CUBIX

Customer Service Support System

BC 4035
Manual

(Cubix Document 855A)

Table of Contents

BC 4035
Chapter 1 - Introduction

Overview

The BC 4035 Series processors are computers on single PC-style, plug-in boards. The BC 4035 includes a 80486 processor running at 33, 66, or 100MHz.

Hardware

Each BC 4035 Series computer provides all the functionality of a standard PC. It includes video support, two serial ports, one parallel port, keyboard and mouse support, on board memory, and floppy and IDE hard drive support. Each BC 4035 also has an integrated Ethernet controller with a 10Base-T connector.

A BC is the bus controller for the ISA bus in which it is installed. The BC can be installed only in a Cubix backplane. Cubix backplanes are often divided into groups, each with an independent bus, thereby allowing the installation of multiple BC processors in a single Cubix enclosure.

The BC 4035 Series processor is designed for installation in several Cubix enclosures:

- The BOS (Branch Office System) is a stand alone unit that may contain up to five BC 4035 processors.

- ERS II - Contains a 16-slot ISA backplane that can be divided into eight separate bus groups. May contain up to eight BC series processors and is available as a rack mount unit only.

- ERS/FT II - Fault Tolerant version of ERS II. May contain up to eight BC series processors and is available as a rack mount or table top unit.

- PowerSMP - Version of the ERS/FT II with support for dual Pentium Pro processors (DP6200).

Each Cubix enclosure is equipped with an integrated multiplexor (mux) that allows a single monitor, keyboard, mouse, and floppy disk drive to be shared by all of the BC processors installed in the enclosure. The ability to condense multiple processors in Cubix enclosures provides a manageable platform ideal for remote communications, fax servers, e-mail servers, and many other file server or specialty server applications.

A brief overview of the BC 4035's features is listed below.

Table 1 - 1

Comparison - BC 4035 Processor Board

BC Model	Bus	CPU Speed	L2 Cache	SCSI	Maximum DRAM*	Subsystem Compatibility
4035	ISA	33/66/100	32K	No	64MB	BOS, ERS II, ERS/FT II, PowerSMP

*See Chapter 4 for SIMM configurations before installing additional SIMM modules.

Software

Integrated onto each BC Series processor is a BIOS developed by American Megatrends, Inc. (AMI). In addition, Cubix provides software to support these features specific to the Cubix architecture:

- Mouse Multiplexing - software is required to allow a single mouse to be multiplexed between multiple BC processors

- Cubix Supervisory System - Cubix optionally provides a system that monitors and controls the BC processors and requires software support on each BC

- Ethernet Interface - to use the integrated Ethernet controller requires installation of 10Base-T drivers

- Enhanced Video - to increase the video resolution in certain environments requires installation of video drivers

Board Identification

ISA and EISA boards are differentiated by the contour of their edge connectors. Other differences to look for are the processor type (80386, 80486, or Pentium) and the location of the SIMM sockets. *Before installing additional SIMM modules, reference Chapter 4 for the correct SIMM configurations.*
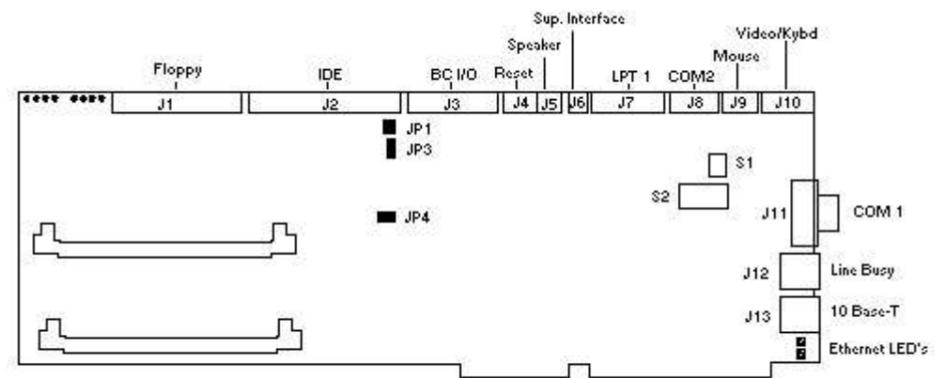

Figure 1 - 1, BC 4035 Board

BC 4035
Chapter 2 - Hardware

Configurable Hardware Options

The options described below are supported by the BC 4035 Series processors.

- **Warning!**

    Jumpers are set by Cubix manufacturing and should not be changed. Jumper definitions are included for information purposes only.

Ethernet

An Ethernet controller is integrated onto each BC Series processor. This controller is configured with hardware switches. Refer to *Chapter 4 - Technical Reference* for specific Ethernet configuration options.

Reset Loss of DCD / DSR

The BC Board can be configured to perform a hardware reset when the Data Carrier Detect (DCD) or Data Set Ready (DSR) signal changes from true to false on the COM1 serial port. This feature is designed for use in remote communication applications where the BC is used to host dial in session on a network, as it forces the BC host to reset after each dial in session. The reset causes the BC hardware to return to its initial state and also prevents the next dial in user from accessing data left in memory by the previous user. *This function is available on COM1 only.*

Video

A hardware switch can be set to disable the on board video controller. If this controller is disabled, an external video controller with a video BIOS at address C0000 hexadecimal must be installed. Refer to *Chapter 4 - Technical Reference* for information on resolution support.

Cubix Supervisory System

Cubix offers an optional Supervisory System for BC processor management. The Supervisory System requires installation of an IES (Intelligent Environmental Sensor) module in each Cubix subsystem being supervised. This IES module communicates with the BC processors in the subsystem via a hardware interrupt which is configurable as IRQ 10 or IRQ 15 on each BC. If no IES is installed, configure the BC for no Cubix Supervisory interrupt. *In older subsystems this interrupt should be configured for the PA 3030 supervisory processor (the PA 3030 was the predecessor to IES).*

Mouse

A PS/2 style mouse port is included on each BC processor. The mouse may be connected to the BC via a Cubix multiplexor or by installing an adapter (refer to Chapter 3 - Installation). If a mouse is installed, the mouse interrupt (IRQ 12) must be enabled in the hardware configuration. The "Mouse Support Options" in the Advanced CMOS Setup section of the BIOS Setup Utilities must be "Enabled" (refer to the *American Megatrends, Inc. BIOS Configuration Program User's Guide*).

Switch and Jumper Settings

For an explanation of the features controlled by the BC 4035 switch settings, refer to *Chapter 4 - Technical Reference*.
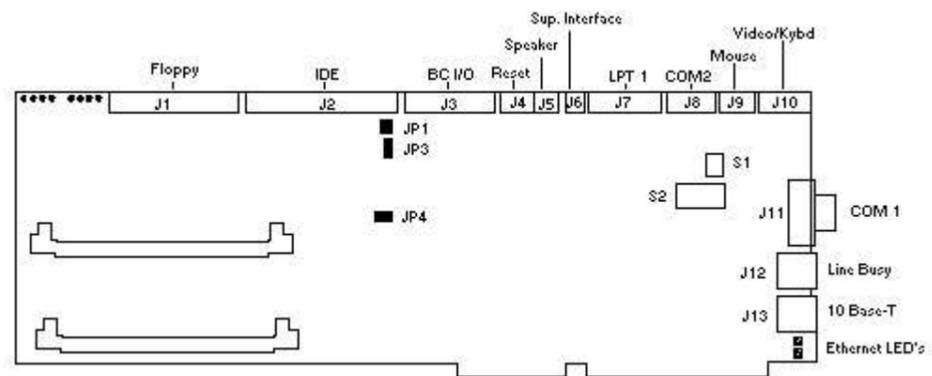

Figure 2 - 1, BC 4035 Board

BC4035A

The BC 4035A is an updated version of the BC 4035. It provides support for 3.5 volt processors, such as the 80486DX4 running at 100 MHz and some 80486DX2 66MHz processors. The BC 4035A also includes local bus video and support for EIDE hard disk drives over 540MB. To identify the board type, refer to the label on the back side of the board. **"BC 4035"** or **"BC 4035A"** is silk screened on the upper left corner when the ISA edge connectors are pointing down. The type of board is also displayed in the sign-on message when the board is booted.

Table 2 - 1
BC 4035 Reset on Loss of DCD or DSR (Switch S1)

Reset Condition	Position	
	1	2
Reset when DSR drops on COM1	ON	OFF
Reset when DCD drops on COM1	OFF	ON
Reset when DCD or DSR drops on COM1	ON	ON
*Reset Disabled	OFF	OFF
*Factory Setting	OFF	OFF
Note; If positions 1 and 2 are both set to ON, then loss of DSR will reset the BC 4035.		

Table 2 - 2
BC 4035 Switch S2 Summary

	Position						
Function	1	2	3	4	5	6	7
*Enable Video Controller	---	ON	---	---	---	---	---
Disable Video Controller	---	OFF	---	---	---	---	---
Cubix Supervisory Interrupt to IRQ 10	---	---	ON	OFF	---	---	---
*Cubix Supervisory Interrupt to IRQ 15	---	---	OFF	ON	---	---	---
No Cubix Supervisory Interrupt	---	---	OFF	OFF	---	---	---
*PS/2 Mouse Interrupt on IRQ 12	---	---	---	---	ON	---	---

PS/2 Mouse Interrupt on IRQ 12 Disabled	---	---	---	---	OFF	---	---
Ethernet Interrupt on IRQ 3	ON	---	---	---	---	ON	OFF
*Ethernet Interrupt on IRQ 5	ON	---	---	---	---	OFF	ON
Disable Ethernet Controller	OFF	---	---	---	---	OFF	OFF
*Factory Settings	ON	ON	OFF	ON	ON	OFF	ON

Jumpers JP1, JP3, and JP4 configure the BC 4035 for the type of CPU installed. JP2 is a pair of pads which when shorted together with power off will clear the CMOS RAM. This may be necessary if a password has been entered and later forgotten.

Table 2 - 3
BC 4035 JP1, JP3 - Processor Speed Select

JP1- Pins 1-2	JP1- Pins 3 -4	JP3	CPU Speed
OFF	ON	1-2	SX-25, DX-25, DX2-50
OFF	OFF	1-2	SX-33, DX-33, DX2-66, DX4-100
ON	OFF	2-3	DX-40 (must have 40MHz chipset)

Warning! P1 and JP3 are configured at the factory for the CPU type installed and should not be changed

Table 2 - 4
BC 4035 JP4 - Processor Type

JP4	CPU Type
OFF	DX, DX2
ON	SX

Warning! JP4 is configured at the factory for the CPU type installed and should not be changed.

I/O Connections

I/O connections on the BC on the Cubix enclosure in which the processor is installed. The headers and connectors on the BC should be connected to the device indicated for the appropriate enclosure in Table 2-5.

Table 2 - 5
Cubix Enclosure I/O Connections - BC 4035

Header/ Connector	Connector Description	Connect to	
		BOS	Subsystem
J1 - 34-pin header	Floppy disk drive interface	Mux or floppy disk drive	Mux or floppy disk drive
J2 - 40-pin header	IDE hard disk drive interface	3.5" IDE drive with 0.1" pitch pins	3.5" IDE drive with 0.1" pitch pins
*J3 - 26-pin header	BC I/O (see note below)	Mux	N/A
*J4 - 5-pin header	Reset signal	N/A	Mux or reset switch
*J5 - 4-pin header	Speaker signal	N/A	Mux or speaker
*J6 - 4-pin header	Supervisory interface (for IES Supervisory System support)	N/A	Mux
J7 - 20-pin header	Parallel printer interface (LPT1	Optional LPT1 adapter board	Optional LPT1 adapter board
J8 - 10-pin header	Serial port (COM2)	COM2 connector on optional adapter board	COM2 connector on optional adapter board
*J9 - 5-pin header	Mouse interface	Mouse connector on optional adapter board	Mux or optional adapter board

Header/ Connector	Connector Description	Connect to	
		BOS	Subsystem
J10 - 14-pin header	Video/keyboard/ mouse interface	N/A	Mux or optional video, keyboard, and mouse adapter board (Note; mouse support for adapter board only; mouse mux support provided via J9)
J11 - DB-9 connector	Serial port (COM1)	Serial device	Serial device
J12 - RJ-11 connector	Line busy	Telephone cable	Telephone cable
J13 - RJ-45 connector	10BASE-T	Ethernet hub	Ethernet hub

*When the BC is installed in an old Cubix subsystem (ERS, ERS/FT or MultiServ/FT), the reset, speaker, supervisory interface, mouse, video and keyboard signals are interfaced to the multiplexor via headers J4, J5, J6, J9 and J10. In an ERS II, ERS/FT II, PowerSMP, or BOS subsystem, these signals are combined into the single J3 header. Refer to Figure 2 - 1 for connector locations.

Specifications - BC 4035

Processor

Processor type and speed	80486-SX 33 MHz
	80486-DX 33 MHz
	80486-DX2 66 MHz
	80486-DX4 100 MHz
External CPU caching	32 KBytes
System BIOS	AMI ISA BIOS

Bus

Type	ISA

Real Time CMOS Clock

Rate	32.768 KHz

Memory Support

Total	16 MBytes
-- Conventional memory area	640 KBytes [0-9FFFFH]
-- High memory area	380 KBytes [A0000-FFFFFH]
-- Extended memory area	1 - 16 MBytes [100000-FFFFFFH
Access time (RAM speed)	70 nanoseconds
High memory ROM shadowing	Yes
Parity	Yes
Compatible memory SIMMs	
-- Memory type (PS/2-type 72-pin)	DRAM
-- Memory size	4/8/16/32 Mbytes
-- Minimum number of SIMMs installed	1
-- Maximum number of SIMMs installed	2

SIMM Dimensions
-- Maximum height   1.35 inches (34.3 mm)
-- Width   4.25 inches (108 cm)

Video Support

Video controller type   Cirrus Logic CL-GD5428
Video controller location   On board
Highest mode supported   SVGA with 1 MByte
Highest resolution   1024x768 with 256 colors

Keyboard/Mouse Support

Controller   PS/2 compatible
Keyboard connector   Internal header
Mouse connector   Internal header

Communication Ports

Serial
-- Assignment   COM1, COM2
-- UART type   16C550
-- -- Buffering   16 Byte
-- Maximum transmission rate   115.2 Kbps
-- COM1 connector type   DB-9 male on rear bracket
-- COM2 connector type   Internal header
Parallel
-- Assignment   LPT1
-- Type   Centronics compatible
-- Connector type   Internal header

Disk Support

Floppy controller
-- Media size   3.5-inch or 5.25-inch
-- Maximum number of drives   2
IDE controller
-- Media size   3.5-inch or 5.25-inch
-- Maximum number of drives   2

Ethernet Port

Interface   10BASE-T
Connector Type   RJ-45 on rear bracket

Line Busy

Connector Type   RJ-11 on rear bracket

Other Input/Output

Reset Switch	Internal header
Hard drive activity LED	Internal header
Video/Keyboard/mouse multiplexor	Internal header
Speaker	Internal header
Cubix Supervisory System interface	Internal header

Communications Processor Characteristics

Configurable automatic reset	Upon loss of DCD/DSR from COM1

Power

33 MHz rating	15.2 Watts
66 MHz rating	16.7 Watts
Requirements	
-- +5 VDC (33 MHz)	2.8 amps maximum
-- +5 VDC (66 MHz)	3.1 amps maximum
-- +12 VDC	0.05 amps maximum
-- -12 VDC	0.05 amps maximum

Environmental

Operating temperature	0 - 40° C
Relative humidity	0 - 80% noncondensing
FCC compliance	Class A

Physical Measurements

Height	4.5 inches (11.43 cm)
Width	13.25 inches (33.65 cm)

Warranty

Parts and labor return-to-manufacturer	1 year

BC 4035
Chapter 3 - Installation

Hardware Installation

Installation in a Cubix Enclosure

1. Configure the hardware options as described in Chapter 2.

2. Gain access to the backplane. Typically this requires removing the cover from the enclosure.

3. Power down the enclosure or group in which the BC will be installed (if the BC is being installed in a Fault Tolerant subsystem, only the group that will contain the BC needs to be powered down).

4. Seat the BC into the appropriate group in the backplane.

5. Secure the BC with a screw on the end bracket.

6. Install any peripheral devices required in the enclosure. Instructions for peripheral device installation may be found in the documentation accompanying the enclosure.

7. Install any adapters required to provide connectors for peripheral devices as described later in this chapter.

8. Connect the cables to all peripherals and I/0 connectors (refer to *Chapter 2 - Hardware* for connection information).

9. Reassemble the system as necessary.

10. Apply power

11. Use a monitor and keyboard to verify that the system is functioning properly. Monitor, keyboard and mouse support are provided through a multiplexor or via an adapter board as described in the *Optional Video, Keyboard & Mouse* section later in this chapter.

12. Run the BIOS setup utility to configure the CMOS (refer to the *American Megatrends, Inc. BIOS Configuration Program User's Guide)*.

13. Install software as specified in the *Software Installation & Configuration* section of this chapter. Instructions to configure the 10 Base-T Ethernet drivers necessary to use the integrated Ethernet controller are included in the appendices.

Optional Video Keyboard & Mouse

The video, keyboard, and PS/2 style mouse signals are normally cabled from headers on the top of the BC board to a Cubix multiplexor where they are ultimately brought out to standard connectors and attached to a monitor, keyboard, and mouse. If a multiplexor is not used, Cubix can provide an optional adapter. This adapter is a printed circuit board and bracket that provide an interface between the BC headers and the Mini-DIN 6 and HD DSUB-15 connectors needed to connect a VGA monitor and PS/2 style keyboard and mouse. These optional connectors may be installed in an empty slot (where the end bracket of a board would normally be), or in the additional connector space of an auxiliary junction panel. Refer to *"Peripheral Adapter Installation"* for mounting instructions.
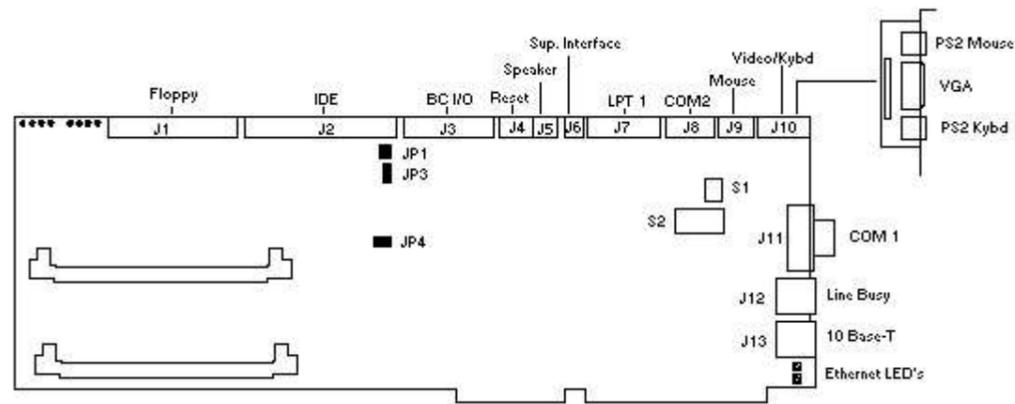
Figure 3 - 1

Video/Keyboard/Mouse Adapter Connected to the BC Processor

- **Warning!**

   When header J10 or J3 of a BC processor installed in a Cubix Fault Tolerant subsystem is not connected to the multiplexor, this processor will not support the multiplexed floppy interface.

Optional LPT1

An optional parallel port may be added to function as LPT1 on the BC. This requires a Cubix LPT1 printed circuit board adapter and bracket which provide an interface between the BC header and the DB-25 connector. The optional connector may be installed in an empty slot (where the end bracket of a board would normally be), or in the additional connector space of an auxiliary junction panel. Refer to the *Peripheral Adapter Installation* section later in this chapter for mounting instructions.
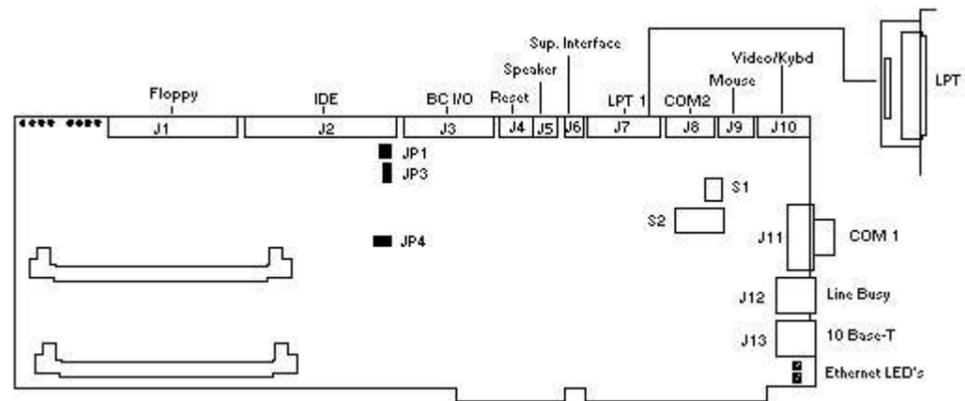

Figure 3 - 2

LPT1 Adapter Connected to BC

Optional COM2 and Mouse

An optional second serial port may be added to function as COM2 of the BC. A PS/2 mouse input port may also be added. If the optional video, keyboard, and mouse adapter previously discussed will be installed, it is not necessary to include the mouse option on this adapter. Connecting COM2 and the optional mouse requires a Cubix printed circuit board adapter and bracket, which provide an interface between the BC header and the DB-9 and Mini-DIN 6 connectors. Both the

COM2 and mouse interfaces are provided on the same adapter. These connectors may be installed in an empty slot (where the end bracket of a board would normally be), or in the additional connector space of an auxiliary junction panel. Refer to the *Peripheral Adapter Installation* section later in this chapter for mounting instructions.

- Refer to *Chapter 2 - Hardware* to enable the mouse interrupt hardware option (IRQ 12). Also check advanced CMOS setup to make sure mouse support is enabled in the BIOS.
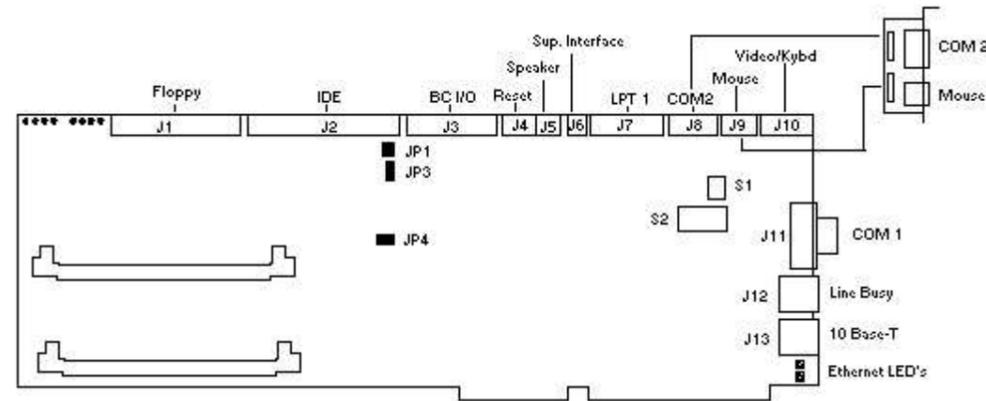

Figure 3 - 3

COM2/Mouse Adapter Connected to BC

Peripheral Adapter Installation

Follow the steps below to install optional Cubix adapter boards for peripheral devices such as video, keyboard, mouse, and LPT1.

- **Warning!**

  Make sure the system is powered off and unpluged before beginning this procedure.

1. Install the Cubix adapter in a panel opening on the system. Typically, an opening provided for an empty board space is dedicated to the adapter. In this case, install the bracket next to the BC board that requires the adapter port and tighten the screw firmly.
   Alternately, if the adapter is being installed into a Cubix auxiliary junction panel, the bracket provided with the adapter should be removed. Unscrew the connector from the bracket and install the adapter into the desired panel opening.

2. Connect one end of the provided cable to the appropriate header on the BC board. The pin-one side of the ribbon cable is marked with a colored (blue or red) stripe. Pin one on the BC box header is labeled with a triangular arrowhead. Align the pin-one side of the ribbon cable with pin one on the header.

3. Connect the other end of the ribbon cable to the adapter. Pin one on the adapter's box header is labeled with a triangular arrowhead. Align the pin-one side of the ribbon cable with pin one on the adapter.

4. Plug the peripheral device's cable into the connector.

Software Overview

To utilize all of the features integrated into the BC 4035 Series processors, the following software drivers and utilities are available:

- **Cirrus Cubix Mouse/Keyboard Multiplexing Software** - support for mouse and keyboard multiplexing among multiple Cubix processor boards

- **AMD Ethernet Drivers** - support for the on-board 10Base-T Ethernet interface

- **Cirrus Logic Video Drivers - support for enhanced video resolutions**

Cubix Mouse/Keyboard Multiplexing Software

The functions provided by the Mouse/Keyboard Multiplexing Software are:

- **Mouse multiplexor support - required if a single mouse is shared among multiple Cubix processors in a Cubix multiplexor subsystem**

- **Remote mouse and keyboard support - required when the Cubix processor is functioning as a remote control host for a remote system using a mouse and/or keyboard, and no mouse or keyboard is physically attached to the Cubix host processor.**

AMD 10Base-T Ethernet Drivers

The AMD Ethernet Drivers are required if using the on-board Ethernet controller. The driver diskettes provided by Cubix contain the following Ethernet drivers:

- **NDIS2, NDIS3, and NDIS4**
- **NetWare Client and Server**

Cirrus Logic Video Drivers

The Cirrus Logic Drivers may be required by some operating systems or application programs. The driver diskettes provided by Cubix contain the following video drivers:

- **Windows 3.1**
- **Windows 95**
- **Windows NT 3.51**

Cubix Mouse/Keyboard Multiplexing Software Installation

DOS Environment

The Cubix DOS device driver CBXMOUSE.SYS provides mouse multiplexor support as well as remote mouse and keyboard support.

NOTE: A mouse driver (e.g. Logitech's MOUSE.COM or Microsoft's MOUSE.EXE) must be loaded for CBXMOUSE.SYS to provide mouse support.

To install this driver for use with the DOS operating system:

1. Copy the CBXMOUSE.SYS file from the \DOS directory of the *Cubix Mouse/Keyboard Multiplexing Software* diskette to the root directory of the boot drive.

2. If present, remove the following line from the CONFIG.SYS file:

   device = bcsetup.sys

3. Add the following line to the CONFIG.SYS file in the root directory of the drive:

   device = cbxmouse.sys

This sets the following defaults:

- Mouse Multiplexor Support Enabled

- Remote Mouse Support Enabled

- Keyboard Type 101/102 Keys

The following is a list of options that may be used with CBXMOUSE.SYS. Place options on the same line in the CONFIG.SYS file. *Command line options are not case sensitive.*

Command Line Option	Explanation
-n	83/84 key keyboard
-nl	Allows non-Logitech mice. Note that if this option is used, mouse multiplexing is not supported.

Table 3-1
CBXMOUSE.SYS Command Line Options

All Cubix mouse software is designed to be used explicitly with Logitech PS/2 style mice. If non-Logitech mice are to be used, the command line option -nl should be entered in the config.sys file following the mouse emulation software filename:

device = cbxmouse.sys -nl

The -nl option disables the synchronizing algorithms specific to Logitech mice. As a result, mouse multiplexing is not supported. However, remote mouse support will still be available.

4. Reboot the Cubix processor to allow the modifications in the CONFIG.SYS file to take effect.

Windows 3.1x Environment

The Cubix virtual device driver CBXMOUSE.386 will allow a mouse to function properly if it is attached directly to the Cubix processor after Windows is invoked, or if it is attached through a Cubix multiplexor and multiplexed to the Cubix processor after Windows is invoked.

To install this virtual device driver with Windows:

1. Install CBXMOUSE.SYS as described in the *DOS Environment* installation section.

2. Copy the file CBXMOUSE.386 from the \WIN31X directory of the *Cubix Mouse/Keyboard Multiplexing Software* diskette to the Windows SYSTEM directory (usually \WINDOWS\SYSTEM).

3. Modify the [386enh] section of the Windows SYSTEM.INI file (usually in the \WINDOWS directory) to include the line:

device = cbxmouse.386
and, if present, remove the line:
device = vhotfix.386

4. Reboot the Cubix processor to allow the modifications to take effect.

Windows 95 Environment

The Cubix Windows 95 mouse driver provides PS/2 mouse support on Cubix processors running Windows 95.

To Install the Cubix PS/2 Mouse Driver for Windows 95:

1. From the Windows 95 Control Panel, select the **Add New Hardware** icon.

2. From the "Add New Hardware Wizard" window, click on the **Next** button.

3. When prompted about whether or not Windows should search for the new hardware, select **NO** and click on the **Next** button. A list of hardware type options appears.

4. From the **Hardware Types** list, select **Mouse** and click on the **Next** button. The **Manufacturers and Models** list appears.

5. From the "Manufacturers and Models" list, click on the **Have Disk** button.

6. Make sure the *Cubix Mouse/Keyboard Multiplexing Software* diskette is in the floppy drive, and **A:\ WIN95** is the file path. Click on the **OK** button.

7. When the **Cubix Mouse Driver** option appears, select it and click on the **Next** button.

8. In response to the message **"To continue installing the software needed by your hardware, click Finish,"** click on the **Finish** button. When the current window closes, the installation is complete and the driver is available for immediate use. Note that rebooting the system is not required.

Windows NT Environment

CBXI8042.SYS is a complete multiplexed mouse and keyboard device driver for Cubix processors running Windows NT. CBXI8042.SYS replaces the I8042PRT.SYS device driver file provided with Windows NT.

To install the Cubix mouse/keyboard driver for Windows NT, run the InstallShield setup program found in the \WINNT subdirectory of the *Cubix Mouse/Keyboard Multiplexing Software* diskette:

1. Make sure the *Cubix Mouse/Keyboard Multiplexing Software* diskette is in the floppy drive. From the DOS command prompt of Windows NT, type
a:\winnt\setup

Follow the prompts provided by the Setup program to install the mouse/keyboard driver.

OS/2 Environment

The Cubix device driver CBXMOUSE.SYS is a fully functional mouse driver that replaces the OS/2 MOUSE.SYS driver. CBXMOUSE.SYS loads PS/2 mouse support whether or not a mouse is physically present.

To install the Cubix mouse driver for OS/2:

1. 1. Copy the file CBXMOUSE.SYS from the \OS2 directory of the *Cubix Mouse/Keyboard Multiplexing Software* diskette to the \OS2 directory of the boot drive.

2. 2. In the CONFIG.SYS file, remark out the line: **device = os2\mouse.sys**

3. by placing "REM" in front of it, so that it reads: **rem device = os2\mouse.sys**

4. 3. In the CONFIG.SYS file, add the line: **device = os2\cbxmouse.sys**

5. 4. Reboot the Cubix processor to allow the modification in the CONFIG.SYS to take effect.

All Cubix mouse software is designed to be used explicitly with Logitech PS/2 style mice. If non-Logitech mice are to be used then the command line option -nl should be entered in the CONFIG.SYS file following the mouse emulation software filename:

device= cbxmouse -nl

The **-nl** option disables the synchronizing algorithms specific to Logitech mice. As a result, mouse multiplexing is not supported. However, remote mouse support will still be available.

Mouse/Keyboard Multiplexing Hints

The Cubix mouse drivers are intended for use in Cubix multiplexor subsystems. This section lists some hints for using the mouse/keyboard effectively.

1. Avoid moving the mouse when selecting different channels on the Cubix multiplexor subsystem.

2. When the multiplexor subsystem is powered up, make sure that at least one processor completes the boot process without changing the multiplexor channel.

3. Make sure that the multiplexor channel is enabled while the processor boots so that the mouse will be connected to the processor.

4.

Acquiring Additional or Updated Drivers

Please refer to the Cubix Customer Service information at the back of this manual

BC 4035
Chapter 4 - Technical Reference

BIOS

An American Megatrends, Inc. (AMI) system BIOS with embedded setup and hard disk setup utilities resides in EPROM on the board. At boot time, the data can be transferred to shadow RAM. This provides increased system performance, since RAM access is faster than EPROM access.

POST Display

The BC has eight LEDs arranged in two groups of four (refer to the illustrations in the *Board Identification* section of Chapter 1 for LED location). As the system proceeds through its Power On System Test (POST) these LEDs display binary codes which can be used to diagnose board failures. Refer to Appendix A for a description of these codes.

Memory - Hardware

All BC system memory is provided in 72-pin by 36-bit standard 70ns SIMM modules. These SIMMs are defined in Table 4-1.

Table 4 - 1
SIMM Definitions

SIMM Type	Banks	Total Memory
1M x 36	Single	4MB
2M x 36	Double	8MB
4M x 36	Single	16MB
8M x 36	Double	32MB

SIMM Configurations

The SIMM configurations supported the BC 4035 are represented in Table 4-2.

Table 4 - 2

SIMM SOCKET 1	SIMM SOCKET 2	TOTAL MB
4		4
8		8
8	4	12

8	8	16
16		16
32		32
32	4	36
32	8	40
32	16	48
32	32	64

Memory Management

Memory between 640 KBytes and 1 MByte not required by hardware memory windows or BIOS can be made available to the installed memory manager. By configuring these areas as EMS page frames or Upper Memory Blocks, they can be used for loading and executing application software such as TSRs (Terminate and Stay Resident programs) and network drivers.

Memory maps for the BC 4035 processor are illustrated in the following figures.

BC 4035 Memory & I/O Configurations

BC4035 Memory Map

F800-FFFF	Reserved for AMI ROM BIOS.
F700-F7FF	Available
F000-F6FF	Reserved for AMI ROM BIOS
D000-EFFF	Available as Expanded(EMS) or Upper Memory (UMB)
C800-CFFF	Remote Boot EPROM if enabled.Otherwise available.
C000-C7FF	Reserved for VGA BIOS
B800-BFFF	VGA/CGA Video Memory
B000-B7FF	VGA/Mono Video Memory
A000-AFFF	VGA Video Memory
0000-9FFF	Conventional DOS

BC 4035 Memory Map

BC 4035 I/0 Map

Table 4 - 3

ISA Ports	Description

0000 - 00FF	Various "AT" functions in 499/82C206chip and keyboard controller
01F0 - 01FF	IDE hard drive interface
02F8 - 02FF	COM2
0300 - 0317	Ethernet controller
03A0	Cubix Supervisory System interface
03B4 - 03B5	VGA
03BC - 03BF	LPT1
03C0 - 03CF	VGA
03D4 - 03D5	VGA
03F0 - 03F7	Floppy / IDE
03F8 - 03FF	COM1

Video Controller

The BC 4035 contains an extended high resolution video graphics controller. Table 4 - 4 defines the video support provided on each processor.

Table 4 - 4

Video Support

Processor	Video Memory	Extended Mode Support
BC 4035	1MB	640 x 480 with 256 colors 800 x 600 with 256 colors 1024 x 768 with 16 colors

Refer to *Chapter 3 - Installation* for information on available video driver.

Keyboard/Mouse Controller

The BC has a PS/2 compatible keyboard controller with the AMI keyboard BIOS. The keyboard controller uses IRQ 1 for its interrupts, and requires no DMA channel.

The keyboard controller also supports a PS/2 compatible mouse which uses IRQ 12. Switch S2 is used to enable the PS/2 mouse interrupt on IRQ 12 (refer to Chapter 2 for switch settings).

IDE Hard Drive Interface

An IDE hard drive interface is included on the BC for applications that require a hard disk drive. IDE drives include an AT compatible disk controller. /The IDE interface circuit will support one or two IDE drives. The hard disk controller uses IRQ 14 for its interrupt. When adding an IDE drive to the board, use the AMI BIOS setup program to select the drive type. See the *American Megatrends, Inc. BIOS Configuration Program User's Guide* for information on selecting IDE drive types.

The BC CMOS must be configured to properly set up the IDE interface. In the **Standard CMOS Setup** section, hard disk types for C: and D: must be entered. If a disk is not present, select "Not Installed". This should be done, for example, if the only hard drive in the system is a SCSI drive. ISA processors also require that the IDE interface be "Enabled" in the **Peripheral Management Setup** section (if no disk is present set the IDE interface to "Disabled").

To recover IRQ 14, all IDE drives must be removed from the 40-pin header cable.

Floppy Disk Controller

The BC contains a PC/AT compatible floppy disk controller that supports all PC/AT floppy disk configurations. It is configured for industry standard single-speed floppy disk drives, and supports up to two of any combination of 5.25 or 3.5 inch drives. The BIOS setup program must be configured for the proper drives. The floppy controller uses IRQ 6 for its interrupt and DRQ 2 for its DMA channel. ISA processors allow the floppy disk controller to be disabled in the **Peripheral Management Setup** section of the System BIOS CMOS setup program (refer to the *American Megatrends, Inc. BIOS Configuration Program User's Guide).*

BC4035 and BC 4035A IDE Support

The AMI BIOS on the BC 4035 has been updated to provide enhanced IDE support. The same BIOS is now provided on both the BC 4035 and the BC 4035A.

To determine which BIOS is included on a BC 4035, boot the board and watch the sign-on message. If the date displayed is March 10, 1995 or later, the BIOS supports the enhanced IDE interface. Otherwise, enhanced IDE support is not provided. All BC 4035A boards include the updated BIOS.

The BC 4035 and BC 4035A enhanced IDE features included in the March 10, 1995 AMI BIOS are described below. The options may be enabled or disabled via the BIOS setup.

Block mode (multi-sector) transfer

To increase system performance, enable the block mode option. If the hard disk supports multi-sector transfers, BIOS will enable the multi-sector transfer for read/write commands.

LBA mode (for hard disks larger than 528 Mbytes)

Previous versions of the BIOS did not support disk drives larger than 528 Mbytes. To use larger drives with the new BIOS, configure the drive type (use type 47 for a user defined drive and set the cylinders, sectors, and heads as recommended by the disk drive manufacturer). Enable the Logical Block Assignment (LBA) mode for each drive that is larger than 528 Mbytes (this option may be configured separately for each drive). Do not configure this option for drives that are 528 Mbytes or smaller.

Recommended Configuration

Enable the options for block mode (multi-sector) transfer. For each disk greater than 528 Mbytes, enable LBA mode.

Serial and Parallel Ports

Two serial ports and a parallel port are available on the BC processor board. One serial port is accessible through a standard DB-9 connector on the rear bracket (J 11). The other serial port (COM2) and the parallel port (LPT1) are accessible internally through header connectors (J8 and J7). All ports comply fully with PC/AT interrupt and I/O port standards. External access to the internal I/O connectors (COM2 and LPT1) is accomplished through Cubix-supplied adapter boards. Refer to the sections Optional LPTI and Optional COM2 and Mouse in Chapter 3 for more information Contact the Cubix Sales department to order the serial or parallel port adapter product required to access the COM2 or LPT1 ports.

Use the Peripheral Management Setup section of the System BIOS CMOS setup program to configure the serial and parallel ports (refer to the *American Megatrends, Inc* BIOS Configuration Program User's Guide).

Ethernet Controller

The BC is equipped with an integral Ethernet controller with a 10BASE-T RJ-11 connector (J13) on the mounting bracket at the rear of the card. Software drivers are provided for this controller to support PC local area networks.

Near the RJ-45 connector and visible through a slot in the mounting bracket are two light emitting diodes. The green LED will light when the interface has a valid connection to a 10BASE-T hub. The orange LED will light whenever the Ethernet controller detects data on the receive lines. These LEDs can be useful indicators of network activity.

Ethernet Drivers

A BC Series 10BASE-T Driver Diskette included with the BC contains drivers for the following network operating systems:

- Novell NetWare v3.x, v3.x

- Microsoft LAN Manager

- Microsoft Windows NT

- Microsoft Windows for Workgroups v3.1, v3.11

- Banyan VINES (client support only)

- IBM LAN Server

- Sun PC-NFS

- Artisoft LANtastic v4.x, v5.x

- Packet Driver

- A Unix Streams driver for SCO Unix is also available from Cubix Customer Service.

- The Microsoft NDIS driver supports NDIS compatible networks, including DEC Pathworks.

The different drivers and associated software are stored in subdirectories on the diskette. The appendices of this manual include installation procedures for each network. These installation instructions are intended to provide examples to aid the installer. Procedures for installing the drivers for each particular network configuration vary.

Ethernet Configuration

The ISA based Ethernet adapter is a bus master device which gains control of the ISA bus to transfer data between the CPU and the network by DMA. This Ethernet adapter uses 24 I/O port addresses starting at 300 hexadecimal. The adapter also uses DMA channel 5. The I/O addresses and DMA channel cannot be changed, but they can be disabled if the Ethernet controller is not used. An interrupt is required; the interrupt level is a switch selectable choice between IRQ 3 and IRQ 5. Refer to Chapter 2 for switch configurations.

For diskless installations in a Novell environment, the BC 4035 contain remote boot software which may be enabled in the CMOS setup program in the "*Advanced Chipset Setup*" section. In this section's setup screen the "On board LAN BIOS boot" must be "enabled" if the BC is to boot from a Novell NetWare file server. All local boot devices must be disabled for this function to work. This means that C: and D: must be set to "Not Installed" in the "*Standard CMOS Setup*" section.

The Ethernet controller does not use a shared memory window on the CPU. (The Novell remote boot option does use a memory window if it is enabled.)

The BC 4035 Ethernet adapter can be configured as shown in Table 4 - 7.

Table 4 - 7
BC 4035 Ethernet Configuration Options

Option	Settings
IRQ	3, 5*
Base I/O Address	3OOH
DMA Channel	5
Ethernet Controller	Enabled*, Disabled

*Default Setting

The Base I/O Address and DMA Channel settings are fixed and cannot be changed. To use another device in the ISA bus at these settings, disable the Ethernet controller. The Ethernet controller should be disabled if it is not to be used for network communications. The Ethernet controller functions are selected with Switch S2 as described in Chapter 2.

Line Busy

The Cubix Line Busy RJ-11 jack is designed to be connected to the phone line that attaches to a modem. Its purpose is the make the telephone line appear busy when the processor or modem is not ready to answer an incoming telephone call.

The Line Busy circuit is inserted in parallel with the telephone line from the PBX to the modem. The Federal Communications Commission (FCC) has registered this circuit for use on PBX systems only and not for direct connection to the Public Telephone Network.

The Line Busy circuit is designed to be used on rotary PBX systems to keep incoming calls from ringing on line that will not answer. The circuit uses Data Terminal Ready (DTR) from the Cubix processor's communication port to determine whether the processor is ready for a call. If DTR is false, the circuit creates an off-hook condition on the telephone line to force the rotary PBX to bypass this extension for an incoming call. When DTR is true, the Line Busy Circuit will terminate the off-hook condition, and the processor will respond to an incoming call. The Line Busy circuit on the BC is controlled by the COM1 DTR signal. The COM2 port has no effect on Line Busy.

Cubix processors assert DTR false on the reset operation. It is the responsibility of the communications application running in the processor to assert the DTR signal true.

-
Warning!

The line busy circuit integrated onto the BC (J12) has been registered with the Federal Communications Commission for use on PBX's in the United States only. Use of this function outside the United States may violate local regulations and is not recommended by Cubix Corporation.

The line busy circuit complies with Part 68, FCC Rules.

FCC Registration Number

2HEUSA-73508-KX-N

ringer Equivalence O.O.B.

Line Busy Installation

1. Connect the PBX modular telephone cable to the "Line" input of the modem.

2. Connect the modular telephone cable from he modem's "Phone" jack to the RJ-11 jack on the BX (J12). See Figure 4.- 2.

3. If the modem phone jack is unavailable, a "T" modular jack can be uses as shown in Figure 4 - 3.
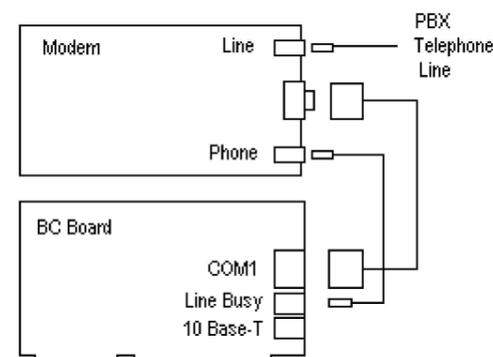

Figure 4 - 2

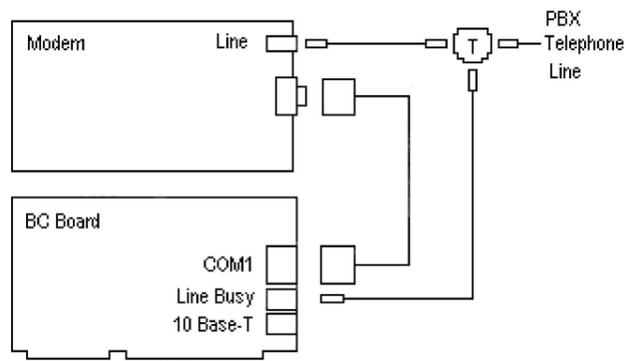**Line Busy Circuit Connected Via Modem Phone Jack**

Figure 4 - 3

Line Busy Circuit Connected with "T" Jack

CMOS Battery

The BC has an internal battery that backs up the real time clock and CMOS memory. No external battery is required to retain date, time of day or setup information.

Speaker

The BC has a connection for an eight ohm permanent magnet type speaker. The speaker signal is the standard AT speaker output.

System Interrupts

The 16 system hardware interrupts on the BC are represented in Table 4 - 8. Interrupts are managed by two standard 8259A Programmable Interrupt Controllers (PICs). Interrupts at IRQ 0 through 7 are located on the main PIC IRQ 8 through 15 are on the save PIC.

Table 4 - 8
BC Interrupt Configuration

IRQ	Description
0	Timer Clock
1	Keyboard
2	Second PIC controller
3	COM2 / Ethernet (S2)
4	COM1
5	Available / Ethernet (S2)
6	Floppy disk controller
7	LPT1
8	Real time clock
9	Redirected IRQ 2
10	Available / IES (S2)

11	Available / SCSI
12	Available / Mouse (S2)
13	Math coprocessor
14	Hard disk controller
15	Available / IES (S2)

BC 4035
Chapter 5 - Troubleshooting

Continual Resets

The Cubix Supervisory System supports a CPR (Cubix Processor Recovery) function designed to automatically reset an inactive BC processor. If a Supervisory System is installed with the CPR function enabled and a BC processor continuously resets, follow the steps below.

1. Disable CPR on the resetting BC. Verify that the erroneous resets cease.

2. Verify that the appropriate software is installed on the BC:

- DOS Environments - BCSETUP.SYS must be loaded

- Windows Environments - BCSETUP.SYS must be loaded

- OS/2 Environments - BCSETOS2.SYS must be loaded

- NetWare Environments - BCACTIVE.NLM must be loaded

3. Verify the S2 switch setting on the BC processor. It must be set to configure the Supervisory Interrupt on IRQ 15 or IRQ 10. Refer to *Chapter 2 - Hardware* for switch configurations.

4. Verify that the interrupt selection (IRQ 15 or IRQ 10) of the hardware (via S2) and the software (via command line parameters) match.

5. Refer to the *Software Installation & Configuration* section in Chapter 3 for more information on installation and command line parameters of the software components.

QL Boot Problems

QL processors are slave boards that will function as NetWare workstations when they are installed in the backplane of a NetWare file server or MultiProtocol Router (MPR). If a BC processor is configured as this server or MPR, and the QL processors do not boot, attach the video/keyboard adapter board supplied with the QL to the QL processor board and use a monitor to view the boot process of the QL. If the message "Cannot connect to server" is displayed on the QL monitor, run QLVision and view the status of the QL node. If this status shows as Active, attempt to connect to the QL from QLVision. If this connect attempt fails, there is probably an interrupt conflict.

The BC processors use IRQ 15 as the default interrupt for the Cubix Supervisory System. The QL use IRQ 15 as the default interrupt to the NetWare file server or MPR. To correct this conflict, configure the QL driver to use IRQ 11 (0B hexadecimal) or configure the BC to use IRQ 10 (0A hexidecimal).

NIC Driver Installation

To use the integrated Ethernet controller on the BC processor, a NIC driver must be installed. In Novell environments, the name of the driver is PCNTNW.LAN (for BC processors installed as NetWare servers or routers) or PCNTNW.COM (for BC processors installed as NetWare workstations). Complete instructions for NIC driver installations in NetWare and other network environments may be found in the appendices of this manual.

Resets on Modem Initialization

If a BC processor is configured as a host for remote communication sessions, and the BC resets when the remote communication software is loaded, examine switch SI. If reset on loss of DCD is enabled, the modem is probably toggling DCD during initialization. Contact the modem vendor to determine how to correct this condition.

Remote Boot Problems

The integrated Ethernet controller on the BC 4035 processors supports the ability to remote boot from a NetWare file server. Instructions for enabling this option may be found in *Appendix B - Novell ODI Driver Installation.* If the remote boot option is enabled, and the BC processor cannot find the file server from which it is to boot, examine the NET.CFG file. Verify that the Frame and Protocol statements have been modified for the 802.2 frame type as follows:

Frame Ethernet 802.2

Protocol IPX EO Ethernet-802.2

Note that the Protocol ID **must** be changed from 0 (for 802.3) to EO (for 802.2) frame types.

Monochrome Monitor with CubixConnect

Cubix offers a CubixConnect product consisting of Novell's Connect software integrated onto Cubix hardware. Cubix provides software to simplify the installation of CubixConnect in the field. This software can exhibit display problems when run on a BC processor connected to a monochrome monitor.

To correct these video difficulties" use the Cirrus CLMODE utility available on the Cubix BBS (refer to the *Acquiring Additional VGA Drivers* section of Chapter 3). The command:

- **clmode f**

forces monochrome graphics support. Using this command will allow the CubixConnect utility to function properly.

Monochrome Monitor on BC Workstation

The default CONFIG.SYS file provided with BC processors includes the following line:

- **emm386 I = bOO00-bffff**

This statement instructs emm386 to **include** the memory **bOO00-bffff** in its memory allocations. This can cause a video conflict with monochrome monitors attached to BC processors functioning as NetWare workstations. To resolve the conflict, delete this inclusion and reboot the BC processor.

Mouse Problems

Sometimes problems occur if a mouse is connected to a BC processor via a multiplexor (mux). For proper muxed mouse operation under DOS (or Windows) the following steps must be taken.

1. The CONFIG.SYS file must contain the line: **device = bcsetup.sys**

2. A mouse driver must be loaded (e.g. Logitech's MOUSE.COM or Microsoft's MOUSE.EXE).

3. The mouse device must be a Logitech PS/2 style bus mouse.

4. The processor must boot with the segment selected so that the mouse is detected when the driver loads.

If muxed operation is required with Windows, these additional steps must be followed:

1. The file VHOTFIX.386 must be copied to the \WINDOW\SYSTEM subdirectory.

2. Add the following line to the [386enh} section of the SYSTEM.INI file in the \WINDOWS subdirectory:
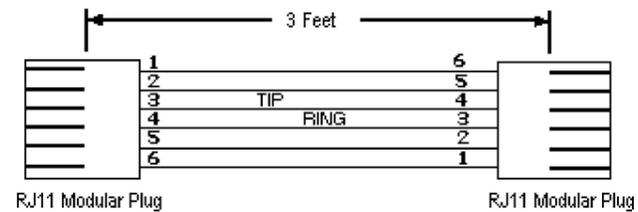
- **device = vho-tfix.386**

Line Busy

If the Line Busy Circuit does not cause the line to appear busy, check the cable connections.

The center two pins of the RJ-11, tip and ring, should measure approximately 48 volts DC under on-hook conditions. When the Line Busy Module has asserted an off-hook condition, the tip-ring voltage should be approximately 8 volts DC.

Figure 5 - 1

RJ-11 Tip and Ring Lines

If the Line Busy Circuit is not asserting off-hook, check the state of the DTR signal (pin 4 of the DB-9 RS-232 connector). DTR is false when it is -6 volts with respect to pin 7 of this connector. DTR is true when it is +6 volts with respect to pin 7. The voltage on pin 20 can be measured on the modem DB-25 connector while the computer DB-9 connector is cabled to the Cubix processor.
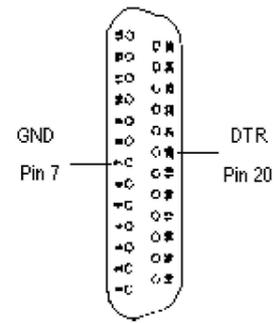
Figure 5 - 2

DB-25 Connector

If DTR is not changing as expected, check the Cubix processor's COM1 port hardware. Verify the COM1 port configuration in the communication application software.

If DTR is changing properly and the telephone line is not changing from 48 volts to 8 volts, the Line Busy Circuit is probably defective. Contact Cubix Customer Service for assistance.

BC 4035
Appendix A - BIOS POST Codes

As the system BIOS proceeds through its Power On System Test (POST), it displays an incrementing binary coded hexadecimal value using LEDs on the board (refer to the illustrations in Chapter 1 for LED location). If POST detects an error condition and comes to a halt, the LEDs display a value indicating the function currently under test. These codes are listed and defined in Tables A-1 and A-2, and can be used to troubleshoot a malfunctioning board.

An example of how the LED display appears when a POST error occurs is illustrated below. Error code **"A7h"** would appear as follows:

●   ○   **MSB LSB**

■   **On Off On Off Off On On On**

● ○●○○● ● ●

A7h

This display is addressed at I/O Port 80H and can be used after the operating system has booted for other display and debug purposes.

Table A - 1

BIOS POST Codes

Code	LED Display	Description
C2	●●○○○ ○ ● ○	NMI is disabled. Power on delay is starting.
C5	●●○○○●○●	Power on delay is completed. Disabling cache if any.
C6	●●○○○●●○	Calculating the ROM BIOS checksum.
C7	●●○○○●●●	ROM BIOS checksum passed. CMOS shutdown register test is to be performed next.
C8	●●○○●○○○	CMOS shutdown register test is complete. The CMOS checksum calculation to be done next.
CA	●●○○●○●○	CMOS checksum calculation is done, CMOS DIAG byte is written. Next, the CMOS status register is initialized for Date and Time.
CB	●●○○●○●●	CMOS initialization is complete. Any initialization required before the keyboard BAT is performed next.
CD	●●○○●●○●	A BAT command to the keyboard controller is to be issued.
CE	●●○○●●●○	The keyboard BAT result was verified. Any initialization required after the keyboard controller BAT is performed next.
CF	●●○○●●●●	Initialization after the keyboard controller BAT is complete. A keyboard controller command byte code is to be written next.
D1	●●○●○○○●	The keyboard controller command byte has been written. To check the INS key when pressed during power on.
D2	●●○●○○●○	Check of INS key when pressed during power on was done. To disable DMA and Interrupt controllers.
D3	●●○●○○●●	DMA controller #1 and #2 disabled. Interrupt controller #1 and #2 disabled. Chipset initialization and auto memory detection about to begin.

Code	LEDs	Description
D4	● ● ○ ● ○ ● ○ ○	Chipset initialization and auto memory detection are done. To decompress the RUNTIME code.
D5	● ● ○ ● ○ ○ ● ○ ●	The RUNTIME code is decompressed.
DD	● ● ○ ● ● ● ○ ●	Transferring control to decompressed code in shadow RAM at F000:FFF0.
01h	○ ○ ○ ○ ○ ○ ○ ●	Processor register test about to start. NMIs are disabled next.
02h	○ ○ ○ ○ ○ ○ ● ○	NMIs are disabled. The "power on" delay is starting.
03h	○ ○ ○ ○ ○ ○ ● ●	Power on delay has been completed. Initializations required before the keyboard BAT is done are now in progress.
04h	○ ○ ○ ○ ○ ● ○ ○	The initializations required before the keyboard BAT are completed. Reading the keyboard SYS bit to check for soft reset or power-on next.
05h	○ ○ ○ ○ ○ ● ○ ●	The soft reset or power-on setting has been determined. Next, enabling the ROM and disabling shadow RAM and Cache Memory, if any.
06h	○ ○ ○ ○ ○ ● ● ○	ROM is enabled. Calculating the ROM BIOS checksum and waiting for the keyboard controller input buffer to be free.
07h	○ ○ ○ ○ ○ ● ● ●	The ROM BIOS checksum test passed and the keyboard controller input buffer is free. Issuing a BAT command to the keyboard controller next.
08h	○ ○ ○ ○ ● ○ ○ ○	A BAT command has been issued to the keyboard controller. Verifying the BAT command next.
09h	○ ○ ○ ○ ● ○ ○ ●	The keyboard controller BAT result was verified. A keyboard controller command byte is to be written next.
0Ah	○ ○ ○ ○ ● ○ ● ○	A keyboard controller command byte code has been issued. Writing the command byte data next.
0Bh	○ ○ ○ ○ ● ○ ● ●	The keyboard controller command byte has been written. Issuing the Pin 23, 24 blocking and unblocking command next.
0Ch	○ ○ ○ ○ ● ● ○ ○	Pin 23,24 of the keyboard controller has been blocked and unblocked. The keyboard controller NOP command is issued next.
0Dh	○ ○ ○ ○ ● ● ○ ●	The keyboard controller NOP command processing is done. The CMOS RAM shutdown register test is performed next.
0Eh	○ ○ ○ ○ ● ● ● ○	The CMOS RAM shutdown register Read/Write test passed. Calculating the CMOS RAM checksum and updating the DIAG byte next.
0Fh	○ ○ ○ ○ ● ● ● ●	The CMOS RAM checksum calculation is done and the DIAG byte is written. CMOS RAM initialization begins next if CMOS RAM is to be initialized during every boot.
10h	○ ○ ○ ● ○ ○ ○ ○	CMOS RAM initialization (if any) is done. Next, the CMSO RAM status register is initialized for Date and Time.
11h	○ ○ ○ ● ○ ○ ○ ●	The CMOS RAM status register has been initialized. Disabling the DMA and interrupt controllers next.
12h	○ ○ ○ ● ○ ○ ● ○	DMA controllers 1 and 2 and interrupt controllers 1 and 2 are disabled. Disabling the video display and initializing port B next.
13h	○ ○ ○ ● ○ ○ ● ●	The video display is disabled and port B is initialized. Chipset initialization and auto memory detection are about to begin
14h	○ ○ ○ ● ○ ● ○ ○	Chipset initialization and auto memory detection are done. The 8254 Channel 2 timer test is about to start.
15h	○ ○ ○ ● ○ ● ○ ●	The 8254 Channel 2 timer test is half-completed. The entire 8254 Channel 2 timer test is completed next.
16h	○ ○ ○ ● ○ ● ● ○	The entire 8254 Channel 2 timer test is done. The 8254 Channel timer test is done next.
17h	○ ○ ○ ● ○ ● ● ●	The 8254 Channel 1 timer test is done. The 8254 Channel 0 timer test is completed next.
18h	○ ○ ○ ● ● ○ ○ ○	The 8254 Channel 0 timer test is done. About to start memory refresh.
19h	○ ○ ○ ● ● ○ ○ ●	Memory refresh has been started. The memory refresh test is performed next.
1Ah	○ ○ ○ ● ● ○ ● ○	The memory refresh line is toggling. Checking the 15 second ON/OFF time next.
1Bh	○ ○ ○ ● ● ○ ● ●	The memory refresh test has been completed. The base 64 KB memory test is about to start.
20h	○ ○ ● ○ ○ ○ ○ ○	The base 64 KB memory test has been started. The address line test is to be done next.
21h	○ ○ ● ○ ○ ○ ○ ●	The address line test passed. Toggling parity next.
22h	○ ○ ● ○ ○ ○ ● ○	The parity toggle has been completed. Performing a sequential data read/write test next.
23h	○ ○ ● ○ ○ ○ ● ●	The base 64 KB sequential data read/write test passed. Performing any necessary system initialization before interrupt vector initialization.
24h	○ ○ ● ○ ○ ● ○ ○	The system configuration required before vector initialization has been completed. Interrupt vector initialization is about to begin.
25h	○ ○ ● ○ ○ ● ○ ●	Interrupt vector initialization is done. Reading the input port of the 8042 for the turbo switch setting (if any).
26h	○ ○ ● ○ ○ ● ● ○	The input port of the 8042 has been read. Initializing global data for the turbo switch.
27h	○ ○ ● ○ ○ ● ● ●	Global data initialization is done. Initialization after the interrupt vector initialization will be done next.
28h	○ ○ ● ○ ● ○ ○ ○	Initialization after interrupt vector initialization is completed. Setting monochrome mode next.
29h	○ ○ ● ○ ● ○ ○ ●	Monochrome mode is set. Setting color mode next.
2Ah	○ ○ ● ○ ● ○ ● ○	Color mode is set. Toggling parity before the optional Video ROM test next.
2Bh	○ ○ ● ○ ● ○ ● ●	Parity toggle completed. About to do any system initialization required before the video ROM check.
2Ch	○ ○ ● ○ ● ● ○ ○	Initialization before video ROM control is done. Looking for video ROM next. Control passed to video ROM next.
2Dh	○ ○ ● ○ ● ● ○ ●	The video ROM check is done. Next, do processing after the video ROM returns control.
2Eh	○ ○ ● ○ ● ● ● ○	Finished processing after the video ROM had control. If an EGA or VGA adapter is not found, the display memory read/write test is next.
2Fh	○ ○ ● ○ ● ● ● ●	No EGA or VGA adapter has been found. The display memory read/write test is about to begin.
30h	○ ○ ● ● ○ ○ ○ ○	The display memory read/write test passed. About to look for retrace check.

Code	Indicator	Description
31h	○○●●○○○●	The display memory read/write test or retrace check failed. About to perform the alternate display memory read/write test.
32h	○○●●○○●○	The alternate display memory read/write test passed. About to look for alternate display retrace checking.
33h	○○●●○○●●	The video display check is completed. Verification of the display type with switch setting and the actual adapter card is next.
34h	○○●●○●○○	Verification of the display adapter is done. The display mode is set next.
35h	○○●●○●○●	The display mode has been set. The BIOS ROM data area is about to be checked.
36h	○○●●○●●○	The BIOS ROM data area check is completed. Setting the cursor for the Power-On message next.
37h	○○●●○●●●	Cursor setting for the Power-On message is done. Displaying the Power-On message next.
38h	○○●●●○○○	The Power-On message has been displayed. Reading the new cursor position next.
39h	○○●●●○○●	The new cursor position has been read and saved. Displaying the BIOS Identification String next.
3Ah	○○●●●○●○	The BIOS Identification String has been displayed. Displaying the "Hit <DEL>..." message next.
3Bh	○○●●●○●●	The "Hit <DEL> ..." message has been displayed. The virtual mode memory test is about to start.
40h	○●○○○○○○	Preparing the virtual mode test. Verify from display memory next.
41h	○●○○○○○●	Returned to POST after verifying from display memory. Preparing the descriptor tables next.
42h	○●○○○○●○	The descriptor tables have been prepared. Entering virtual mode for the memory test next.
43h	○●○○○○●●	Entered virtual mode. Enabling interrupts for diagnostics mode next.
44h	○●○○○●○○	Interrupts are enabled if the diagnostics switch is on. Initializing data to check the memory wraparound at 0:0h next.
45h	○●○○○●○●	Data has been initialized for the memory wraparound check. Checking for memory wraparound at 0:0h and finding the total system memory size next.
46h	○●○○○●●○	The memory wraparound test has been done. The memory size calculation has been done. About to write memory test patterns.
47h	○●○○○●●●	The memory test patterns were written to extended memory. Writing patterns in conventional memory (first 640 KB) next.
48h	○●○○●○○○	The patterns to be tested were written to conventional memory. Finding the amount of memory below 1 MB next.
49h	○●○○●○○●	The amount of memory below 1 MB was found and verified. Finding the amount of memory above 1 MB next.
4Ah	○●○○●○●○	The amount of memory above 1 MB was found and verified. Performing the BIOS ROM data area check test next.
4Bh	○●○○●○●●	The BIOS ROM data area check is done. Checking the Del key status and clearing the memory below 1 MB for a soft reset next.
4Ch	○●○○●●○○	The memory below 1 MB has been cleared via a soft reset. Clearing the memory above 1 MB next.
4Dh	○●○○●●○●	The memory above 1 MB has been cleared via a soft reset. Clearing the memory size next.
4Eh	○●○○●●●○	The memory test has started. No soft reset was performed. About to display the first 64 KB memory test.
4Fh	○●○○●●●●	The memory size display has started. This display is updated during the memory test. Running the sequential and random memory test.
50h	○●○●○○○○	The test of memory below 1 MB completed. Adjusting the memory size for relocation and shadowing next.
51h	○●○●○○○●	The memory size has been adjusted for memory relocation above 1 MB and shadowing options. The test of memory above 1 MB is next.
52h	○●○●○○●○	The test of memory above 1 MB has completed. Preparing for real mode next.
53h	○●○●○○●●	The CPU registers have been saved, including the memory size. Entering real mode next.
54h	○●○●○●○○	Shutdown was successful and the CPU is in real mode. Restoring the registers saved during preparation for shutdown next.
55h	○●○●○●○●	The registers have been restored. Disabling the Gate A20 address line next.
56h	○●○●○●●○	The Gate A20 address line was disabled successfully. Checking the BIOS ROM data area next.
57h	○●○●○●●●	The BIOS ROM data area check is partially completed. Completing the BIOS ROM data area check next.
58h	○●○●●○○○	The BIOS ROM data area check has completed. Clearing the "Hit Del" message next.
59h	○●○●●○○●	The "Hit Del" message has been cleared. About to start the DMA and interrupt controller tests.
60h	○●●○○○○○	The DMA page register test passed. About to verify from display memory.
61h	○●●○○○○●	The display memory verification test is done. About to perform the DMA Controller 1 base register test.
62h	○●●○○○●○	The DMA Controller 1 base register test passed. Performing the DMA Controller 2 base register test next.
63h	○●●○○○●●	The DMA Controller 2 base register test passed. Performing the BIOS ROM data area check next.
64h	○●●○○●○○	The BIOS ROM data area check is partially done. The BIOS ROM data area check is completed next.
65h	○●●○○●○●	The BIOS ROM data area check is done. Programming the DMA Controllers 1 and 2 next.
66h	○●●○○●●○	DMA Controller 1 and 2 programming was completed. Initializing the 8259 interrupt controller next.
67h	○●●○○●●●	The 8259 initialization is done. Starting the keyboard test next.
80h	●○○○○○○○	The keyboard test has started. Issuing the keyboard reset command next and clearing the output buffer.

Code	LEDs	Description
81h	● ○ ○ ○ ○ ○ ○ ●	The keyboard reset command completed successfully. Next, checking the stuck keys and issuing the interface test command if there was an error.
82h	● ○ ○ ○ ○ ○ ● ○	The keyboard controller interface test is done. About to write a command byte and initialize the circular buffer.
83h	○ ○ ● ● ○ ○ ● ●	The command byte has been written and the global data initialization is done. About to check for locked keys.
84h	○ ● ○ ○ ○ ● ○ ○	Lock key checking is done. About to check for a memory size mismatch with CMOS RAM data.
85h	○ ● ○ ● ● ○ ● ○	The memory size check has been completed. About to display a soft error and check for password or bypass Setup.
86h	○ ● ● ○ ○ ● ● ○	The password has been checked. About to do programming before Setup.
87h	○ ● ● ● ○ ● ● ●	The programming before Setup has been completed. Calling the BIOS Setup program next.
88h	● ○ ○ ○ ● ○ ○ ○	Returned from the BIOS Setup program and cleared the screen. Programming after Setup.
89h	● ○ ○ ○ ● ○ ○ ●	The programming after Setup is completed. Displaying the Power-On screen message next.
8Ah	● ○ ○ ○ ● ○ ● ○	The first screen message has been displayed. About to display the "wait…" message.
8Bh	● ○ ○ ○ ● ○ ● ●	The "wait…" message has been displayed. About to perform system and video BIOS shadowing.
8Ch	● ○ ○ ○ ● ● ○ ○	System and video BIOS shadowing was successful. About to perform Setup options programming after Standard CMOS Setup.
8Dh	● ○ ○ ○ ● ● ○ ●	The Setup options are programmed. The mouse check and initialization is done next.
8Eh	● ○ ○ ○ ● ● ● ○	The mouse check and initialization is done. Checking the floppy disk next.
8Fh	● ○ ○ ○ ● ● ● ●	The floppy disk check indicated that the floppy drive needs to be initialized. Floppy drive configuration is next.
90h	● ○ ○ ● ○ ○ ○ ○	Floppy drive configuration has completed. Hard disk configuration is next.
91h	● ○ ○ ● ○ ○ ○ ●	The hard disk presence test has completed. Hard disk configuration is next.
92h	● ○ ○ ● ○ ○ ● ○	Hard disk configuration has completed. Checking the BIOS ROM data area next.
93h	● ○ ○ ● ○ ○ ● ●	The BIOS ROM data area check was partially completed. The entire BIOS ROM data area check is completed next.
94h	● ○ ○ ● ○ ● ○ ○	The BIOS ROM data area check has fully completed. Setting the base and extended memory sizes next.
95h	● ○ ○ ● ○ ● ○ ●	The memory size has been adjusted because of mouse support and hard disk type 47. Verifying from display memory next.
96h	● ○ ○ ● ○ ● ● ○	Returned after verifying from display memory. Initializing before C8000h adapter ROM control next.
97h	● ○ ○ ● ○ ● ● ●	Any initialization that had to be done before control is passed to the adapter ROM at C8000h option has been completed. The adapter ROM check and control test is next. Relinquishing control to adapter ROM at C8000h.
98h	● ○ ○ ● ● ○ ○ ○	The adapter ROM control test has been done. About to do required processing after the adapter ROM returns control.
99h	● ○ ○ ● ● ○ ○ ●	Any initialization for the option ROM test was done. Configuring the timer data area and the parallel printer base address next.
9Ah	● ○ ○ ● ● ○ ● ○	Set the timer data area and the parallel printer base address. Setting the RS-232 base address next.
9Bh	● ○ ○ ● ● ○ ● ●	Set the RS-232 base address. Initializing before the coprocessor test next.
9Ch	● ○ ○ ● ● ● ○ ○	The required initialization before the coprocessor test has been done. Initializing the coprocessor next.
9Dh	● ○ ○ ● ● ● ○ ●	The coprocessor has been initialized. Performing any initialization after the coprocessor test next.
9Eh	● ○ ○ ● ● ● ● ○	Initialization after the coprocessor test is completed. Checking the Extended Keyboard, Keyboard ID and Num Lock keyboard settings next.
9Fh	● ○ ○ ● ● ● ● ●	The Extended Keyboard flags have been checked, the Keyboard ID flag set, and Num Lock is set On or Off as specified. The Keyboard ID command is issued next.
A0h	● ○ ● ○ ○ ○ ○ ○	The Keyboard ID command has been issued. The Keyboard ID flag reset is next.
A1h	● ○ ● ○ ○ ○ ○ ●	The Keyboard ID flag reset has been done. The cache memory tests follow.
A2h	● ○ ● ○ ○ ○ ● ○	The cache memory test has been done. Displaying any soft errors next.
A3h	● ○ ● ○ ○ ○ ● ●	Soft error display is complete. Setting the keyboard typematic rate next.
A4h	● ○ ● ○ ○ ● ○ ○	The keyboard typematic rate is set. Programming the memory wait states next.
A5h	● ○ ● ○ ○ ● ○ ●	Memory wait states programming is done. The screen is cleared next.
A6h	● ○ ● ○ ○ ● ● ○	The screen has been cleared. Enabling parity and NMIs next.
A7h	● ○ ● ○ ○ ● ● ●	NMIs and parity have been enabled. Performing any initialization required before passing control to the adapter ROM at E0000h next.
A8h	● ○ ● ○ ● ○ ○ ○	Initialization before E0000h adapter ROM control has been done. The E000h adapter ROM gets control next.
A9h	● ○ ● ○ ● ○ ○ ●	Returned from E0000h adapter ROM control. Performing any initialization required after E0000h adapter ROM control next.
AAh	● ○ ● ○ ● ○ ● ○	Initialization after E0000h adapter ROM control has been done. Displaying the system configuration next.
B1	● ● ○ ● ○ ○ ○ ●	To copy any code to a specific area.
B0	● ● ○ ● ○ ○ ○ ○	The system configuration is displayed.
00h	○ ○ ○ ○ ○ ○ ○ ○	The system configuration has been displayed. Passing control to INT 19h Bootstrap Loader next.

BC 4035
Appendix B - Novell ODI Driver Installation

The BC uses AMD's ODI Pcnet family of drivers for the Novell environment. Cubix has included the latest version of these drivers on the *BC Series 10 Base-T Driver Diskette.* The latest updates for these drivers are available on the Cubix BBS (refer to the rear of this manual for BBS information)

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the NetWare DOS, OS/2, 3.x and 4.x drivers, insert the driver diskette into the system, change to that drive and type:

- **novell-d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation.

NetWare DOS ODI Client Driver

NetWare PCnet DOS ODI driver is located in the NOVELL\WKSTN\DOSODI subdirectory on the driver diskette. This driver can be loaded directly from the DOS command line or from a batch file (such as AUTOEXEC.BAT). The example below is for a NETX configuration using default settings.

1. Copy the following files from the *BC Series 10 Base-T Driver Diskette* to the root or subdirectory:

```
LSL.COM
PCNTNW.COM
IPXODI.COM
NETX.EXE
NET.CFG
```

2. Load these files in the following order:

```
LSL
PCNTNW.COM
IPXODI
NETX
```

NET.CFG for BC 4035 Board

The following illustrates the proper format for the NET.CFG file:

- # NET.CFG File for the Cubix BC 4035

    #

Link Driver PCNTNW

PORT 300

DMA 5

INT 5

Frame Ethernet_802.3

Protocol IPX 0 Ethernet_802.3

- If this information is not provided in the NET.CFG file, the PCNTNW driver will default to IRQ 3 and frame type 802.2. Make sure all lines following "Link Driver PCNTNW" are indented. If these lines are not indented, the PCNTNW driver will ignore the commands.

To change parameters such as IRQ, frame type, etc., edit the NET.CFG file. When editing the NET.CFG file, be aware that either IRQ 3 or 5 are supported. The DMA channel is fixed at 5 and the I/0 port address is fixed at 300H.

NetWare OS/2 ODI Client Driver

The NetWare OS/2 ODI driver is located in the NOVELL\WKSTN\OS20DI subdirectory of the driver diskette. This driver should be loaded from the OS/2 CONFIG.SYS file. For more information on installing and configuring the OS/2 ODI driver, please refer to the *NetWare Requester for OS12 Installation* documentation.

Example Configuration:

1. Copy the OS/2 ODI driver PCNTNW.OS2 from the *BC Series 10 Base-T Driver Diskette* to the C:\NETWARE directory of the boot drive.

2. Edit the CONFIG.SYS file to load the driver as follows: DEVICE=C:\NETWARE\PCNTNW.OS2

3. Following is an example CONFIG.SYS load sequence for the OS/2 ODI driver configured for the IPX protocol stack.

```
REM --- NetWare Requestor Statements Begin ---

DEVICE = C:\NETWARE\LSL.SYS
RUN = C:\NETWARE\DDAEMON.EXE
DEVICE = C:\NETWARE\PCNTNW.OS2
DEVICE = C:\NETWARE\IPX.SYS
DEVICE = C:\NETWARE\NWREQ.SYS
IFS = DEVICE = C:\NETWARE\NWIFS.IFS
RUN = DEVICE = C:\NETWARE\NWDAEMON. EXE

REM --- NetWare Requestor Statements End ---
```

To change parameters such as IRQ, frame type, etc., edit the NET.CFG file.

Both IRQ 3 and 5 are supported. The DMA channel is fixed at 5 and the I/0 port address is fixed at 300H.

NetWare ODI Server Driver

The NetWare v3.11, v3.12, and v4.x server drivers are located under the \NOVELL\SERVER\3.1 X and \NOVELL\SERVER\4.X subdirectories. The NetWare server drivers for the BC are loaded and configured using the LOAD and BIND statements from the server's console. Please refer to the NetWare installation documentation for further information on loading and configuring network card drivers.

Example for IPX driver under NetWare 3.11

1. Copy the files from \NOVELL\SERVER\3.IX directory on the driver diskette to the \SYSTEM directory on the file server.

PCNTNW.LAN v3.1x/v4.x Server Driver

MSM31X.NLM Media Support Module for 3.1x

PATCHMAN.NLM Patch file called by LSLENH

ETHERTSM.NLM Ethernet TSM for v3.1x

LSLENH.NLM Enhanced LSL for v3.11

MONITOR.NLM new Monitor program required for v3.11

****IMPORTANT****

2. *In NetWare 3.11 installations only*, LSLENH.NLM must be loaded before any other LAN driver is loaded. (LSLENH is not used with NetWare v3.12 or v4.x.)

3. Load and bind the PCNTNW driver to IPX. Following is an example sequence for the file server's AUTOEXEC.NCF file.

LOAD LSLENH (autoloads PATCHMAN.NLM)

LOAD MSM31 X

LOAD PCNTNW

Frame = Ethernet 802.3 (autoloads ETHERTSM.NLM)

BIND IPX to PCNTNW net= 25

- Be sure to replace the MONITOR.NLM which was shipped with v3.1 1 with the newer version included.

- For BC 4035 processor, the LOAD PCNTNW command line should specify the Base I/0 Port Address, DMA Channel, and Interrupt level as well as the Frame type. For example:

  LOAD PCNTNW IOP=300 DRQ=5 IRQ=5

  Frame = Ethernet 802.3

- Do not use **PORT, DMA,** and **INT** keywords. Use **IOP, DRQ,** and **IRQ** instead.

PORT must remain set to 300H and DMA must be 5. The IRQ may be 3 or 5.

Diskless Boot ROM

The Diskless Boot ROM is enabled in the AMI BIOS Setup program in the Advanced Chipset Options. When it is enabled, the BC will execute Novell's RPL code during system boot to allow the BC to be configured for diskless boot. The Diskless Boot ROM is mapped into the 32KByte section of system memory at C8000-CBFFF. Please refer to Novell's installation documentation for details on how to configure a workstation for diskless boot.

To enable the diskless boot option, set the "**ON BOARD LAN BIOS BOOT**" to "enabled". The C and D drives must be configured as "Not Installed" in the **Standard CMOS Setup** section.

When the Diskless Boot ROM is enabled the port address, DMA channel, IRQ, and Boot ROM Memory address are fixed at the following locations.

    I/0 Address =300

    DMA Channel = 5

    IRQ = 5

    Memory Address = C8000-CBFFF

The following configuration changes are required:

1. Change the NET.CFG file from Ethernet - 802.3 to Ethernet-802.2. This requires modifying the Frame and Protocol lines as follows:

    Frame Ethernet 802.2

    Protocol IPX EO Ethernet 802.2

NOTE: The Protocol ID must be changed from 0 (for 802.3) to EO (for 802.2).

2. Add the following lines to the file server's AUTOEXEC.NCF file:

    LOAD PCNTNW IOP=300 DRQ=5 IRQ=5

    FRAME=ETHERNET_802.2

    BIND IPX TO PCNTNW [FRAME= ETHERNET-802.21 NET= 26

    LOAD RPL

    BIND RPL TO PCNTNW [FRAME= ETHERNET-802.21

3. Copy the RBOOT.RPL file to the SYS:LOGIN directory of the file server.

BC 4035
Appendix C - NDIS 2.0.1 Driver Installation

Microsoft LAN Manager Driver

The BC can be used as a LAN Manager server, workstation, enhanced workstation for MS-DOS, or basic workstation for MS-DOS. The system hardware and software requirements as well as the installation procedure for the LAN Manager software are contained in the *Microsoft LAN Manager Installation Guide* provided with the LAN Manager software.

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the LAN Manager DOS, OS/2 drivers, insert the driver diskette into the system, change to that drive and type:

- **msianman -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation.

The directory structure on the driver diskette supports the Microsoft Setup utility, which will always look in the NIF directory for the NDIS drivers network information files. Additional directories that are created to store the drivers should be consistent with the install directory structure.

Installation

1. Insert the *BC Series 10 Base-T Driver Diskette* into the system.

2. From the LAN Manager Subdirectory on the hard disk, run SETUP to begin installation.

3. Use the ALT key and highlighted letter to pull down the Configuration Menu (ALT + C).

4. From the Network Adapter dialog box, select the AMD PCnet Family driver from the menu, if shown. Otherwise, select Other Driver to import the PCnet driver from the driver diskette.

5. Enter the drive letter for the driv er diskette. No path is required.

6. Select the desired protocol from the Network Protocol dialog box and choose OK.

7. Select the PCnet Family Ethernet Adapter from the Workstation Configuration dialog box and choose OK.

8. Complete the installation process as detailed in the instructions.

As an example, CONFIG.SYS, AUTOEXEC.BAT, and PROTOCOL.INI will look like the following

CONFIG.SYS:

DEVICE=C:\LANMAN.DOS\DRIVERS\PROTMAN\PROTMAN.DOS /i:C:\LANMAN.DOS

DEVICE=C:\LANMAN.DOS\DRIVERS\ETHERNE-RPCNET\PCNTNW.DOS

AUTOEXEC.BAT:

SET PATH= C:\LANMAN.DOS\NETPROG;%PATH%

NET START WORKSTATION

LOAD NETBUI

NET LOGON bill.gates

PROTOCOL.INI:

[PROTMAN]

- DRIVERNAME= PROTMAN$

    DYNAMIC=YES

    PRIORITY=NETBEUI

[NETBEUI - XIF]

- DRIVERNAME = NETBEUI$

    SESSIONS= 6

    NCBS=12

    BINDINGS="PCNTND-NIF"

    LANABASE=0

[PCNTND-NIF]

;---;

; AMD PCnet Ethernet Adapter ;

;---;

- DRIVERNAME = PCNTND$

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The PROTOCOL.INI file on the BC 4035 will include these statements following the DRIVERNAME specification:

- IO ADDRESS= OxO3OO

    INTERRUPT= 5

    DMA CHANNEL= 5

Windows for Workgroups 3.1 Driver

The PCnet NDIS driver supports the Windows for Workgroups 3.1 environment. The installation for the NDIS 2.0.1 driver is menu driven through the Windows interface.

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the WFW 3.1 drivers, insert the driver diskette into the system, change to that drive and type:

- **wfw3I -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation.

The directory structure provided on the driver diskette has been setup for automatic installation. Follow the guidelines in the *Microsoft Windows for Workgroups User's Guide* for more details to install the PCnet Family driver from the driver diskettes.

To install the PCnet Family NDIS 2.0.1 driver, follow the instructions given below:

1. Insert the *BC Series 10 Base-T Driver Diskette* in the system's floppy drive.

2. From the Main group in Windows, choose the Control Panel icon.

3. In the Network Settings dialog box, choose the Adapters button. The Network Adapters dialog box should appear.

4. Choose the Add button to install the PCnet driver from the driver diskette.

5. In the list of network adapters, select the Unlisted or Updated Network Adapter option.

6. Enter the drive letter the WFW31 path to load the PCnet Family NDIS driver. For example, A:\WFW31.

7. Select the AMD PCnet Family Driver and choose OK.

8. A setup dialog box appears displaying the default settings. The default settings will show IRQ=3 and DMA=5. Use the Advanced button option for additional settings. The BC will support interrupts 3 or 5. The IRQ setting must match the switch setting on the board.

9. In the Network Adapters dialog box, choose the Close button. Then choose the OK button in the Network Settings dialog box.

10. Follow the remaining instructions to restart the computer and load the driver.

An example follows:

PROTOCOL.INI:

[PCNTND-NIF]

;--;

; AMD PCnet Ethernet Adapter ;

;--;

- DRIVERNAME = PCNTND$

BC 4035

The PROTOCOL.INI file on the BC 4035 will include these statements following the DRIVERNAME specification:

- IO ADDRESS OxO3OO

    INTERRUPT= 3 (Match setting on board)

    DMA CHANNEL= 5

Windows for Workgroups 3.11 Driver

Please refer to the *Installing the Windows for Workgroups 3.11 Driver* in *Appendix D - NDIS 3.0 Driver Installation.* The procedure to load NDIS 2.0.1 is exactly the same as for NDIS 3.0. In fact, Windows for Workgroups 3.11 will automatically load NDIS 2.0.1, NDIS 3.0, or both drivers together.

Banyan VINES Client Driver

The PCnet driver may be configured to run in the Banyan VINES environment for client based systems only.

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the Banyan VINES client driver, insert the driver diskette into the system, change to that drive and type:

- **msianman -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation.

The steps to load the driver are as follows:

1. Copy all the files necessary (see Table C-1) for VINES from the VINES master diskettes to a working directory (for example, C:\VINES).

2. Copy the PCnet driver (PCNTND.DOS) from the MSLANMAN.DOS\DRIVERS\ETHERNE-RPCNET directory on the *BC Series 10 Base-T Driver Diskette* to the same working directory as the VINES files (e.g. C:\VINES).

3. Create PROTOCOL.INI, CONFIG.SYS, and AUTOEXEC.BAT (examples are included later in this section).

- a. Modify the PROTOCOL.INI to reflect the changes necessary for the appropriate LAN card section.

    b. Modify the AUTOEXEC.BAT and CONFIG.SYS to reflect changes in the DIRECTORY where the files are to be placed.

4. Run the VINES PCCONFIG to configure the NDIS Ethernet Driver.

5. Reboot the machine and run AUTOEXEC.BAT.

6. Run BAN.

Table C - 1

Files Required for VINES

File Name	Ext	Size	Date	Time
BAN	EXE	32835	02-12-92	6:07p
BAN	MSB	2058	02-12-92	6:07p
REDIR	MSB	982	02-12-92	6:07p
NEWREV	EXE	47933	02-12-92	6:07p
NEWREV	MSB	5139	02-12-92	6:07p
PCCONFIG	DB	19656	02-12-92	6:07p
REDIRALL	EXE	51546	02-12-92	6:07p
PCCONFIG	EXE	61155	02-12-92	6:07p
PCCONFIG	MSB	5785	02-12-92	6:07p
NDISBAN	COM	35356	02-12-92	6:07p
NETBIND	EXE	15639	02-12-92	6:07p
NDISBAN	DOC	3072	02-12-92	6:07p
NDISBAN	OVL	15639	02-12-92	6:07p
PROTMAN	DOS	10649	02-12-92	6:07p

User must create:

PROTOCOL.INI

CONFIG.SYS

AUTOEXEC.BAT

Sample modifications to CONFIG.SYS, AUTOEXEC.BAT, and PROTOCOL.INI are shown:

CONFIG.SYS

FILES=20

BUFFERS = 20

DEVICE=C:\VINES\PROTMAN.DOS /I:C\VINES

DEVICE=C:\VINES\PCNTND.DOS

AUTOEXEC.BAT

PATH = C:\DOS

PROMPT PG

C:

CD\VINES

BAN

PROTOCOL.INI

[PROTOCOL.INI]

- ○ DRIVERNAME = PROTMAN$

PROTOCOL.INI section for the AMD PCnet Controller

[PCNTND-NIF]

- ○ DRIVERNAME = PCNTND$

[VINES XIF]

- ○ DRIVERNAME = NDISBAN.DOS$

  BINDINGS = PCNTND-NIF

BC 4035

The PROTOCOL.INI file on the BC 4035 will include these statements following the DRIVERNAME specification:

- ○ IO ADDRESS 0x0300

  INTERRUPT= 5

  DMA CHANNEL= 5

IBM LAN Server Driver

The PCnet driver may also be configured to run under the IBM LAN Server environment.

The files on the *BC Series 10-Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the LAN Server driver, insert the driver diskette into the system, change to that drive and type:

- **lansrvr -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation. Please see the README.TXT file in the LANSRVR directory of the driver diskette for information about the installation.

The directory structure provided on the driver diskette has been setup for automatic installation. Follow the guidelines in the *IBM LAN Adapter and Protocol Support Configuration Guide* for more details to install the PCnet Family driver from the driver diskette.

To install the PCnet (PCNTND) NDIS driver for IBM LAN Server, complete the following steps:

1. Insert the *BC Series 10 Base-T Driver Diskette* into the floppy drive.

2. In IBM LAN Server, **select** or run the LAPS (LAN Adapter and Protocol Support) program. Please refer to the *IBM LAN Adapter and Protocol Support Configuration Guide* to access this utility and for more details on adapter and device driver installation.

3. From the IBM LAPS dialog box, choose the INSTALL button to install a PCnet Network adapter for the IBM LAN Server environment. If the Pcnet Adapter has already been installed, skip to step 6.

4. Specify the drive and path to copy the appropriate files from the driver diskette

- **A:\LANSRVR**

5. After successfully installing or copying the appropriate NIF files from the disk, the IBM LAPS dialog box will appear again

6. Now from the IBM LAPS diaog box, select the Configure option to complete the installation of the NDIS driver for the PCnet Adapter.

7. In the Configuration dialog box, choose the "Configure LAN transports" (default) option and select Continue.

8. When the Configure Workstation dialog box is displayed, remove the current configurations from the Current Configuration list box.

9. Choose the AMD PCnet Family Ethernet Adapter from the Network Adapters list box by highlighting the entry. Then choose Add to add the AMD PCnet Adapter card to the Current Configuration list box.

10. Highlight the appropriate protocols in the Protocols list box. Then choose Add to add them to the Current Configuration list box.

BC 4035

Continue running LAPS. Choose the AMD PCnet Adapter at the Current Configuration list box. Then choose Edit. The parameters for the AMD adapter are displayed.

View the default configuration. If the default configuration is appropriate, choose OK. Otherwise, change the options in the dialog box. Choose Range to display the available settings for each option. Press [FI] for help.

Make all modifications necessary to match the switch settings on the BC 4035. The AMD driver installation on the IBM LAN Server is complete.

IBM Extended Services

To install the driver for IBM Extended Services 1.0, follow these steps:

1. Insert the *BC Series 10 Base-T Driver Diskette* into the floppy drive.

2. Display the Communication Manager main menu and choose Advanced.

3. Choose Configuration.

4. Choose LAN Adapter and Protocol Support (LAPS).

5. At the Options dialog box, choose Copy Additional Network Adapter Drivers. Then choose OK.

6. At the Copy Additional Network Adapter Drivers dialog box, type the path (a:). Then choose OK.

7. When the Copy Diskette dialog box is displayed, choose OK.

8. When the Options dialog box is displayed, choose Configure Workstation. Then choose OK.

9. When the Configure Workstation dialog box is displayed, remove the current configurations from the Current Configuration list box.

10. Choose the AMD PCnet Family Ethernet Adapter from the Network Adapters list box by highlighting the entry. Then choose Add to add the AMD adapter to Current Configuration list box.

11. Highlight the appropriate protocols in the Protocols list box. Then choose Add to add them to the Current Configuration list box.

BC 4035

Continue running LAPS. Choose the AMD PCnet Adapter at the Current Configuration list box. Then choose Edit. The parameters for the AMD adapter are displayed.

View the default configuration. If the default configuration is appropriate, choose OK. Otherwise, change the options in the dialog box. Choose Range to display the available settings for each option. Press [FI] for help.

Make all modifications necessary to match the switch settings on the BC 4035. The AMD driver installation for IBM Extended Services vI.O is complete.

NDIS 2.0.1 for PC-NFS

The PCnet Family NDIS 2.0.1 driver (PCNTND.DOS) may be installed for the PC-NFS environment.

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the PC-NFS driver, insert the driver diskette into the system, change to that drive and type:

- **pcnfs -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation. The directory structure provided on the *BC Series 10 Base-T Driver Diskette* has been setup for automatic installation. Follow the guidelines in the *Sun Microsystems PC-NFS Manuals* for more details on installing the PCnet Family driver from the driver diskette.

To install the PCnet Family NDIS 2.0.1 driver, follow the instructions given below:

1. Insert the PC-NFS QUIKNDIS disk into the system's floppy drive. Change the drive letter containing the QUIKNDIS disk.

2. Type QUIKNDIS at the prompt and press Enter.

3. A message will appear asking for the current boot drive. Enter the current boot drive and press Enter.

4. In the next dialog box, press "Y" to save the current PROTOCOL.INI as PROTOCOL.OLD. Ignore this step if this dialog box does not appear.

5. In the adapter card list box, select the Custom option to install the Pcnet NDIS driver for PC-NFS.

6. If necessary, remove the QUIKNDIS disk from the floppy drive. Insert the *BC Series 10 Base-T Driver Diskette* into a floppy drive.

7. Follow the dialog boxes and enter the correct drive and path on the driver diskette to install the NDIS driver. For example, type:

A:\PCNFS

8. Next, enter the PCNTND for the NIF file name and press Enter.

9. Installation of the PCnet Family NDIS 2.0.1 driver for PC-NFS is now complete.

BC 4035
Appendix D -NDIS 3.0 Driver Installation

Windows NT Driver

The *BC Series 10 Base-T Driver Diskette* includes the NDIS 3.0 driver for the Windows NT environment.

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the Windows NT driver, insert the driver diskette into the system, change to that drive and type:

- **winnt -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation.

The directory structure provided on the driver diskette has been set up for automatic installation. Follow the guidelines in the *Microsoft Windows NT User's Guide* for more details to install the PCnet Family driver from the driver diskette.

To install the PCnet NDIS 3.0 driver, simply follow the instructions given below to navigate through the menu driven functions in Windows NT.

1. Insert the *BC Series 10 Base-T Driver Diskette* into the system's floppy drive.

2. From the Control Panel in the Windows NT Main window, double click on the Network icon to install the Pcnet adapter.

3. In the Network Settings dialog box, choose Add Adapter.

4. In the Add Network Adapter dialog box, pull the adapter card list menu and select:

<Other> Requires disk from manufacturer

5. In the next window, specify the drive and path for the AMD files. The Windows NT files for AMD reside in the WINNT subdirectory. For example, enter:

A:\WINNT

6. Select the AMD PCnet Family Ethernet Adapter from the dialog box to install the AMD PCnet Adapter.

7. While in the AMD PCnet Family Ethernet Adapter Setup dialog box, select the bus type **All** (defaults to **All** if nothing is selected). The BC 4035 must use DMA channel 5. IRQ 3 or 5 may be used; however, the value must match the switch settings on the BC.

8. Close the Setup dialog box and exit from the Add Network Adapter dialog box to complete the installation. Follow any remaining instructions from Windows NT to reboot the system.

For additional guidelines, please refer to the *Microsoft Windows NT documentation.* In addition, the user may review README.TXT file in the WINNT directory of the driver diskette.

Windows for Workgroups 3.11 Driver

Microsoft's Windows for Workgroups 3.11 supports both NDIS 2.0.1 and NDIS 3.0 drivers. Both NDIS drivers are provided to run under the Windows for Workgroups 3.11 environment. Please note the format and procedure to install the NDIS drivers for Windows for Workgroups 3.11 is different from that of Windows for Workgroups 3.1.

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the NDIS 3.0 driver for WFW, insert the driver diskette into the system, change to that drive and type:

- **wfw311 -d**

If the NDIS 2.0.1 driver will also be installed, type:

- **wfw31 -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation. The directory structure provided on the *BC Series 10 Base-T Driver Diskette* has been setup for automatic installation. Follow the guidelines in the *Microsoft Windows for Workgroups 3. 11 User's Guide* for more details to install the PCnet Family driver from the driver diskette.

To install the PCnet NDIS 2.0.1 and/or NDIS 3.0 drivers, simply follow the instructions given below:

1. Insert the *BC Series 10 Base-T Driver Diskette* into the system's floppy drive.

2. In the Windows for Workgroups 3.1 1 Program Manager, double click on the Windows Setup icon from the MAIN window.

3. While in the Windows Setup dialog box, select the Change Network Settings from the Options menu to install PCnet drivers from the driver diskette.

4. From the Network Setup dialog box, select the Add Adapter button to install the PCnet device drivers.

5. In the Network Drivers dialog box, select the Add Adapter button to install the Pcnet device drivers.

6. In the Add Network Adapter window, choose Unlisted or Updated Network Adapter from the menu and select OK.

7. The Install Driver dialog box will appear. Specify the floppy drive containing the driver diskette and specify the WFW311 path to install the PCnet drivers. For example:

A:\WFW311

Then Select OK.

8. The Advanced Micro Devices PCnet Family selection will appear under the Network Adapters list. Simply select OK to continue.

9. The user will be asked a series of questions for the correct Interrupt channel, DMA channel, Twisted Pair keyword option, and the four LED keyword options. If the driver is being installed on an ISA BC processor, set the DMA channel to 5 and the IRQ channel to 3 or 5 (IRQ must correspond to the switch settings on the BC). If the driver is being installed on an EISA BC processor, the DMA channel and IRQ do not need to be specified, as they are software configurable. The Twisted Pair keyword option should be set to TP. LED2 and LED3 are not available on the BC. LEDO and LED1 may be set to any of the following hex values to indicate the function of the LED:

00h - Indicates collision activity on the network

02h - Indicates PCnet is jabbering on the network

04h - Indicates promiscuous receive activity for this station

08h - Indicates the current receive polarity condition

10h - Indicates the transmit activity for this station

20h - Indicates the receive activity for this station

40h - Indicates the current Link Status

30h - Indicates the transmit and receive activity for this station

34h - Indicates the transmit and promiscuous receive activity for this station

10. Select OK to exit. Windows for Workgroups 3.11 will ask the user to reboot the machine once installation is completed.

CUBIX

BC 4035
Appendix E - LANtastic Driver Installation

LANtastic Driver Installation Versions 4.x and 5.x

The PCNTLC.EXE AL-LANBIOS driver allows operation of the BC as a node in an Artisoft LANtastic network. This driver is located in the ARTISFT\4.x and ARTISFT\5.x directories of the device driver diskette. A PCNTLC driver is provided for ARTISOFT's LANtastic/AI Network Operating System Version 4.x and Version 5.x. In addition to the PCNTLC driver, the AILANBIO.EXE (included in the LANtastic/AI software package) is required to provide high-level communications across the LAN. Therefore, no network software can be run until after the PCNTLC.EXE and AILANBIO.EXE files are loaded. For details about the AILANBIO.EXE program, please refer to the LANtastic manuals.

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the Artisoft LANtastic driver, insert the driver diskette into the system, change to that drive and type:

- **artisft -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation.

Installation

1. Copy the NETBIOS driver, PCNTLC.EXE, to the directory. Make sure that AILANBIO.EXE is also resident. The command line for installing the driver is as follows:

- **PCNTLC.EXE**

    AILANBIO.EXE

The default values are invoked if none are entered on the command line. These defaults set the adapter number to 0 and the DOS multiplex number (MPX) to C7 hexadecimal. The interrupt level defaults to 3, the DMA Channel defaults to 5, and the I/0 port address defaults to 300H.

The MPX switch specifies the DOS multiplex number to use for communication with AILANBIO.EXE. Change this value only if the default MPX number is in use by another application or NETBIOS. Multiplex numbers 00 through BF are reserved for DOS use; therefore, use a multiplex number between C0 and FF

2. Using command line switches, different values may be assigned for the driver. Shown below is an example:

- **PCNTLC.EXE/MPX=D7/IRQ=5**

    AILANBIO.EXE/MPX=D7/ADAPTER= 1

The command line switches instruct the NETBIOS to load as Adapter Number 1 using DOS MPX number D7. The interrupt level is specified as 5.

3. If the driver is installed successfully, the PCNTLC.EXE driver will produce message below:

- **PCNTLC AL-LANBIOS Compatible Driver installed**

4. Other switch commands that are available:

- § **@switch-file** specifies that further switches are to be taken from a switch file. Any switches after the @switch-file name will be used, and the switch settings take precedence over any settings in the switch file. Switch files may be invoked from within switch files. The file should contain valid switches and may contain comment characters (type ";" at the beginning of each line or after switches). For example:

  PCNTLC @SETUP

  - ○ The file SETUP

    PCNTLC AL-LANBIOS driver setup file

    ;

    VERBOSE ;Display verbose information

  § **HELP** instructs PCNTLC.EXE to display information about the valid command line switches. For example: (PCNTLC/Help).

  § **VERBOSE** causes the PCNTLC.EXE driver to be installed and detailed information about the configuration of the PCNTLC.EXE driver to be displayed. See the messages section of the LANtastic manual for a detailed description of the VERBOSE output.

  § **REMOVE** command removes the PCNTLC.EXE driver from memory. Remove TSR programs in the opposite order in which they were loaded. For example, if PCNTLC.EXE is loaded followed by AILANBIO, remove AILANBIO before PCNTLC.EXE.

For more details regarding switches and PCNTLC.EXE messages, refer to the PCNTLC.DOC document and LANtastic manuals.

BC 4035

The BC 4035 supports interrupt channels 3 and 5. The interrupt is set using a hardware switch on the board. The I/0 port is fixed at 300H, and the DMA channel is fixed at 5.

LANtastic Driver Installation Version 6.x

The files provided on the *BC Series 10 Base-T Driver Diskette* are compressed into the form of self extracting ZIP files. Before installation of any drivers the appropriate ZIP file must be decompressed. To decompress the Artisoft LANtastic drivers, insert the driver diskette into the system, change to that drive and type

- **artisft -d**

The decompressed drivers will be placed on the same diskette, at which point the diskette is ready for installation:

Installation

1. Start the installation of LANtastic 6.x according to the LANtastic documentation.

5. Proceed through the installation, selecting "KEEP all previous LANtastic setup information" and adding any additional LANtastic features.

6. Select "NDIS Support for Network Adapters

7. Insert the *BC Series 10 Base-T Driver Diskette* into the floppy drive.

8. Select the **artisft\6.x\pcntnd dos** driver.

9. Complete the LANtastic 6.x installation.

On startup the following information will be displayed:

AMD PCNet Family Ethernet Adapter

NDIS v2.0.1 MAC Driver, version x.xx

Driver name

Driver configuration information such as IO Address, Interrupt, and DMA

BC 4035
Appendix F - Packet Driver Installation

The AMD Packet Driver for the PCnet family of adapters is based on the packet driver from Clarkson University. The Driver Diskette contains the source and executable code for the DOS version of the Packet Driver. The Driver Diskette includes a number of other utilities which run above the Packet Driver. The source code for these utilities is also included. The Driver Diskette contains a number of documentation files. Read all of the information available. The most important file to read is "install.txt".

The files on the *BC Series 10 Base-T Driver Diskette* are compressed in the form of self extracting ZIP files. Before installation of any drivers, the appropriate ZIP file must be decompressed. To decompress the Pocket Driver, insert the driver diskette into the system, change to that drive and type:

- **pktdrvr -d**

The decompressed drivers will be placed on the same diskette. After the files are decompressed, the diskette is ready for installation.

Copy the AMD Packet Driver (PCNTPK.COM) into a directory. The packet driver can be loaded from the DOS prompt or from the AUTOEXEC.BAT file. The command line format for Packet Driver is:

- PCNTPK [-n] [-d] [-w] <INT = packet_int_no> [IRQ=int-no]

    [IOADDR = io-addr] [DMA = dma-no]

[-n]

The -n option converts Ethernet type 8137 and Novell PSO-like packets. This is required if a standard boot ROM from AMD is used to boot from an image file, and the driver in the image file was created using the Packet Driver and IPX included in the Packet Driver package.

[-d]

The -d option delays initialization. The -d option will keep the initialization code after loading. This is required for the PROM boot available on ISA processors to function properly.

[-w]

The -w switch is used for Windows. Install the Packet Driver before running MS-Windows. This switch does not prevent Windows from swapping the network application out of memory. It simply detects when the network application is swapped out and drops any packet the application receives.

< packet_int_no >

This is the software interrupt used to communicate with the packet driver. The range of this parameter is between Ox6O and Ox8O. See Appendix A of "install.doc" file for more details.

[int-no]

This is the hardware interrupt number. For the BC 4035 this can be 3 or 5. The default value is IRQ 5.

[io-addr]

This is the I/0 Base Address. For the BC 4035, this parameter is fixed at 300H.

[dma_no]

This is the DMA Channel number. For the BC 4035, this parameter is fixed at 5.