support
CONFIG_X86_UP_APIC	N	APIC Support on Uniprocessors

Table 3-5: General Setup

Option	Value	Description
CONFIG_BLUECAT_IGNORE_PRINTK	N	BlueCat Linux ignore <code>printk</code>
CONFIG_BLUECAT_SMALL_FOOTPRINT	N	BlueCat Linux small memory footprint
CONFIG_NET	Y	Networking support
CONFIG_BLUECAT_MEMSIZE	N	Memory usage statistics
CONFIG_PCI	Y	PCI support
CONFIG_PCI_GOBIOS	Any	PCI access mode
CONFIG_PCI_NAMES	Y	PCI device name database
CONFIG_EISA	Y	EISA support
CONFIG_MCA	N	MCA support
CONFIG_HOTPLUG	N	Support for hot-pluggable devices
CONFIG_PCMCIA	N	PCMCIA/CardBus support
CONFIG_BLUECAT_LOADER	N	BlueCat Linux OS loader support
CONFIG_SYSVIPC	Y	System V IPC
CONFIG_BSD_PROCESS_ACCT	Y	BSD Process Accounting

Table 3-5: General Setup (Continued)

Option	Value	Description
CONFIG_SYSCTL	Y	Sysctl support
CONFIG_KCORE_ELF	Y	Kernel core (/proc/kcore) format
CONFIG_BINFMT_AOUT	M	Kernel support for a.out binaries
CONFIG_BINFMT_ELF	Y	Kernel support for ELF binaries
CONFIG_BINFMT_MISC	M	Kernel support for MISC binaries
CONFIG_PM	N	Power Management support
CONFIG_APM_IGNORE_USER_SUSPEND	N	Ignore USER SUSPEND
CONFIG_APM_DO_ENABLE	N	Enable PM at boot time
CONFIG_APM_CPU_IDLE	N	Make CPU Idle calls when idle
CONFIG_APM_DISPLAY_BLANK	N	Enable console blanking using APM
CONFIG_APM_RTC_IS_GMT	N	RTC stores time in GMT
CONFIG_APM_ALLOW_INTS	N	Allow interrupts during APM BIOS calls
CONFIG_APM_REAL_MODE_POWER_OFF	N	Use real mode APM BIOS call to power off

Table 3-6: Memory Technology Devices (MTD)

Option	Value	Description
CONFIG_MTD	N	Memory Technology Device (MTD) support

Table 3-7: Parallel Port Support

Option	Value	Description
CONFIG_PARPORT	Y	Parallel port support
CONFIG_PARPORT_PC	Y	PC-style hardware
CONFIG_PARPORT_SERIAL	N	Parallel+serial PCI card support
CONFIG_PARPORT_PC_FIFO	N	Use FIFO/DMA if available
CONFIG_PARPORT_PC_SUPERIO	N	SuperIO chipset support

Table 3-7: Parallel Port Support (Continued)

Option	Value	Description
CONFIG_PARPORT_OTHER	N	Support foreign hardware
CONFIG_PARPORT_1284	N	IEEE 1284 transfer modes

Table 3-8: Plug and Play Configuration

Option	Value	Description
CONFIG_PNP	Y	Plug and Play support
CONFIG_ISAPNP	N	ISA Plug and Play support
CONFIG_PNPBIOS	N	PNPBIOS support

Table 3-9: Block Devices

Option	Value	Description
CONFIG_BLK_DEV_FD	Y	Normal PC floppy disk support
CONFIG_BLK_DEV_XD	M	XT hard disk support
CONFIG_PARIDE	M	Parallel port IDE device support
CONFIG_PARIDE_PD	M	Parallel port IDE disks
CONFIG_PARIDE_PCD	M	Parallel port ATAPI CD-ROMs
CONFIG_PARIDE_PF	M	Parallel port ATAPI disks
CONFIG_PARIDE_PT	M	Parallel port ATAPI tapes
CONFIG_PARIDE_PG	M	Parallel port generic ATAPI devices
CONFIG_PARIDE_ATEN	M	ATEN EH-100 protocol
CONFIG_PARIDE_BPCK	M	Micro Solutions BACKPACK Series 5 protocol
CONFIG_PARIDE_BPCK6	N	Micro Solutions BACKPACK Series 6 protocol
CONFIG_PARIDE_COMM	M	DataStor Commuter protocol
CONFIG_PARIDE_DSTR	M	DataStor EP-2000 protocol
CONFIG_PARIDE_FIT2	M	FIT TD-2000 protocol

Table 3-9: Block Devices (Continued)

Option	Value	Description
CONFIG_PARIDE_FIT3	M	FIT TD-3000 protocol
CONFIG_PARIDE_EPAT	M	Shuttle EPAT/EPEZ protocol
CONFIG_PARIDE_EPIA	M	Shuttle EPIA protocol
CONFIG_PARIDE_FRIQ	M	Freecom IQ ASIC-2 protocol
CONFIG_PARIDE_FRPW	M	FreeCom power protocol
CONFIG_PARIDE_KBIC	M	KingByte KBIC-951A/971A protocols
CONFIG_PARIDE_KTTI	M	KT PHd protocol
CONFIG_PARIDE_ON20	M	OnSpec 90c20 protocol
CONFIG_PARIDE_ON26	M	OnSpec 90c26 protocol
CONFIG_BLK_CPQ_DA	M	Compaq SMART2 support
CONFIG_BLK_CPQ_CISS_DA	N	Compaq CISS Array support
CONFIG_BLK_DEV_DAC960	M	Mylex DAC960/DAC1 100 PCI RAID Controller support
CONFIG_BLK_DEV_LOOP	Y	Loopback device support
CONFIG_BLK_DEV_NBD	M	Network block device support
CONFIG_BLK_DEV_RAM	Y	RAM disk support
CONFIG_BLK_DEV_RAM_SIZE	4096	Default RAM disk size
CONFIG_BLK_DEV_INITRD	N	Initial RAM disk (<i>initrd</i>) support
CONFIG_BLUECAT_RFS	Y	BlueCat Linux RFS support

Table 3-10: Multi-Device Support (RAID and LVM)

Option	Value	Description
CONFIG_MD	N	Multiple device support (RAID and LVM)

Table 3-11: Networking Options

Option	Value	Description
CONFIG_PACKET	Y	Packet socket
CONFIG_PACKET_MMAP	N	Packet socket: mmaped IO
CONFIG_NETLINK	Y	Kernel/User netlink socket
CONFIG_RTNETLINK	Y	Routing messages
CONFIG_NETLINK_DEV	Y	Netlink device emulation
CONFIG_NETFILTER	N	Network packet filtering (replaces ipchains)
CONFIG_FILTER	Y	Socket Filtering
CONFIG_UNIX	Y	UNIX domain sockets
CONFIG_INET	Y	TCP/IP networking
CONFIG_IP_MULTICAST	Y	IP: Multicasting
CONFIG_IP_ADVANCED_ROUTER	N	IP: Advanced router
CONFIG_IP_PNP	N	IP: Kernel-level autoconfiguration
CONFIG_NET_IPIP	M	IP: Tunneling
CONFIG_NET_IPGRE	M	IP: GRE tunnels over IP
CONFIG_NET_IPGRE_BROADCAST	N	Broadcast GRE over IP
CONFIG_IP_MROUTE	N	IP multicast routing
CONFIG_ARPD	N	ARP daemon support
CONFIG_INET_ECN	N	IP: TCP Explicit Congestion Notification support
CONFIG_SYN_COOKIES	N	IP: TCP syncookie support (disabled per default)
CONFIG_IPV6	N	The IPv6 protocol
CONFIG_KHTTPD	N	Kernel httpd acceleration
CONFIG_ATM	N	Asynchronous Transfer Mode (ATM)
CONFIG_IPX	M	The IPX protocol
CONFIG_IPX_INTERN	N	IPX: Full internal IPX network
CONFIG_ATALK	M	Appletalk protocol support
CONFIG_DECNET	N	DECnet support

Table 3-11: Networking Options (Continued)

Option	Value	Description
CONFIG_BRIDGE	N	802.1d Ethernet Bridging
CONFIG_X25	N	CCITT X.25 Packet Layer
CONFIG_LAPB	N	LAPB Data Link Driver
CONFIG_LLC	N	802.2 LLC
CONFIG_NET_DIVERT	N	Frame Diverter
CONFIG_ECONET	N	Acorn Econet/AUN protocols
CONFIG_WAN_ROUTER	M	WAN router
CONFIG_NET_FASTROUTE	N	Fast switching (Read help!)
CONFIG_NET_HW_FLOWCONTROL	N	Forwarding between high speed interfaces

Table 3-12: QoS and/or Fair Queueing

Option	Value	Description
CONFIG_NET_SCHED	N	QoS and/or Fair Queueing (Experimental)

Table 3-13: Telephony Support

Option	Value	Description
CONFIG_PHONE	N	Linux telephony support

Table 3-14: ATA/IDE/MFM/RLL Support

Option	Value	Description
CONFIG_IDE	Y	ATA/IDE/MFM/RLL support

Table 3-15: IDE, ATA and ATAPI Block Devices

Option	Value	Description
CONFIG_BLK_DEV_IDE	Y	Enhanced IDE/MFM/RLL disk/CD-ROM/tape/floppy support
CONFIG_BLK_DEV_HD_IDE	N	Use old disk-only driver on primary interface
CONFIG_BLK_DEV_IDEDISK	Y	Include IDE/ATA-2 DISK support
CONFIG_IDEDISK_MULTI_MODE	N	Use multi-mode by default
CONFIG_BLK_DEV_IDECD	M	Include IDE/ATAPI CD-ROM support
CONFIG_BLK_DEV_IDETAPE	M	Include IDE/ATAPI tape support
CONFIG_BLK_DEV_IDEFLOPPY	M	Include IDE/ATAPI floppy support
CONFIG_BLK_DEV_CMD640	N	CMD640 chipset bugfix/support
CONFIG_BLK_DEV_RZ1000	N	RZ1000 chipset bugfix/support
CONFIG_BLK_DEV_IDEPCI	Y	Generic PCI IDE chipset support
CONFIG_IDEPCI_SHARE_IRQ	N	Support for sharing PCI IDE interrupts
CONFIG_BLK_DEV_IDEDMA_PCI	Y	Generic PCI bus-master DMA support
CONFIG_BLK_DEV_OFFBOARD	N	Boot off-board chipsets first support
CONFIG_IDEDMA_PCI_AUTO	N	Use PCI DMA by default when available
CONFIG_IDEDMA_PCI_WIP	N	ATA Work(s) In Progress (Experimental)
CONFIG_BLK_DEV_AEC62XX	N	AEC62XX chipset support
CONFIG_BLK_DEV_ALI15X3	N	ALI M15x3 chipset support
CONFIG_BLK_DEV_AMD74XX	N	AMD Viper support
CONFIG_BLK_DEV_CMD64X	N	CMD64X chipset support
CONFIG_BLK_DEV_CY82C693	N	CY82C693 chipset support
CONFIG_BLK_DEV_CS5530	N	Cyrix CS5530 MediaGX chipset support
CONFIG_BLK_DEV_HPT34X	N	HPT34X chipset support
CONFIG_BLK_DEV_HPT366	N	HPT366 chipset support
CONFIG_BLK_DEV_PIIIX	N	Intel PIIIXn chipsets support
CONFIG_BLK_DEV_NS87415	N	NS87415 chipset support (Experimental)

Table 3-15: IDE, ATA and ATAPI Block Devices (Continued)

Option	Value	Description
CONFIG_BLK_DEV_OPTI621	N	OPTi 82C621 chipset enhanced support (Experimental)
CONFIG_BLK_DEV_PDC202XX	N	PROMISE PDC20246/PDC20262/PDC20265/PDC20267/PDC20268 support
CONFIG_BLK_DEV_SVWKS	N	ServerWorks OSB4/CSB5 chipset support
CONFIG_BLK_DEV_SIS5513	N	SiS5513 chipset support
CONFIG_BLK_DEV_SLC90E66	N	SLC90E66 chipset support
CONFIG_BLK_DEV_TRM290	N	Tekram TRM290 chipset support
CONFIG_BLK_DEV_VIA82CXXX	N	VIA82CXXX chipset support
CONFIG_IDE_CHIPSETS	N	Other IDE chipset support
CONFIG_IDEDMA_IVB	N	IGNORE word93 Validation BITS
CONFIG_BLK_DEV_ATA RAID	N	Support for IDE Raid controllers

Table 3-16: SCSI Support

Option	Value	Description
CONFIG_SCSI	N	SCSI support

Table 3-17: Fusion MPT Device Support

Option	Value	Description
CONFIG_FUSION_ISENSE	N	Fusion MPT enhanced SCSI error reporting [optional] module
CONFIG_FUSION_CTL	N	Fusion MPT misc device (<code>ioctl</code>) driver [optional] module
CONFIG_FUSION_LAN	N	Fusion MPT LAN driver [optional]

Table 3-18: IEEE 1394 (FireWire) Support

Option	Value	Description
CONFIG_IEEE1394	N	IEEE 1394 (FireWire) support (Experimental)

Table 3-19: I2O Support

Option	Value	Description
CONFIG_I2O	N	I2O support

Table 3-20: Network Device Support

Option	Value	Description
CONFIG_NETDEVICES	Y	Network Device Support
CONFIG_DUMMY	M	Dummy net driver support
CONFIG_BONDING	N	Bonding driver support
CONFIG_EQUALIZER	M	EQL (serial line load balancing) support
CONFIG_TUN	N	Universal TUN/TAP driver support
CONFIG_ETHERTAP	M	Ethertap network tap (Obsolete)
CONFIG_NET_SB1000	N	General Instruments Surfboard 1000
CONFIG_FDDI	N	FDDI driver support
CONFIG_HIPPI	N	HIPPI driver support (Experimental)
CONFIG_PLIP	M	PLIP (parallel port) support
CONFIG_PPP	M	PPP (point-to-point protocol) support
CONFIG_PPP_MULTILINK	N	PPP multilink support
CONFIG_PPP_FILTER	N	PPP filtering
CONFIG_PPP_ASYNC	N	PPP support for async serial ports
CONFIG_PPP_SYNC_TTY	N	PPP support for sync tty ports
CONFIG_PPP_DEFLATE	N	PPP Deflate compression

Table 3-20: Network Device Support (Continued)

Option	Value	Description
CONFIG_PPP_BSDCOMP	N	PPP BSD-Compress compression
CONFIG_PPPOE	N	PPP over Ethernet
CONFIG_SLIP	M	SLIP (serial line) support
CONFIG_SLIP_COMPRESSED	Y	CSLIP compressed headers
CONFIG_SLIP_SMART	Y	Keepalive and linefil
CONFIG_SLIP_MODE_SLIP6	Y	Six bit SLIP encapsulation
CONFIG_NET_FC	N	Fibre Channel driver support
CONFIG_RCPCI	M	Red Creek Hardware VPN (Experimental)
CONFIG_SHAPER	M	Traffic Shaper (Experimental)

Table 3-21: ARCnet Devices

Option	Value	Description
CONFIG_ARCNET	N	ARCnet support

Table 3-22: Appletalk Devices

Option	Value	Description
CONFIG_APPLETALK	N	AppleTalk interfaces support

Table 3-23: Ethernet (10 or 100 Mbit)

Option	Value	Description
CONFIG_NET_ETHERNET	Y	Ethernet (10 or 100 Mbit)
CONFIG_HAPPYMEAL	N	Sun Happy Meal 10/100baseT support
CONFIG_SUNGEM	N	Sun GEM support
CONFIG_NET_VENDOR_3COM	Y	3COM cards

Table 3-23: Ethernet (10 or 100 Mbit) (Continued)

Option	Value	Description
CONFIG_LANCE	N	AMD LANCE and PCnet (AT1500 and NE2100) support
CONFIG_NET_VENDOR_SMC	N	Western Digital/SMC cards
CONFIG_NET_VENDOR_RACAL	N	Racal-Interlan (Micom) NI cards
CONFIG_AT1700	N	AT1700/1720 support
CONFIG_DEPCA	N	DEPCA support
CONFIG_HP100	N	HP 10/100VG PCLAN (ISA, EISA, PCI) support
CONFIG_NET_ISA	Y	Other ISA cards
CONFIG_E2100	N	Cabletron E21xx support
CONFIG_EWRK3	N	EtherWORKS 3 (DE203, DE204, DE205) support
CONFIG_EEXPRESS	N	EtherExpress 16 support
CONFIG_EEXPRESS_PRO	N	EtherExpressPro support/EtherExpress 10 (i82595) support
CONFIG_HPLAN_PLUS	N	HP PCLAN+ (27247B and 27252A) support
CONFIG_HPLAN	N	HP PCLAN (27245 and other 27xxx series) support
CONFIG_LP486E	N	LP486E on board Ethernet
CONFIG_ETH16I	N	ICL EtherTeam 16i/32 support
CONFIG_NE2000	N	NE2000/NE1000 support
CONFIG_NET_PCI	Y	EISA, VLB, PCI and on board controllers
CONFIG_PCNET32	N	AMD PCnet32 (VLB and PCI) support
CONFIG_ADAPTEC_STARFIRE	N	Adaptec Starfire support
CONFIG_AC3200	N	Ansel Communications EISA 3200 support
CONFIG_APRICOT	N	Apricot Xen-II on board Ethernet
CONFIG_CS89x0	N	CS89x0 support (Daynaport CS and LC cards)
CONFIG_TULIP	M	DECchip Tulip (dc21x4x) PCI support
CONFIG_TULIP_MWI	N	New Tulip bus configuration
CONFIG_TULIP_MMIO	N	Use PCI shared mem for NIC registers
CONFIG_DE4X5	N	Generic DECchip & DIGITAL EtherWORKS PCI/EISA
CONFIG_DGRS	N	Digi Intl. RightSwitch SE-X support

Table 3-23: Ethernet (10 or 100 Mbit) (Continued)

Option	Value	Description
CONFIG_DM9102	N	Davicom DM910x/DM980x support
CONFIG_EEPRO100	M	EtherExpress Pro/100 support
CONFIG_LNE390	N	Mylex EISA LNE390A/LNE390B support
CONFIG_FEALNX	N	Myson MTD-8xx PCI Ethernet support
CONFIG_NATSEMI	N	National Semiconductor DP8381x series PCI Ethernet support
CONFIG_NE2K_PCI	N	PCI NE2000 and clones support
CONFIG_NE3210	N	Novell/Eagle/Microdyne NE3210 EISA support
CONFIG_ES3210	N	Racal-Interlan EISA ES3210 support
CONFIG_8139TOO	N	RealTek RTL-8139 PCI Fast Ethernet Adapter support
CONFIG_SIS900	N	SiS 900/7016 PCI Fast Ethernet Adapter support
CONFIG_EPIC100	N	SMC EtherPower II
CONFIG_SUNDANCE	N	Sundance Alta PCI Ethernet support
CONFIG_TLAN	N	TI ThunderLAN support
CONFIG_VIA_RHINE	N	VIA Rhine support
CONFIG_WINBOND_840	N	Winbond W89c840 PCI Ethernet support
CONFIG_NET_POCKET	N	Pocket and portable adapters

Table 3-24: Ethernet (1000 Mbit)

Option	Value	Description
CONFIG_ACENIC	M	Alteon AceNIC/3Com 3C985/NetGear GA620 Gigabit support
CONFIG_ACENIC_OMIT_TIGON_I	N	Omit support for old Tigon I based AceNICs
CONFIG_DL2K	N	D-Link 2000-based Gigabit Ethernet support
CONFIG_NS83820	N	National Semiconductor DP83820 series driver
CONFIG_HAMACHI	N	Packet Engines Hamachi GNIC-II support

Table 3-24: Ethernet (1000 Mbit) (Continued)

Option	Value	Description
CONFIG_YELLOWFIN	M	Packet Engines Yellowfin Gigabit-NIC / Symbios 53c885 support
CONFIG_SK98LIN	N	SysKonnnect SK-98xx support

Table 3-25: Wireless LAN (non-ham radio)

Option	Value	Description
CONFIG_NET_RADIO	N	Wireless LAN (non-ham radio)

Table 3-26: Token Ring Devices

Option	Value	Description
CONFIG_TR	N	Token Ring driver support

Table 3-27: Wan Interfaces

Option	Value	Description
CONFIG_WAN	N	Wan interfaces support

Table 3-28: Amateur Radio Support

Option	Value	Description
CONFIG_HAMRADIO	N	Amateur Radio support

Table 3-29: IrDA (infrared) Support

Option	Value	Description
CONFIG_IRDA	N	IrDA subsystem support

Table 3-30: ISDN Subsystem

Option	Value	Description
CONFIG_ISDN	N	ISDN support

Table 3-31: Old CD-ROM drivers (not SCSI, not IDE)

Option	Value	Description
CONFIG_CD_NO_IDESCSI	Y	Support non-SCSI/IDE/ATARI CD-ROM drivers
CONFIG_AZTCD	M	Aztech/Orchid/Okano/Wearnes/TXC/CyDROM CD-ROM support
CONFIG_GSCD	M	Goldstar R420 CD-ROM support
CONFIG_SBPCD	M	Matsushita/Panasonic/Creative, Longshine, TEAC CD-ROM support
CONFIG_MCD	M	Standard Mitsumi [no XA/Multisession] CD-ROM support
CONFIG_MCD_IRQ	11	IRQ channel for Mitsumi CD-ROM
CONFIG_MCD_BASE	300	I/O base address for Mitsumi CD-ROM
CONFIG_MCDX	M	Mitsumi [XA/MultiSession] CD-ROM support
CONFIG_OPTCD	M	Optics Storage DOLPHIN 8000AT CD-ROM support
CONFIG_CM206	M	Philips/LMS CM206 CD-ROM support
CONFIG_SJCD	M	Sanyo CDR-H94A CD-ROM support
CONFIG_ISP16_CDI	M	ISP16/MAD16/Mozart soft configurable CD-ROM interface support
CONFIG_CDU31A	M	Sony CDU31A/CDU33A CD-ROM support
CONFIG_CDU535	M	Sony CDU535 CD-ROM support

Table 3-32: Input Core Support

Option	Value	Description
CONFIG_INPUT	N	Input core support
CONFIG_INPUT_MOUSEDEV_SCREEN_X	1024	Horizontal screen resolution
CONFIG_INPUT_MOUSEDEV_SCREEN_Y	768	Vertical screen resolution

Table 3-33: Character Devices

Option	Value	Description
CONFIG_VT	Y	Virtual terminal
CONFIG_VT_CONSOLE	Y	Support for console on virtual terminal
CONFIG_SERIAL	Y	Standard/generic (8250/16550 and compatible UARTs) serial support
CONFIG_SERIAL_CONSOLE	Y	Support for console on serial port
CONFIG_SERIAL_EXTENDED	Y	Extended dumb serial driver options
CONFIG_SERIAL_MANY_PORTS	Y	Support more than 4 serial ports
CONFIG_SERIAL_SHARE_IRQ	Y	Support for sharing serial interrupts
CONFIG_SERIAL_DETECT_IRQ	N	Auto-detect IRQ on standard ports (Unsafe)
CONFIG_SERIAL_MULTIPOINT	Y	Support special multiport boards
CONFIG_HUB6	N	Support the Bell Technologies HUB6 card
CONFIG_SERIAL_NONSTANDARD	N	Non-standard serial port support
CONFIG_UNIX98_PTYS	Y	Unix98 PTY support
CONFIG_UNIX98_PTY_COUNT	256	Maximum number of Unix98 PTYs in use (0-2048)
CONFIG_PRINTER	Y	Parallel printer support
CONFIG_LP_CONSOLE	N	Support for console on line printer
CONFIG_PPDEV	N	Support for user-space parallel port device drivers
CONFIG_BLUECAT_BPAR	N	BlueCat Linux bidirectional parallel port driver

Table 3-34: Serial Drivers

Option	Value	Description
CONFIG_SERIAL_8250	N	8250/16550 and compatible serial support (Experimental)

Table 3-35: I2C Support

Option	Value	Description
CONFIG_I2C	N	I2C support

Table 3-36: L3 Serial Bus Support

Option	Value	Description
CONFIG_L3	N	L3 serial bus support

Table 3-37: Mice

Option	Value	Description
CONFIG_BUSMOUSE	M	Bus Mouse Support
CONFIG_ATIXL_BUSMOUSE	M	ATIXL busmouse support
CONFIG_LOGIBUSMOUSE	N	Logitech busmouse support
CONFIG_MS_BUSMOUSE	M	Microsoft busmouse support
CONFIG_MOUSE	Y	Mouse Support (not serial and bus mice)
CONFIG_PSMOUSE	Y	PS/2 mouse (aka “auxiliary device”) support
CONFIG_82C710_MOUSE	M	C&T 82C710 mouse port support (as on TI Travelmate)
CONFIG_PC110_PAD	M	PC110 digitizer pad support

Table 3-38: Joysticks

Option	Value	Description
CONFIG_INPUT_GAMEPORT	N	Game port support

Table 3-39: Watchdog Cards

Option	Value	Description
CONFIG_WATCHDOG	N	Watchdog Timer support

Table 3-40: Ftape, Floppy Tape Device Driver

Option	Value	Description
CONFIG_FTAPE	M	Ftape (QIC-80/Travan) support
CONFIG_ZFTAPE	M	VFS interface for ftape
CONFIG_ZFT_DFLT_BLK_SZ	10240	Default block size for zftape
CONFIG_FT_NR_BUFFERS	3	Number of DMA buffers
CONFIG_FT_PROC_FS	N	Enable procfs status report (+2kb)
CONFIG_FT_NORMAL_DEBUG	Normal	Controlling the amount of debugging output of ftape
CONFIG_FT_STD_FDC	Standard	The floppy drive controller for ftape
CONFIG_FT_FDC_THR	8	FDC FIFO Threshold before requesting DMA service
CONFIG_FT_FDC_MAX_RATE	2000	FDC maximum data rate

Table 3-41: Multimedia Devices

Option	Value	Description
CONFIG_VIDEO_DEV	N	Video For Linux

Table 3-42: File Systems

Option	Value	Description
CONFIG_QUOTA	N	Quota support
CONFIG_AUTofs_FS	M	Kernel automounter support
CONFIG_AUTofs4_FS	N	Kernel automounter version 4 support (also supports v3)
CONFIG_REISERFS_FS	N	Reiserfs support
CONFIG_ADFS_FS	N	ADFS file system support
CONFIG_AFFS_FS	N	Amiga FFS file system support
CONFIG_HFS_FS	N	Apple Macintosh file system support
CONFIG_BFS_FS	N	BFS file system support
CONFIG_CMS_FS	N	CMS file system support
CONFIG_EXT3_FS	N	Ext3 journaling file system support (Experimental)
CONFIG_FAT_FS	N	DOS FAT file system support
CONFIG_EFS_FS	N	EFS file system support (read-only)
CONFIG_CRAMFS	N	Compressed ROM file system support
CONFIG_TMPFS	N	Virtual memory file system support
CONFIG_RAMFS	N	Simple RAM-based file system support
CONFIG_ISO9660_FS	M	ISO 9660 CD-ROM file system support
CONFIG_JOLIET	N	Microsoft Joliet CD-ROM extensions
CONFIG_ZISOFS	N	Transparent decompression extension
CONFIG_MINIX_FS	N	Minix file system support
CONFIG_FREEVXFS_FS	N	FreeVxFS file system support (VERITAS VxFS(TM) compatible)
CONFIG_NTFS_FS	N	NTFS file system support (read-only)
CONFIG_HPFS_FS	N	OS/2 HPFS file system support
CONFIG_PROC_FS	Y	/proc file system support
CONFIG_DEVFS_FS	N	/dev file system support
CONFIG_DEVPTS_FS	Y	/dev/pts file system for Unix98 PTYs

Table 3-42: File Systems (Continued)

Option	Value	Description
CONFIG_QNX4FS_FS	N	QNX4 file system support (read-only)
CONFIG_ROMFS_FS	M	ROM file system support
CONFIG_EXT2_FS	Y	Second extended file system support
CONFIG_SYSV_FS	N	System V/Xenix/V7/Coherent file system support
CONFIG_UDF_FS	N	UDF file system support (read-only)
CONFIG_UFS_FS	N	UFS file system support (read-only)

Table 3-43: Network File Systems

Option	Value	Description
CONFIG_CODA_FS	N	Coda file system support (advanced network file system)
CONFIG_INTERMEZZO_FS	N	InterMezzo file system support (experimental, replicating file system)
CONFIG_NFS_FS	M	NFS file system support
CONFIG_NFS_V3	N	Provide NFSv3 client support
CONFIG_NFS_FS	M	NFS file system support
CONFIG_NFSD	M	NFS server support
CONFIG_NFSD_V3	N	Provide NFSv3 server support
CONFIG_SMB_FS	N	SMB file system support (to mount Windows shares, etc.)
CONFIG_NCP_FS	M	NCP file system support (to mount NetWare volumes)
CONFIG_NCPFS_PACKET_SIGNING	Y	Packet signatures
CONFIG_NCPFS_IOCTL_LOCKING	Y	Proprietary file locking
CONFIG_NCPFS_STRONG	Y	Clear remove/delete inhibit when needed
CONFIG_NCPFS_NFS_NS	Y	Use NFS namespace if available
CONFIG_NCPFS_OS2_NS	Y	Use LONG (OS/2) namespace if available
CONFIG_NCPFS_SMALLDOS	Y	Lowercase DOS filenames on LONG namespace volume

Table 3-43: Network File Systems (Continued)

Option	Value	Description
CONFIG_NCPFS_NLS	Y	Use Native Language Support
CONFIG_NCPFS_EXTRAS	Y	Symbolic links and mode permission bits

Table 3-44: Partition Types

Option	Value	Description
CONFIG_PARTITION_ADVANCED	N	Advanced partition selection

Table 3-45: Native Language Support

Option	Value	Description
CONFIG_NLS_DEFAULT	iso8859-1	Default NLS Option
CONFIG_NLS_CODEPAGE_437	M	Codepage 437 (United States, Canada)
CONFIG_NLS_CODEPAGE_737	M	Codepage 737 (Greek)
CONFIG_NLS_CODEPAGE_775	M	Codepage 775 (Baltic Rim)
CONFIG_NLS_CODEPAGE_850	M	Codepage 850 (Europe)
CONFIG_NLS_CODEPAGE_852	M	Codepage 852 (Central/Eastern Europe)
CONFIG_NLS_CODEPAGE_855	M	Codepage 855 (Cyrillic)
CONFIG_NLS_CODEPAGE_857	M	Codepage 857 (Turkish)
CONFIG_NLS_CODEPAGE_860	M	Codepage 860 (Portuguese)
CONFIG_NLS_CODEPAGE_861	M	Codepage 861 (Icelandic)
CONFIG_NLS_CODEPAGE_862	M	Codepage 862 (Hebrew)
CONFIG_NLS_CODEPAGE_863	M	Codepage 863 (Canadian French)
CONFIG_NLS_CODEPAGE_864	M	Codepage 864 (Arabic)
CONFIG_NLS_CODEPAGE_865	M	Codepage 865 (Norwegian, Danish)
CONFIG_NLS_CODEPAGE_866	M	Codepage 866 (Cyrillic/Russian)
CONFIG_NLS_CODEPAGE_869	M	Codepage 869 (Greek)

Table 3-45: Native Language Support (Continued)

Option	Value	Description
CONFIG_NLS_CODEPAGE_936	M	Simplified Chinese charset (CP936, GB2312)
CONFIG_NLS_CODEPAGE_950	M	Traditional Chinese charset (Big5)
CONFIG_NLS_CODEPAGE_932	M	Japanese charsets (Shift-JIS, EUC-JP)
CONFIG_NLS_CODEPAGE_949	M	Korean charset (CP949, EUC-KR)
CONFIG_NLS_CODEPAGE_874	M	Thai charset (CP874, TIS-620)
CONFIG_NLS_ISO8859_8	M	Hebrew charsets (ISO-8859-8, CP1255)
CONFIG_NLS_CODEPAGE_1251	N	Windows CP1251 (Bulgarian, Belarusian)
CONFIG_NLS_ISO8859_1	M	NLS ISO 8859-1 (Latin 1; Western European Languages)
CONFIG_NLS_ISO8859_2	M	NLS ISO 8859-2 (Latin 2; Slavic/Central European Languages)
CONFIG_NLS_ISO8859_3	M	NLS ISO 8859-3 (Latin 3; Esperanto, Galician, Maltese, Turkish)
CONFIG_NLS_ISO8859_4	M	NLS ISO 8859-4 (Latin 4; old Baltic charset)
CONFIG_NLS_ISO8859_5	M	NLS ISO 8859-5 (Cyrillic)
CONFIG_NLS_ISO8859_6	M	NLS ISO 8859-6 (Arabic)
CONFIG_NLS_ISO8859_7	M	NLS ISO 8859-7 (Modern Greek)
CONFIG_NLS_ISO8859_9	M	NLS ISO 8859-9 (Latin 5; Turkish)
CONFIG_NLS_ISO8859_13	M	NLS ISO 8859-13 (Latin 7; Baltic)
CONFIG_NLS_ISO8859_14	M	NLS ISO 8859-14 (Latin 8; Celtic)
CONFIG_NLS_ISO8859_15	M	NLS ISO 8859-15 (Latin 9; Western European languages with Euro)
CONFIG_NLS_KOI8_R	M	NLS KOI8-R (Russian)
CONFIG_NLS_KOI8_U	M	NLS KOI8-U/RU (Ukrainian, Belarusian)
CONFIG_NLS_UTF8	M	NLS UTF8

Table 3-46: Console Drivers

Option	Value	Description
CONFIG_VGA_CONSOLE	Y	VGA text console
CONFIG_VIDEO_SELECT	N	Video mode selection support
CONFIG_MDA_CONSOLE	M	MDA text console (dual-headed)

Table 3-47: Frame-buffer Support

Option	Value	Description
CONFIG_FB	N	Support for frame buffer devices

Table 3-48: Sound

Option	Value	Description
CONFIG_SOUND	M	Sound support
CONFIG_SOUND_BT878	N	BT878 Audio DMA
CONFIG_SOUND_CMPCI	M	C-Media PCI (CMI8338/8378)
CONFIG_SOUND_CMPCI_FM	N	Enable legacy FM
CONFIG_SOUND_CMPCI_MIDI	N	Enable legacy MPU-401
CONFIG_SOUND_CMPCI_JOYSTICK	N	Enable joystick
CONFIG_SOUND_CMPCI_CM8738	N	Support CMI8738 based audio cards
CONFIG_SOUND_EMU10K1	N	Creative SBLive! (EMU10K1) based PCI sound cards
CONFIG_SOUND_FUSION	N	Crystal SoundFusion (CS4280/461x)
CONFIG_SOUND_CS4281	N	Crystal Sound CS4281
CONFIG_SOUND_ES1370	M	Ensoniq AudioPCI (ES1370) based PCI sound cards
CONFIG_SOUND_ES1371	M	Ensoniq AudioPCI 97 (ES1371) based sound cards

Table 3-48: Sound (Continued)

Option	Value	Description
CONFIG_SOUND_ESSSOLO1	M	ESS Solo1 based PCI sound cards (e.g., SC1938)
CONFIG_SOUND_MAESTRO	N	ESS Maestro, Maestro2, Maestro2E driver
CONFIG_SOUND_MAESTRO3	N	ESS Maestro3/Allegro driver
CONFIG_SOUND_ICH	N	Intel ICH audio support
CONFIG_SOUND_RME96XX	N	RME Hammerfall (RME96XX) support
CONFIG_SOUND_SONICVIBES	M	S3 SonicVibes based PCI sound cards
CONFIG_SOUND_TRIDENT	N	Trident 4DWave DX/NX, SiS 7018 or ALi 5451 PCI Audio Core
CONFIG_SOUND_MSNDCLAS	M	Support for Turtle Beach MultiSound Classic, Tahiti, Monterey
CONFIG_MSNDCLAS_INIT_FILE	/etc/sound/msndinit.bin	Full path name of MSNDINIT.BIN firmware file
CONFIG_MSNDCLAS_PERM_FILE	/etc/sound/msndperm.bin	Full path name of MSNDPERM.BIN firmware file
CONFIG_SOUND_MSNDPIN	M	Support for Turtle Beach MultiSound Pinnacle, Fiji
CONFIG_MSNDPIN_INIT_FILE	/etc/sound/pndspini.bin	Full path name of PNDSPINI.BIN firmware file
CONFIG_MSNDPIN_PERM_FILE	/etc/sound/pndsperm.bin	Full path name of PNDSPERM.BIN firmware file
CONFIG_SOUND_VIA82CXXX	M	VIA 82Cxxx Audio Codec
CONFIG_MIDI_VIA82CXXX	N	VIA 82C686 MIDI
CONFIG_SOUND_OSS	M	OSS sound modules
CONFIG_SOUND_TRACEINIT	N	Verbose initialization
CONFIG_SOUND_DMAP	N	Persistent DMA buffers
CONFIG_SOUND_AD1816	M	Support for AD1816(A) based cards
CONFIG_SOUND_SGALAXY	M	Support for Aztech Sound Galaxy (non-PnP) cards
CONFIG_SOUND_ADLIB	M	Adlib Cards

Table 3-48: Sound (Continued)

Option	Value	Description
CONFIG_SOUND_ACI_MIXER	N	ACI mixer (miroSOUND PCM1-pro/PCM12/PCM20 radio)
CONFIG_SOUND_CS4232	M	Support for Crystal CS4232 based (PnP) cards
CONFIG_SOUND_SSCAPE	M	Ensoniq SoundScape support
CONFIG_SOUND_GUS	M	Gravis Ultrasound support
CONFIG_SOUND_GUS16	Y	16 bit sampling option of GUS (_NOT_ GUS MAX)
CONFIG_SOUND_GUSMAX	Y	GUS MAX support
CONFIG_SOUND_VMIDI	M	Loopback MIDI device support
CONFIG_SOUND_TRIX	M	MediaTriX AudioTriX Pro support
CONFIG_SOUND_MSS	M	Microsoft Sound System support
CONFIG_SOUND_MPU401	M	MPU-401 support (NOT for SB16)
CONFIG_SOUND_NM256	M	NeoMagic 256AV/256ZX sound chipsets
CONFIG_SOUND_MAD16	M	Support for OPTi MAD16 and/or Mozart based cards
CONFIG_MAD16_OLDCARD	Y	Support MIDI in older MAD16 based cards (requires SB)
CONFIG_SOUND_PAS	M	ProAudioSpectrum 16 support
CONFIG_SOUND_PSS	M	PSS (AD1848, ADSP-2115, ESC614) support
CONFIG_PSS_MIXER	N	Enable PSS mixer (Beethoven ADSP-16 and other compatible)
CONFIG_PSS_HAVE_BOOT	N	Have DSPxxx.LD firmware file
CONFIG_SOUND_SB	M	100% Sound Blaster compatibles (SB16/32/64, ESS, Jazz16) support
CONFIG_SOUND_AWE32_SYNTH	M	SB32/AWE support
CONFIG_SOUND_WAVEFRONT	M	Full support for Turtle Beach WaveFront (Tropéz Plus, Tropéz, Maui) synth/sound cards

Table 3-48: Sound (Continued)

Option	Value	Description
CONFIG_SOUND_MAU1	M	Support for Turtle Beach Wave Front (Maui, Tropez) synthesizers
CONFIG_SOUND_YM3812	M	Yamaha FM synthesizer (YM3812/OPL-3) support
CONFIG_SOUND_OPL3SA1	M	Yamaha OPL3-SA1 audio controller
CONFIG_SOUND_OPL3SA2	M	Support for Yamaha OPL3-SA2 and SA3 based PnP cards
CONFIG_SOUND_YMFPCI	N	Yamaha YMF7xx PCI audio (native mode)
CONFIG_SOUND_UART6850	M	6850 UART support
CONFIG_SOUND_AEDSP16	M	Gallant Audio Cards (SC-6000 and SC-6600 based)
CONFIG_SC6600	Y	SC-6600 based audio cards (new Audio Excel DSP 16)
CONFIG_SC6600_JOY	Y	SC-6600 Joystick Interface
CONFIG_SC6600_CDROM	4	SC-6600 CD-ROM Interface
CONFIG_SC6600_CDROMBASE	0	SC-6600 CD-ROM Interface I/O Address
CONFIG_AEDSP16_SBPRO	Y	Audio Excel DSP 16 (SBPro emulation)
CONFIG_AEDSP16_MPU401	Y	Audio Excel DSP 16 (MPU401 emulation)

Table 3-49: USB Support

Option	Value	Description
CONFIG_USB	Y	Support for USB
CONFIG_USB_DEBUG	N	USB verbose debug messages
CONFIG_USB_DEVICEFS	N	USB device file system
CONFIG_USB_BANDWIDTH	N	Enforce USB bandwidth allocation
CONFIG_USB_LONG_TIMEOUT	N	USB long timeout

Table 3-49: USB Support (Continued)

Option	Value	Description
CONFIG_USB_LARGE_CONFIG	N	USB fetch large config
CONFIG_USB_UHCI	N	UHCI (Intel PIIX4, VIA,...) support
CONFIG_USB_UHCI_ALT	N	UHCI (Intel PIIX4, VIA,...) alternate (JE) support
CONFIG_USB_OHCI	N	OHCI (Compaq, iMacs, OPTi, SiS, ALi,...) support
CONFIG_USB_OHCI_SA1111	N	SA1111 OHCI-compatible host interface support
CONFIG_USB_AUDIO	N	USB Audio support
CONFIG_USB_BLUETOOTH	N	USB Bluetooth support
CONFIG_USB_STORAGE_SDDR09	N	Sandisk SDDR-09 SmartMedia reader support
CONFIG_USB_ACM	N	USB Modem (CDC ACM) support
CONFIG_USB_PRINTER	N	USB Printer support
CONFIG_USB_DC2XX	N	USB Kodak DC-2xx Camera support
CONFIG_USB_MDC800	N	USB Mustek MDC800 Digital Camera support
CONFIG_USB_SCANNER	N	USB Scanner support
CONFIG_USB_DABUSB	N	DABUSB driver
CONFIG_USB_PLUSB	N	PLUSB Prolific USB-Network driver (Experimental)
CONFIG_USB_PEGASUS	N	USB ADMtek Pegasus-based ethernet device support (Experimental)
CONFIG_USB_KAWETH	N	SB KLSI KL5USB101-based ethernet device support (Experimental)
UCONFIG_USB_CATC	N	USB CATC NetMate-based Ethernet device support (Experimental)
CONFIG_USB_CDCETHER	N	USB Communication Class Ethernet driver (Experimental)
CONFIG_USB_USBNET	N	USB-to-USB Networking cable device support (Experimental)
CONFIG_USB_USS720	N	USS720 parport driver
CONFIG_USB_RIO500	N	USB Diamond Rio500 support (Experimental)
CONFIG_USB_ID75	N	USB MassWorks ID-75 (Experimental)

Table 3-50: USB Serial Converter Support

Option	Value	Description
CONFIG_USB_SERAIL	N	USB Serial converter support

Table 3-51: Bluetooth Support

Option	Value	Description
CONFIG_BLUEZ	N	Bluetooth subsystem support

Table 3-52: Kernel Hacking

Option	Value	Description
CONFIG_DEBUG_KERNEL	N	Kernel debugging
CONFIG_BLUECAT_KDBG	N	Include kdbg kernel debugger

Table 3-53: Modular Advanced Power Management

Option	Value	Description
CONFIG_BLUECAT_APM	N	MAPM support

Table 3-54: Messenger Support

Option	Value	Description
CONFIG_BLUECAT_IOPMAN	N	Enable IOP Manager support
CONFIG_BLUECAT_MSGNG	N	Enable Messenger Support

This chapter provides information about BlueCat Linux demo systems supported by the cpci735 Board Support Package (BSP).

Demo Systems

The table below lists the demo systems supported in the cpci735 BSP distribution, the boot devices supported by each demo system, and their respective RAM and ROM requirements.

Table 4-1: Demo Systems Supported by cpci735 TSP

Demo	Boot Devices Supported by Default	ROM Requirements	RAM Requirements
developer	Network using the OS loader	3000 KB	25500 KB
msg_minet	Network using the OS loader	3500 KB	28000 KB
osloader	IDE Flash disk	1000 KB	16500 KB
showcase	Network using the OS loader	2500 KB	23500 KB

Demo System Console

All the demo systems, except for `msg_minet`, are configured to use the graphical adapter and the PC keyboard as the system console. `msg_minet` is configured to use a serial terminal as the system console.

If the user desires to switch the system console to a serial terminal for a specific demo system, the following command must be entered from the BlueCat Linux OS loader BLOSH interface prior to running the `boot (b)` command:

```
> set CMD console=ttyS0,baudrate
```

For instance:

```
> set CMD console=ttyS0,9600
```

developer Demo System

The `developer` demo system is a package consisting of the functionalities of the `shell`, `ftp`, `ping`, `gdb`, and `vl_demo` systems. Refer to Chapter 4 of the *BlueCat Linux User's Guide* for descriptions of `developer` and its components.

osloader Demo System

`osloader` is the BlueCat Linux OS loader used to boot a BlueCat Linux system on the target board. Refer to Chapter 4 of the *BlueCat Linux User's Guide* for details.

showcase Demo System

The `showcase` demo system starts and configures the Apache HTTP daemon, turning the target board into a Web server. Refer to Chapter 4 of the *BlueCat Linux User's Guide* for details.

msg_minet Demo System

The `msg_minet` demo system demonstrates a LynuxWorks Messenger Network Interface (MINET) based on the Messenger-over-PCI communication media and APIs. Because the `msg_minet` demo is specific to the Force CPCI-735/736 board, it is described in detail below.

SYNOPSIS

Demonstrates a Messenger-based TCP/IP connectivity of cPCI intelligent cards via the Messenger Network Interface (MINET) over the PCI backplane.

REQUIREMENTS

Storage	Small
RAM	Medium
Network	None
Disk	No

- Initializes the MINET interface (the IP address is assigned automatically by the script)
- Starts the IOP Manager

The IOP Manager locates the IOP boards and starts the process of booting BlueCat Linux onto each of the IOP boards over the cPCI backplane. It is important that the OS loader is preinstalled on each of the IOP boards. (Refer to Chapter 2, “Downloading and Booting BlueCat Linux on the Target” for details.)

A successful boot of an IOP produces the following sample output on the IOP serial console:

```
BlueCat Loader Shell
>
Connecting to host... OK
Allocating buffer... OK
  Buffer start = 0x11000000
  Buffer size = 0x08000000
Copying image... OK
  Kernel size = 478720
  Rootfs size = 1131008
Switching to new kernel...
Linux version 2.4.10-1 (root@build1) (gcc version 2.95.3 20010315
(release)) #25 Thu Dec 20 12:28:27 MSK 2001
BIOS-provided physical RAM map:
BIOS-e820: 0000000000000000 - 000000000009f800 (usable)
BIOS-e820: 000000000009f800 - 00000000000a0000 (reserved)
BIOS-e820: 00000000000a0000 - 00000000000100000 (reserved)
BIOS-e820: 00000000000100000 - 00000000020000000 (usable)
BIOS-e820: 00000000020000000 - 00000000100000000 (reserved)
On node 0 totalpages: 131072
zone(0): 4096 pages.
zone(1): 126976 pages.
zone(2): 0 pages.
Kernel command line:
Initializing CPU#0
Detected 697.404 MHz processor.
Console: colour *CGA 80x25
Calibrating delay loop... 1392.64 BogoMIPS
Memory: 508812k/524288k available (702k kernel code, 15088k reserved, 152k
data, 64k init, 0k highmem)
...
```

The user can use the `iopmanc -i` command on the host to monitor the state of the backplane. This command shows a separate entry for each non-system controller board installed in the chassis. When a board is fully booted, it is in the `BOOTED` state. For instance:

```
init-2.04# iopmanc -i

iop id      : 0
board type  : Force CPCI735
state       : BOOTED
resets num  : 0
default kdi : /img/cpci735.kdi
last kdi    : /img/cpci735.kdi
pci bus     : 1
```

```
pci dev      : 13
pci func     : 0
pci csr      : 0x21300000 - 0x21300FFF
pci ram      : 0x22000000 - 0x22FFFFFF
```

At this point, the MINET interface is ready to be tested. On any board, run **ifconfig minet0** (with no IP address). This command should print the IP address assigned to the board's MINET interface. Use this address to **ping** the board from other nodes.

On the IOP:

```
init-2.04# ifconfig minet0

minet0      Link encap:Ethernet  HWaddr 00:00:00:02:0E:01
            inet addr:1.0.3.47  Bcast:1.255.255.255  Mask:255.0.0.0
            UP BROADCAST RUNNING MTU:1500  Metric:1
            RX packets:0 errors:0 dropped:0 overruns:0 frame:0
            TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:100
```

On the host:

```
init-2.04# ping -c 5 1.0.3.47

PING 1.0.3.47 (1.0.3.47) from 1.0.3.1 : 56(84) bytes of data.
64 bytes from 1.0.3.47: icmp_seq=0 ttl=255 time=1.167 msec
64 bytes from 1.0.3.47: icmp_seq=1 ttl=255 time=100 usec
64 bytes from 1.0.3.47: icmp_seq=2 ttl=255 time=98 usec
64 bytes from 1.0.3.47: icmp_seq=3 ttl=255 time=97 usec
64 bytes from 1.0.3.47: icmp_seq=4 ttl=255 time=97 usec

--- 1.0.3.47 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max/mdev = 0.097/0.311/1.167/0.428 ms
```

CHAPTER 5 *Supported Device Drivers*

The following table shows the device drivers supported by the cpci735 BSP:

Table 5-1: Device Drivers Supported by the cpci735 BSP

Hardware Device	Device Drivers	Location in Source Tree	Kernel Configuration Options	Notes
4 Mb Flash	<code>cpci735.c</code>	<code>drivers/mtd/maps</code>	<code>CONFIG_MTD</code> <code>CONFIG_MTD_CPCI735</code>	
IDE Disk Plug-in 2,5" hard disk on primary board, hard disk or SunDisk via transition module Flash IDE 32 Mb on board IDE FlashDisk	<code>ide.c</code>	<code>drivers/ide</code>	<code>CONFIG_IDE</code> <code>CONFIG_BLK_DEV_IDE</code>	

Table 5-1: Device Drivers Supported by the pci735 BSP (Continued)

Hardware Device	Device Drivers	Location in Source Tree	Kernel Configuration Options	Notes
Ethernet 2x10/100 BaseT (Intel 82559ER)	eeepro100.c	drivers/net	CONFIG_EEPRO100	The second Ethernet interface (eth1) on the Force CPCI-736 is routed to the cPCI connector to support the PICMG 2.16 standard. BlueCat Linux can access this interface like any standard Ethernet device using eth1, and will thus support PICMG 2.16 connectivity. The user is referred to www.picmg.org and www.fci.com for more details about PICMG 2.16.
Serial Interface 3 serial interfaces supporting RS232 level (COM1-COM3)	serial.c	drivers/char	CONFIG_SERIAL	
USB	*.c *.h	drivers/usb	CONFIG_USB	
Parallel Port (LPT1)	parport_pc.c	drivers/parport	CONFIG_PARPORT CONFIG_PARPORT_PC	
Floppy Disk	floppy.c	drivers/block	CONFIG_BLK_DEV_FD	
Keyboard	pc_keyb.c	drivers/char	CONFIG_VT CONFIG_PC_KEYB	
Mouse	pc_keyb.c	drivers/char	CONFIG_VT CONFIG_PC_KEYB	

Defect Fixes and Known Limitations

The table below shows defect fixes in this release of BlueCat Linux:

Table 6-1: Defect Fixes in BlueCat Linux

Platform	Subcomponent	ID	Summary
All	BlueCat Linux Misc	16057	Ctrl-C, Ctrl-Z , etc., do not work from shell.
All	BlueCat Linux OS loader	16358	The BLOSH ntar command hangs the system.
All	BlueCat Linux Misc	17308	Certain sequence of file updates sometimes causes FFS to crash after reboot.
All	BlueCat Linux Debuggers	18404	Update BlueCat gdbserver to process signals to gdb on the host correctly.
ARM	BlueCat Linux Drivers	17677	Error generated when <code>jffs_garbage_collect_thread():free_size == 0</code>
Windows (cross)	BlueCat Linux installation procedure	16130	Windows installation should support non-C drives.

Force PCI-735/736 Target Board Problems and Limitations

- In a configuration where an IDE hard disk and an IDE flash device are both connected to the same IDE interface, the hard disk is not recognized by the BlueCat Linux kernel by default. Such a configuration is possible, for instance, if a 2.5" IDE hard disk is installed onto the on-board IDE disk connector. (Note that the IDE Flash device is always present on the

board.) To enable support for both IDE devices in such a configuration, the user must pass the following kernel command option to the BlueCat Linux kernel:

```
idex=flashmate
```

where *x* is the identifier of the IDE interface to which the IDE devices are connected (0 for the primary IDE interface; 1 for the secondary IDE interface).

- Debugging of multithreaded applications via GDB is not supported.
- When booting via the PXE Netboot, a kernel command line is limited to 28 symbols. If a command line exceeds this limitation, it is recommended to use the BlueCat Linux OS loader as an OS booter.
- Instability of the PXE server on some hosts running Red Hat 7.2 requires a restart of the PXE server each time the BlueCat Linux image has been downloaded using the PXE Netboot.
- There is a problem with initialization of the USB controller in BIOS versions earlier than 1.0.0. In BIOS v1.0.0 the USB controller is initialized successfully.
- If `mkrootfs` is terminated (either by an error or by a signal), it tries to clean all its temporary files before exiting. However, due to certain features of the Cygwin execution environment, such temporary files can remain uncleaned in the `/tmp` directory on a Windows host. It is recommended that the `/tmp` directory be regularly checked and cleaned.
- The `tc1x` RPM package is not included in the Windows-hosted distribution.
- On Windows hosts, some file permissions (including `r` and `s`) always have default values. To set permissions different from the default values, the `chmod` command should be used in the `.spec` file.
- When changing the default kernel configuration for the 735 board, changing the `osloader` kernel configuration with `make xconfig` does not update the `i_osloader` kernel configuration. To update the `i_osloader` configuration, the user must run:

```
make -f Makefile.i xconfig
```

- The `demo_trg-cpci735-1.0-1.i386.rpm` package cannot be rebuilt from the sources provided. This is because the demo systems are provided in full source in the binary RPMs. Thus, the SRPM is not needed for this package.