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18. APPENDIX A: NET.CFG Options For Novell NetWare

For each workstation driver you configure, select a custom set of supported values from the PCnet configuration options. If a driver configuration is different from the default settings, or if you are using multiple protocols, you should create a NET.CFG file.

The NET.CFG file is a configuration file containing section headings and options that deviate from the established defaults of the ODI software. See the OS documentation specific to your protocol for additional NET.CFG information.

Use any DOS text editor to create the file. Specify only options that will change from the defaults.

18.1 Conventions

- Main section headings must be left-justified and are not case sensitive.
- The heading must precede the options you want to include in that section.
- Options are not case sensitive and must be preceded by a tab or hard spaces.
- Precede comments with a semicolon (“;”) and end each line with a hard return.
- Write all numbers in decimal notation except where noted otherwise.

18.2 Options

The chart below lists the driver options defined by the DOS ODI software. The options available for the PCnet driver (PCNTNW and IPX) protocol stack are shown in a sample NET.CFG file. Protocol stacks other than IPX may have additional options not listed here. Refer to that protocol's documentation for more information.

In this chart, the main NET.CFG section headings are shaded and flush with the left margin. NET.CFG options are listed under each heading and indented. The list of options shown in the chart below is not exhaustive. See the *Software Keywords* section of this manual for more information on which keywords may be used in the NET.CFG file.

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Link Driver <i>drivername</i>
DMA [#1 #2] channel_number INT [#1 #2] interrupt_request_number MEM [#1 #2] hex_starting_address [hex_length] PORT[#1 #2] hex_starting_address [hex_number_of_ports] NODE ADDRESS hex_address SLOT number FRAME frame_type PROTOCOL name hex_protocol_IDframe_type SAPS number LINK STATIONS number ALTERNATE MAX FRAME SIZE number CONNECTOR DIX
Link Support
BUFFERS communication_number [size] MEMPOOL number[k]
Protocol <i>protocol name</i>
BIND #board_number

Note: Where *drivername* above can be PCNTNW or PCLAPP (LAPP driver only).

The PCnet driver (PCNTNW) has the following NET.CFG options available for ISA buses:

- DMA (3,5,6,7)
- INT (3,4,5,9)
- PORT (300H,320H,340H,360H)
- NODE ADDRESS
- FRAME
- PROTOCOL (IPX)
- FASTISA mode increases the performance of PCnet-ISA, PCnet-ISA+, and PCnet-ISA II in ISA machines by reducing the memory read and write cycle time from 450 ns to 350 ns. Older machines with slower memory may not support this mode.

For the PCnet-ISA+, PCnet-32, PCnet-PCI and PCnet-FAST devices, the DMA, INT, and PORT are not required for the driver. In some cases, using these keywords would be a violation of the bus specification. Otherwise, all other keywords may be used with the PCnet Family. Keywords listed in the *Software Keywords* section may also be used in the NET.CFG.

Sample #1: NET.CFG For PCnet-ISA Adapter Card Only

```
LINK DRIVER PCNTNW
;Change the DMA channel (DMA) to 7.
DMA 7
;Change the part (Base I/O address) to 340 hex.
PORT 340
;Change the interrupt (IRQ) TO 5.
INT 5
;Fast mode for ISA
FASTISA
```

Note: Comment lines are preceded by a semi-colon (“;”) before each option line to indicate the option change.

Sample #2: NET.CFG For PCnet-ISA Adapter Card Only (When Loading VLM.EXE)

```
LINK DRIVER PCNTNW
;Change the part (Base I/O address) to 300 hex.
PORT 300
;Change the DMA channel (DMA) to 5.
DMA 5
;Change the interrupt (IRQ) TO 3.
INT 5
FRAME Ethernet_802.2
PROTOCOL IPX EO ETHERNET_802.2

NetWare DOS Requester
FIRST NETWORK DRIVE = F
```

Note: Comment lines are preceded by a semi-colon (“;”) before each option line to indicate the option change.

Sample #3: NET.CFG For PCnet Family Adapter Cards

For PCnet-ISA Adapter Cards

```
LINK DRIVER PCNTNW
;Specify bus type for PCnet-ISA adapter card.
;No PORT keyword required if BUSTYPE is used
BUSTYPE ISA
;Change the DMA channel (DMA) to 5.
DMA 5
;Change the interrupt (IRQ) TO 3.
INT 5
;Fast Mode for ISA bus, may be used with PCnet-ISA+
FASTISA
;To change FRAME type to Ethernet_II
FRAME Ethernet_II
PROTOCOL IPX 8137 ETHERNET_II

NetWare DOS Requester
FIRST NETWORK DRIVE = F
```

For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI Adapter Cards

```
LINK DRIVER PCNTNW
;Specify bus type for PCnet-PCI adapter.
;Use PNP for PCnet-ISA+, VESA for PCnet-32 in VL
BUSTYPE PCI
;To change FRAME type to Ethernet_II
FRAME Ethernet_II
PROTOCOL IPX 8137 ETHERNET_II

NetWare DOS Requester
FIRST NETWORK DRIVE = F
```

For PCnet-FAST Adapter Cards

```
Link support buffers 8 1514

Link Driver PCNTNW
; To choose FRAME type
FRAME Ethernet_802.2
FRAME Ethernet_802.3
FRAME Ethernet_II
FRAME Ethernet_SNAP

; The default of keyword LineSpeed is Auto Negotiation
LineSpeed 10f

NetWare DOS Requester
FIRST NETWORK DRIVE = F
NETWARE PROTOCOL = NDS BIND
```

Note: Comment lines are preceded by a semi-colon (“;”) before each option line to indicate the option change.

19. APPENDIX B: Software Keywords (For All Drivers)

This section describes software keywords that may be needed while configuring PCnet adapter cards. There are two sections of keywords discussed below: common keywords and AMD driver specific keywords. Also, a table is provided to show the valid combinations of keywords with the various PCnet adapter cards.

19.1 Common Keywords

Common keywords may be used by any of the operating systems to configure a PCnet adapter card.

19.1.1 PORT

The I/O base address keyword may be used to specify the I/O address of the PCnet adapter card. There are different formats for I/O address settings in each Network Operating System environment. Refer to the appropriate driver installation section (*Operating System/Driver Keywords*) for correct format and usage.

For all of the PCnet adapter cards, the I/O base address does not need to be specified for driver configuration. Software will scan for this information for any bus type (ISA, VL, PCI). See the table below.

19.1.2 INT

An interrupt channel keyword may be set when loading drivers for the PCnet adapter cards. Each Network Operating System environment has different formats and syntax for interrupt settings. Refer to the appropriate driver installation section (*Operating System/Driver Keywords*) for correct format and usage. See the table below.

For PCnet-ISA cards, the interrupt channel should be specified to match the jumper setting on the adapter card. If no interrupt setting is specified, the driver will use the default setting of "3" for the IRQ channel.

For PCnet-ISA+, PCnet-ISA II, and PCnet-PCI boards, the interrupt keyword should not be used. Software will determine the interrupt channel. For PCnet-ISA+ and PCnet-ISA II, the driver will use the interrupt channel set by the Plug and Play

(PnP) ISA Configuration Manager for PnP mode or by the on-board EEPROM when PnP is disabled. For PCnet-32 adapter cards (VL-based), the driver will use the interrupt channel provided by the on-board EEPROM (which may be changed using the PCnet AMINSTAL Utility). For PCnet-PCI (PCI-based) adapter cards, the driver will use the interrupt set by the PCI system BIOS.

19.1.3 DMA

The DMA keyword may be used when loading drivers. There are different formats and syntax for DMA keywords. Refer to the appropriate driver installation section (*Operating System/Driver Keywords*) for correct format and usage. See the Table 7 below for Common Keywords and Table 8 following for Valid Keyword Combinations.

For PCnet-ISA adapter cards, the DMA keyword should be used to match the jumper setting on the adapter card. If no DMA keyword is specified, the default setting of "5" will be used for the DMA channel.

For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI adapter cards, the DMA keyword should not be used. Software will determine the DMA channel. For PCnet-ISA+, software will use the DMA channel set by the PnP ISA Configuration Manager for PnP mode or by the on-board EEPROM when PnP is disabled. For PCnet-32 adapter cards (VL-based) and PCnet-PCI adapter cards (PCI-based) adapter cards, software will use the DMA channel provided by the bus.

19.1.4 Full Duplex

The full duplex keyword may only be used with the PCnet-ISA II adapter card. This keyword enables (UTP or AUI) or disable (OFF) full duplex support on the 10BaseT and AUI ports. See Tables 7 and 8 below.

Table 7. Common Keywords

Keyword Name	PCnet Adapter Card	Range	Default
PORT	PCnet-ISA	300h, 320h, 340h, 360h (jumper selectable)	Driver will scan for I/O address
	PCnet-ISA+ PCnet-ISA II	200h-3FFh (per 20h offset)	Found by scan. Determined by PnP Configuration Mgr. or by on-board EEPROM when PnP is disabled
	PCnet-32	200h-3FFh (per 20h offset)	Found by scan. Determined by on-board EEPROM
	PCnet-PCI	0000-FFFFh	Found by scan. Determined by PCI system BIOS.
INT	PCnet-ISA	3, 4, 5, 9 (jumper selectable)	3
	PCnet-ISA+ PCnet-ISA II	3 (IRQ3), 4 (IRQ4), 5 (IRQ5), 9 (IRQ9), 10 (IRQ10), 11 (IRQ11), 12 (IRQ12), 15 (IRQ15)	Found by scan. Determined by PnP Configuration Mgr. or by on-board EEPROM when PnP is disabled
	PCnet-32	IRQ (0 -15)	Found by scan. Determined by the on-board EEPROM. IRQ read from I/O offset 08h
	PCnet-PCI	0-15 (INTA#)	Found by scan. Determined by the PCI system BIOS
DMA	PCnet-ISA	3, 5, 6, 7 (jumper selectable)	5

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Keyword Name	PCnet Adapter Card	Range	Default
	PCnet-32	N/A	N/A
	PCnet-PCI	N/A	N/A
FDUP	PCnet-ISA	UTP AUI OFF	N/A
	PCnet-ISA+ PCnet-ISA II	UTP AUI OFF	N/A
	PCnet-32	UTP AUI OFF	N/A
	PCnet-PCI	UTP AUI OFF	N/A

Table 8. Valid Keyword Combinations

Keyword	PCnet-ISA	PCnet-ISA+	PCnet-ISA II	PCnet-32	PCnet-PCI
INT	X	X	X	X	
DMA	X	X	X		
PORT	X	X	X	X	
BUSTYPE	X	X	X	X	X
DMAROTATE	X	X	X		
TP	X	X	X	X	X
LED[0-3]	X	X	X	X	X
FDUP			X		

Note: If PORT is specified, then the BUSTYPE keyword will not function. If no PORT or BUSTYPE is specified, the software will automatically scan all buses until a PCnet adapter card is found. Once the PCnet adapter card is found, the driver will load.

19.2 AMD Driver Specific Keywords

19.2.1 DMAROTATE

This keyword applies to the PCnet-ISA, PCnet-ISA+, and PCnet-ISA II adapter cards only. When present, this keyword will force the system 8237 controller into rotating priority mode. The default mode for the 8237 controller is fixed priority.

19.2.2 BUSTYPE = bus

This keyword applies to all of the PCnet adapter cards. If this keyword is specified with one of the above mentioned options, the driver software will only scan the specified bus for the presence of the PCnet adapter card. If this keyword is not specified the software will scan all the buses.

Valid values for “bus” include: PCI, PCI1, PCI2, PNP, ISA, and VESA.

19.2.3 TP

This keyword applies to all of the PCnet adapter cards. When present, this keyword will force the PCnet adapter card into using the 10BASE-T port. The PCnet controller will use the 10BASE-T port even if no link beat pulse is generated from the 10BASE-T hub. If not set, auto port detection will be used.

19.2.4 LED0 = XXXX

This keyword applies to all of the PCnet adapter cards except for PCnet-ISA+ and PCnet-ISA II. When present, this keyword should have a hexadecimal value which indicates the function of LED0. The software reads the hex value of the keyword and programs the LED0 register (BCR4) with the value specified. The user should be careful about what hex value is specified because the hex value is programmed directly into the device register.

“xxxx” is a hex value for the BCR4 register. Some of the valid values are listed below:

- 0001h Indicates collision activity on the network
- 0002h Indicates PCnet is jabbering on the network
- 0004h Indicates promiscuous receive activity on the network
- 0008h Indicates the current receive polarity condition
- 0010h Indicates the transmit activity
- 0020h Indicates receive activity for this station
- 0040h Indicates the current link status
- 0030h Indicates the transmit and receive activity for this station
- 0034h Indicates the transmit and promiscuous receive activity

19.2.5 LED1 = XXXX

“xxxx” is a hex value for the BCR5 register. Same description as LED0.

19.2.6 LED2 = XXXX

“xxxx” is a hex value for the BCR6 register. Same description as LED0.

Note: LED2 is not available for the PCnet-PCI device.

19.2.7 LED3 = XXXX

“xxxx” is a hex value for the BCR7 register. Same description as LED0.

See Table 9 for AMD Driver Specific Keywords.

Table 9. AMD Driver Specific Keywords

Keyword Description	Keyword Name	Range	Default
DMA Rotate	DMAROTATE	Present or Not Present	Not Present (Fixed Priority)
Bus Type to Scan	BUSTYPE BUS_TO_SCAN	PCI PCI1 PCI2 PNP ISA VESA Not Present (All) * PCI1 is used for mechanism 1 and PCI2 is for mechanism 2.	Not Present (represents All buses)
Twisted Pair	TP * TP is void if FDUP=AUI	Present or Not Present	Not Present (Auto Detect)
LED0 Function	LED0 * LED0 not available for PCnet-ISA+ or PCnet-ISA-II	00 - FFh For sample values: see LED0 description on previous page.	See appropriate PCnet Ethernet Controller Hardware User's Manual
LED1 Function	LED1	00 - FFh For sample values: see LED1 description on previous page.	See appropriate PCnet Ethernet Controller Hardware User's Manual
LED2 Function	LED2 * LED2 not available for PCnet-PCI	00 - FFh For sample values: see LED2 description on previous page.	See appropriate PCnet Ethernet Controller Hardware User's Manual
LED3 Function	LED3	00 - FFh For sample values: see LED3 description on previous page.	See appropriate PCnet Ethernet Controller Hardware User's Manual
Full Duplex	FDUP	UTP AUI OFF	OFF

Note: All drivers support the above keywords; however, please refer to the Table of Valid Keyword Combinations for valid combinations with each PCnet adapter cards.

20. APPENDIX C: Driver Error Messages

20.1 Novell DOS ODI Driver Error Messages

Message PCNTNW-DOS-1: The LSL is not loaded.

Meaning The Link Support Module program (LSL.COM) is not loaded.

Action Load the LSL.COM before loading the driver.

Message PCNTNW-DOS-2: The LSL has no more room for a board using Frame <string>

Meaning The maximum number of boards, whether virtual or physical, has been registered with the Link support layer. The DOS ODI LSL can support up to eight boards.

Action Reduce the number of active boards in the systems by unloading a board or by decreasing the number of frame types activated by MLID.

Message PCNTNW-DOS-3: Could not find PCNTNW MLID to unload

Meaning A request was made to unload PCNTNW MLID, but the MLID is not loaded.

Action None

Message PCNTNW-DOS-4: A TSR is loaded above the PCNTNW MLID.

Meaning You tried to unload the PCNTNW MLID from memory, but the PCNTNW MLID detected another Terminate-and Stay-Resident program loaded above the MLID. For the PCNTNW MLID to safely unload, TSRs that were loaded after it must be unloaded first.

Action Either load the other TSR before loading the PCNTNW MLID or unload the TSR before trying this operation.

Message PCNTNW-DOS-5: PCNTNW MLID could not be unloaded; the operation was aborted.

Meaning The PCNTNW MLID was attempting to remove the resident PCNTNW MLID from memory. The PCNTNW MLID was unable to successfully shut down the resident PCNTNW MLID. A hardware failure has probably occurred.

Action Check the hardware. If the hardware is faulty, replace it.

Message PCNTNW-DOS-6: The adapter did not initialize. PCNTNW did not load.

Meaning The hardware did not initialize correctly. The PCNTNW did not load.

Action Check the hardware. Make sure that the hardware setting of the board matches the card's settings in the NET.CFG file.

Message PCNTNW-DOS-7: You need another PCNTNW MLID Section Heading in the NET.CFG file in order to load the MLID again.

Meaning You tried to load the PCNTNW MLID a second time. Normally, you would do this so that you could use two or more boards in the workstation. When two or more of the same type of network boards are installed in the workstation, an associated PCNTNW MLID section heading must be specified in the NET.CFG file.

Action Create a NET.CFG file and add the commands for both PCNTNW MLID boards to the file. Then reboot the workstation.

Message PCNTNW-DOS-8: A NET.CFG is required to load the MLID again.

Meaning You tried to load the PCNTNW MLID a second time. Normally, you would do this so that you could use two or more boards in the workstation. When two or more of the same type of network boards are installed in the workstation, an associated PCNTNW MLID section heading must be specified in the NET.CFG file.

Action Create a NET.CFG file and add the commands for both PCNTNW MLID boards to the file. Then reboot the workstation.

Message PCNTNW-DOS-9: The NET.CFG entry has been ignored.

Meaning The PCNTNW ignored the NET.CFG entry.

Action You may want to modify the NET.CFG file to delete or change the entry in question.

Message The PCNTNW MLID has been successfully removed.

Meaning A request was made to unload an PCNTNW MLID, and the PCNTNW MLID was removed from memory.

Action None

Message PCNTNW-DOS-11: The MLID does not support frame <string>. The protocol keyword has been ignored.

Meaning The "PROTOCOL" option was specified in the NET.CFG for an PCNTNW MLID. The specified frame type is not supported by the PCNTNW MLID.

Action Check the "PROTOCOL" line in the NET.CFG file for possible omissions of required dashes and underscores or any misspellings. Check the board documentation for supported frame types.

Message PCNTNW-DOS-12: The protocol keyword must have a frame type. Entry ignored.

Meaning The "PROTOCOL" option was specified in the NET.CFG for an PCNTNW MLID. The entry failed to specify the associated frame type for the protocol ID addition. AN entry in the NET.CFG file for the "PROTOCOL" option should look similar to the following:

```
LINK DRIVER PCNTNW
PROTOCOL IPX 8137 ETHERNET_II
```

Action Specify a frame with the "PROTOCOL" option.

Message PCNTNW-DOS-13: The MLID could not register Protocol ID <string> for protocol stack <string> for frame type.

Meaning The PCNTNW MLID could not register the specified Protocol ID.

Action Verify the protocol information in the NET.CFG file.

Message PCNTNW-DOS-14: This version of LSL is not supported.

Meaning The PCNTNW MLID cannot run correctly using this version of the LSL.

Action Update your LSL.COM to a newer version.

Message PCNTNW-DOS-15: The frame type is already activated for frame <string>. The NET.CFG entry has been ignored.

Meaning Two "Frame" keywords under the same main section heading specified the same frame type. A specified frame type may be specified only once per driver.

Action Remove the duplicate "Frame" keyword entry.

Message PCNTNW-DOS-16: The node address was incorrectly specified in NET.CFG.

Meaning You used the "NODE ADDRESS" option in the NET.CFG file to override the node address on the network board. The number specified was not a valid Ethernet node address. An Ethernet address is six bytes in length. This error occurs if Bit 0 of the first address byte is a 1. This bit must always be 0. For example, if the first byte has the following address, an invalid Ethernet address is generated.

FIRST BYTE							
7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	1

This byte will produce node addresses in the 0100 0000 0000 to 01FF FFFF FFFF range, all of which will be invalid.

Action Change the NET.CFG file so that a valid node address is specified.

Message PCNTNW-DOS-79: LAPP Driver can NOT run on the PCnetISA Card.

Meaning The LAPP driver is intended for use with the PCnet-ISA+ adapter card.

Action Run the LAPP driver only if you have a PCnet-ISA+ adapter card installed.

Message PCNTNW-DOS-17: An invalid keyword was specified in NET.CFG on line xx.

Meaning The keyword specified in NET.CFG file is incorrect.

Action Check the keyword in question. Make sure that the keyword is correctly spelled.

Message PCNTNW-DOS-18: The frame type specified in NET.CFG is not supported.

Meaning The "PROTOCOL" option was specified in the NET.CFG for an PCNTNW MLID. The specified frame type is not supported by the PCNTNW MLID.

Action Check the "PROTOCOL" line in the NET.CFG file for possible omissions of required dashes and underscores or any misspellings. Check the PCNTNW MLID documentation for supported frame types.

Message PCNTNW-DOS-19: An invalid Ethernet node address is specified in NET.CFG. The MLID modified the incorrect address bits.

Meaning The NET.CFG has an invalid node address. The PCNTNW MLID modified and corrected the address.

Action You may want to correct the node address line in the NET.CFG file.

Message PCNTNW-DOS-50: The board cannot be found.

Meaning The board is either not physically present or not configured correctly.

Action Make sure that the board is physically present in the system. Also check the hardware setting of the board (I/O, IRQ, DMA) against the NET.CFG settings. If this message still appears, replace the board.

Message PCNTNW-DOS-54: The board did not respond to the initialization command.

Meaning The board initialization failed.

Action Replace the board.

Message PCNTNW-DOS-58: The board did not respond to the initialization command.

Meaning The DMA and IRQ settings may be incorrect with the hardware settings. Otherwise, the EEPROM may be corrupted.

Action Verify the DMA & IRQ settings in NET.CFG match the hardware jumper settings or verify that the EEPROM on-board is programmed correctly.

Message PCNTNW-DOS-59: Buffers could not be locked.

Meaning An attempt was made to lock buffers for direct access. The attempt failed.

Action Check the memory manager documentation and make sure that it supports a memory manager VDS (Virtual DMA Server). If in doubt, either use another memory manager or do not use it.

Message PCNTNW-DOS-60: PnP device DMA number mismatch.

Meaning The DMA number specified in NET.CFG mismatches with the DMA number assigned by the PnP Configuration Manager or by the on-board EEPROM if PnP is disabled.

Action Remove the DMA number in NET.CFG.

Message PCNTNW-DOS-61: PCI device IRQ number mismatch.

Meaning The IRQ number specified in NET.CFG mismatches with the IRQ number assigned by the PCI BIOS.

Action Remove the IRQ number in NET.CFG.

Message PCNTNW-DOS-63: PnP device IRQ number mismatch.

Meaning The IRQ number specified in NET.CFG mismatches with the IRQ number assigned by the PnP Configuration Manager or by the on-board EEPROM if PnP is disabled.

Action Remove the IRQ number in NET.CFG.

Message PCNTNW-DOS-64: Device not found.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident the PCnet board.

Message PCNTNW-DOS-65: Device not found at IOADDRESS.

Meaning The PCnet device cannot be found at the IO Address specified in NET.CFG.

Action Verify that the IO Address in NET.CFG matches with the board. Otherwise, remove the PORT keyword from NET.CFG.

Message PCNTNW-DOS-66: PCI scan can only execute on a 386 and higher processor.

Meaning The PCI bus is not available on your system. The PCI bus is only supported on a 386 or higher processor.

Action Do not specify PCI for BUSTYPE with your current system setup.

Message PCNTNW-DOS-67: PCI scan specified, device not found.

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Verify that the PCI board is physically installed properly. Use the BUSTYPE keyword to specify PCI1 or PCI2 values if the PCI mechanism is known for your system. Otherwise, replace the PCI board.

Message PCNTNW-DOS-68: VESA scan specified, device not found.

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Verify that the VL board is physically installed properly. Otherwise, replace the VL board.

Message PCNTNW-DOS-69: PnP scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Verify that the ISA board is physically installed properly. Otherwise, replace the PCnet-ISA+ board.

Message PCNTNW-DOS-70: ISA scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Verify that the ISA board is physically installed properly. Otherwise, replace the PCnet-ISA board.

Message PCNTNW-DOS-71: ISA DMA number out of range.

Meaning The PCnet-ISA board only supports four DMA channels.

Action Specify a valid DMA number in NET.CFG to match the jumper setting on the PCnet-ISA board. Refer to the Software Keyword section of this manual for the available range of values.

Message PCNTNW-DOS-73: PCI BIOS not present.

Meaning The PCI system does not have PCI BIOS support. The driver will try to scan the bus to find AMD's PCI driver.

Action None.

Message PCNTNW-DOS-74: VESA scan can only execute on a 386 or higher processor.

Meaning The VESA bus is not available on your system. The VESA bus is only supported on a 386 or higher processor.

Action Do not specify VESA for BUSTYPE with your current system setup.

Message PCNTNW-DOS-75: Unsupported bus ID specified.

Meaning The bus ID number specified in NET.CFG is not supported by Novell.

Action Correct the bus ID number in the NET.CFG.

Message PCNTNW-DOS-76: Wrong bus ID specified.

Meaning The bus ID number specified in NET.CFG is different from the bus type found in the system.

Action Correct the bus ID number in the NET.CFG.

Message PCNTNW-DOS-77: Driver does not support slave mode.

Meaning The hardware is configured as a slave board.

Action Change to a bus master board.

Message PCNTNW-DOS-79: LAPP Driver can NOT run on the PCnetISA Card.

Meaning The LAPP driver is not intended for use with the PCnet-ISA adapter card.

Action Run the LAPP driver only if you have any PCnet adapter card except PCnet-ISA installed.

Message PCNTNW-DOS-80: DMA number is not necessary for PCI device.

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove DMA from NET.CFG.

Message PCNTNW-DOS-81: DMA number is not necessary for VESA device.

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove DMA from NET.CFG.

20.2 Custom DOS ODI Driver Counters

- **Babbling Transmitter**

This counter indicates that the transmitter has been transmitting longer than the time required to send the maximum size frame. This counter is incremented if 1,519 bytes or greater are transmitted.
- **Fatal Rx Int**

This counter is incremented if the driver receives a frame > 1,518 bytes. Ethernet networks should not contain frames > 1,518 bytes.
- **PCnet Reset**

This counter is incremented when the board goes through a reset.
- **Max Collision**

This counter is incremented when there is a collision on the Ethernet Network.
- **Memory Error**

This counter is incremented when the board does not get bus master resource in the system.
- **Missed Packet**

This counter is incremented when the board misses an incoming packet from the network due to low resources.
- **Rx Frame Error**

This counter is incremented when the board receives a frame with CRC error.
- **Tx Late Collision**

This counter is incremented when a late collision (after 51.2 micro seconds) occurs on the Ethernet network.
- **Tx Retry**

This counter is incremented when the board transmitter fails to transmit a frame after attempting to transmit for 16 times due to repeated collisions.
- **Tx Time Out**

This counter is incremented when the transmitter in the board could not transmit a packet, within an allowed time, on the network due to very heavy traffic conditions.
- **TX Buffer Error**

This counter is incremented when the controller does not find the ENP flag in the next buffer and does not own the next buffer.

- **TX Underflow Error**

This counter is incremented when the transmitter has truncated a message due to data late from memory.

- **Rx Buffer Error**

This counter is incremented when the controller does not own the buffer while data chaining a received frame.

20.3 Novell OS/2 ODI Driver Error Messages

Message PCNTNW-OS2-1: The LSL is not loaded.

Meaning The Link Support Module program (LSL.SYS) is not loaded.

Action Load the LSL.SYS before loading the driver.

Message PCNTNW-OS2-21: Could not add MLID Protocol ID.

Meaning The PCNTNW MLID could not register the specified Protocol ID.

Action Verify the protocol information in the NET.CFG file.

Message PCNTNW-OS2-22: Could not allocate memory. Virtual board did not load.

Meaning The driver could not allocate memory for the virtual board.

Action Check the system configuration.

Message PCNTNW-OS2-54: The board did not respond to the initialization command.

Meaning The board initialization failed.

Action Replace the board.

Message PCNTNW-OS2-56: This interrupt is already used and cannot be shared.

Meaning This interrupt is already used and cannot be shared.

Action Change the IRQ in NET.CFG. For PCnet-ISA, verify the jumper setting matches with IRQ in NET.CFG.

Message PCNTNW-OS2-58: The board did not respond to the initialization command.

Meaning The DMA and IRQ settings may be incorrect with the hardware settings. Otherwise, the EEPROM may be corrupted.

Action Verify the DMA & IRQ settings in NET.CFG match the hardware jumper settings or verify that the EEPROM on-board is programmed correctly.

Message PCNTNW-OS2-59: Buffers could not be locked.

Meaning An attempt was made to lock buffers for direct access. The attempt failed.

Action Check the memory manager documentation and make sure that it supports a memory manager VDS (Virtual DMA Server). If in doubt, either use another memory manager or do not use it.

Message PCNTNW-OS2-60: PnP device DMA number mismatch.

Meaning The DMA number specified in NET.CFG mismatches with the DMA number assigned by the PnP Configuration Manager or by the on-board EEPROM if PnP is disabled.

Action Remove the DMA number in NET.CFG file.

Message PCNTNW-OS2-61: PCI device IRQ number mismatch.

Meaning The IRQ number specified in NET.CFG mismatches with the IRQ number assigned by the PCI BIOS.

Action Remove the IRQ number in NET.CFG file.

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Message PCNTNW-OS2-63: PnP device IRQ number mismatch.

Meaning The IRQ number specified in NET.CFG mismatches with the IRQ number assigned by the PnP Configuration Manager or by the on-board EEPROM if PnP is disabled.

Action Remove the IRQ number in NET.CFG file.

Message PCNTNW-OS2-64: Device not found.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident the PCnet board.

Message PCNTNW-OS2-65: Device not found at IOADDRESS.

Meaning The PCnet device cannot be found at the IO Address specified in NET.CFG.

Action Verify that the IO Address in NET.CFG matches with the board. Otherwise, remove the PORT keyword from NET.CFG.

Message PCNTNW-OS2-66: PCI scan can only execute on a 386 and higher processor.

Meaning The PCI bus is not available on your system. The PCI bus is only supported on a 386 or higher processor.

Action Do not specify PCI for BUSTYPE with your current system setup.

Message PCNTNW-OS2-67: PCI scan specified, device not found.

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Verify that the PCI board is physically installed properly. Use the BUSTYPE keyword to specify PCI1 or PCI2 values if the PCI mechanism is known for your system. Otherwise, replace the PCI board.

Message PCNTNW-OS2-68: VESA scan specified, device not found.

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Verify that the VL board is physically installed properly. Otherwise, replace the VL board.

Message PCNTNW-OS2-69: PnP scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Verify that the ISA board is physically installed properly. Otherwise, replace the PCnet-ISA+ board.

Message PCNTNW-OS2-70: ISA scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Verify that the ISA board is physically installed properly. Otherwise, replace the PCnet-ISA board.

Message PCNTNW-OS2-71: ISA DMA number out of range.

Meaning The PCnet-ISA board only supports four DMA channels.

Action Specify a valid DMA number in NET.CFG to match the jumper setting on the PCnet-ISA board. Please refer to the Software Keyword section of this manual for the available range of values.

Message PCNTNW-OS2-73: Unable to allocate memory.

Meaning The driver could not allocate memory for the virtual board.

Action Check the system configuration.

Message PCNTNW-OS2-74: VESA scan can only execute on a 386 and higher processor.

Meaning The VESA bus is not available on your system. The VESA bus is only supported on a 386 or higher processor.

Action Do not specify VESA for BUSTYPE with your current system setup.

Message PCNTNW-OS2-80: DMA number is not necessary for PCI device.

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove DMA from NET.CFG file.

Message PCNTNW-OS2-81: DMA number is not necessary for VESA device.

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove DMA from NET.CFG file.

20.4 Novell Server ODI Driver Error Messages

Message PCNTNW-NW-054: The board did not respond to the initialization command.

Meaning The board did not respond when the software tried to initialize it.

Action Make sure that the board is physically present in the system. Check the I/O address and other settings and make sure that these jumper values match the software driver settings.

Message PCNTNW-NW-58: The board did not respond to the initialization command.

Meaning The DMA and IRQ settings may be incorrect with the hardware settings. Otherwise, the EEPROM may be corrupted.

Action Verify the DMA and IRQ settings in NET.CFG match the hardware jumper settings, or verify that the EEPROM on-board is programmed correctly.

Message PCNTNW-NW-59: Buffers could not be locked.

Meaning An attempt was made to lock buffers for direct access. The attempt failed.

Action Check the memory manager documentation and make sure that it supports a memory manager VDS (Virtual DMA Server). If in doubt, either use another memory manager or do not use it.

Message PCNTNW-NW-66: The cable might be disconnected on the board.

Meaning The BNC cable may not be connected to the BNC connector on the board.

Action Connect the BNC cable to the board.

Message PCNTNW-NW-071: The matching virtual adapter could not be found.

Meaning You tried to load another instance of the driver with a different I/O address. This new board could not be found.

Action Make sure that the board is physically present. Also check the I/O settings of the board with the settings supplied to the driver.

Message PCNTNW-NW-072: A resource tag is unavailable.

Meaning The driver tried to allocate some resources. These resources were unavailable.

Action Try to add and/or free some memory in the system. Reboot and restart the system.

Message PCNTNW-NW-073: Unable to allocate memory.

Meaning The driver failed to allocate the memory needed for normal operation.

Action Add more memory in the system or else free some memory resources in the system and reboot the machine.

Message PCNTNW-NW-074: The hardware interrupt cannot be set.

Meaning An attempt was made to initialize a given hardware interrupt. The attempt was not successful.

Action Check the hardware system. Make sure the board jumpers are set to correct interrupt numbers. Also make sure that no other device is using this interrupt in the system.

Message	PCNTNW-NW-075: The MLID cannot be registered with the LSL.
Meaning	An error occurred while the driver was trying to register with Link Support Layer.
Action	Check the version of Netware Operating System. Make sure that this driver is for the version of Netware you are running. Restart the complete system.

Message	PCNTNW-NW-076: The polling procedure cannot be added.
Meaning	An error occurred while the driver was adding polling procedure to the Netware Operating System. polling routines.
Action	Check the version of Netware Operating System. Make sure that this driver is for the version of Netware you are running. Restart the complete system.

Message	PCNTNW-NW-077: The event notification cannot be registered.
Meaning	The driver failed to register its event notification routines with the Netware operating system.
Action	Check the version of Netware Operating System. Make sure that this driver is for the version of Netware you are running. Restart the complete system.

Message	PCNTNW-NW-078: The firmware file cannot be read.
Meaning	The driver tried to read a firmware file. The read process failed.
Action	Make sure that the support files accompanying the driver are present. Reboot and restart the complete system.

Message PCNTNW-NW-079: The MLID did not initialize MSMTx Free Count.

Meaning The MSMTx Free Count is not initialized correctly.

Action Restart the system. If error is still present report it to the Card Manufacturers.

Message PCNTNW-NW-084: Unable to allocate memory below the 16 megabyte boundary.

Meaning A request was made to allocate memory below 16 megabyte. The request failed to complete successfully.

Action Free some memory below 16 megabyte or add some more memory below 16 megabyte boundary.

Message PCNTNW-NW-086: The driver parameter block is too small.

Meaning The driver parameter block is too small.

Action Restart the system. If the error is still present, report it to the Card Manufacturer.

Message PCNTNW-NW-087: The media parameter block is too small.

Meaning The driver media parameter block is too small.

Action Restart the system. If error is still present, report it to the Card Manufacturer.

Message PCNTNW-NW-091: The hardware configuration conflicts.

Meaning You tried to load a new frame type for the existing adapter. The hardware assumption made in doing so are incorrect.

Action Check the manual of your card and also check the physical hardware. Make sure that your hardware configuration matches the software settings.

Message PCNTNW-NW-092: Cannot schedule AES without an HSM routine.

Meaning The Netware Operating System needs a Hardware Support Module routine before it can schedule an AES event.

Action Restart the system. If the error is still present, report it to the Card Manufacturer.

Message PCNTNW-NW-093: Cannot schedule interrupt time call back without an HSM routine.

Meaning The driver needs a Hardware Support Module routine before it can schedule an interrupt time call back.

Action Restart the system. If the error is still present, report it to the Card Manufacturer.

Message PCNTNW-NW-094: Cannot set hardware interrupt without an HSM routine.

Meaning The driver needs a hardware interrupt call back routine before it sets the interrupt.

Action Restart the system. If the error is still present, report it to the Card Manufacturer.

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Message PCNTNW-NW-095: Cannot add polling without an HSM routine.

Meaning The driver needs an HSM polling routine before it can start the polling process.

Action Restart the system. If the error is still present, report it to the Card Manufacturer.

Message PCNTNW-NW-026: The MSM is unable to parse a required custom keyword.

Meaning An incorrect parameter keyword was entered by the user.

Action Check the manual and make sure the keyword entered is correctly spelled. Reload the driver.

Message PCNTNW-NW-126: The group bit in the node address override was cleared.

Meaning The IEEE address has a group bit indicating that an address belongs to a group of station. This bit is only used for destination address and not source address. You tried to enter a source address with this bit set. The driver cleared the group bit of the source address.

Action None.

Message PCNTNW-NW-127: The local bit in the node address override was set.

Meaning The local bit in the IEEE address format indicates that the addresses are being managed locally. If you use the node address override capabilities of this driver to enter a new address then the local bit should be set. You entered an address without the local bit set. The driver has set the local bit.

Action None.

Message PCNTNW-NW-164: Device not found.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident the PCnet board.

Message PCNTNW-NW-165: Device not found at IOADDRESS.

Meaning The PCnet device cannot be found at the IO Address specified in NET.CFG file.

Action Verify that the IO Address in NET.CFG matches with the board. Otherwise, remove the PORT keyword from NET.CFG file.

Message PCNTNW-NW-167: PCI scan specified, device not found.

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Verify that the PCI board is physically installed properly. Use the BUSTYPE keyword to specify PCI1 or PCI2 values, if the PCI mechanism is known for your system. Otherwise, replace the PCI board.

Message PCNTNW-NW-168: VESA scan specified, device not found.

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Verify that the VL board is physically installed properly. Otherwise, replace the VL board.

Message PCNTNW-NW-169: PnP scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Verify that the ISA board is physically installed properly. Otherwise, replace the PCnet-ISA+ board.

Message PCNTNW-NW-170: ISA scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Verify that the ISA board is physically installed properly. Otherwise, replace the PCnet-ISA board.

Message PCNTNW-NW-180: DMA number is not necessary for PCI device.

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove DMA from NET.CFG file.

Message PCNTNW-NW-181: DMA number is not necessary for VESA device.

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove DMA from NET.CFG file.

20.4.1 Custom Netware Server Driver Counters

- **Heart Beat Error**

This error indicates that a collision input on the AUI failed to activate within 20 network bit times after terminating transmission. This indicates a transmitter problem.
- **Memory Time Out**

This counter is incremented when the board does not get bus master resource to read or write to memory in the systems
- **Tx Babbling Error**

This counter indicates that the transmitter has been transmitting longer than the time required to send the maximum size frame. This counter is incremented when 1,519 bytes or greater are transmitted.
- **Tx Under Flow Error**

This error indicates that a frame transmission was aborted because the board could not get the data from memory in time.
- **Tx Buffer Error**

This error indicates that the frame buffers which were queued for transmission were not set up correctly by the software.
- **Rx ECBs Over 16 MBytes Count**

This is a standard statistics counter counting receive Event Control Blocks which are located above 16 MBytes.
- **Tx ECBs Over 16 MBytes Count**

This is a standard statistics counter counting transmit Event Control blocks which are located above 16 MBytes.
- **Packet Used 2ECBs**

This is a statistic counter indicating that a packet used two Event Control Blocks.
- **Rx ECBs Double Copy Count**

If the receive Event Control Blocks are located above 16 MBytes and the network adapter card is a 16-bit adapter card (i.e., PCnet-ISA, PCnet-ISA+, or PCnet-ISA II), then the system needs to copy the received packets to the Rx ECBs. This statistics counter counts these events.
- **Tx ECBs Double Copy Count**

If the transmit Event Control Blocks are located above 16 MBytes and the network adapter card is a 16-bit adapter card (i.e., PCnet-ISA, PCnet-ISA+, or PCnet-ISA II), then the system needs to copy the transmit packets to the Tx ECBs. This statistics counter counts these events.

- **PermaNet Server™ Primary Slot Number**
This counter indicates the PermaNet Server primary adapter slot number.
- **PermaNet Server Secondary Slot Number**
This counter indicates the PermaNet Server Secondary adapter slot number.
- **PermaNet Server Mod 0=Off, 1=Primary, 2=Secondary**
This counter indicates the PermaNet Server activated mode.
"0" indicates that the PermaNet Server function is disabled.
"1" indicates that the PermaNet Server function is enabled and the Primary adapter is activated.
"2" indicates that the PermaNet Server function is enabled and the Secondary adapter is activated.

20.5 NDIS 2.01 Driver Error Messages

Message PCNTND-DOS-1: Unable to open Protocol Manager.

Meaning The NDIS stack is not configured correctly.

Action Check and correct your configuration.

Message PCNTND-DOS-6: Out of memory while allocating buffers.

Meaning The driver failed to allocate buffers.

Action Check your system configuration, including TX/RX Buffers in PROTOCOL.INI file.

Message PCNTND-DOS-7: Protocol Manager device error.

Meaning The NDIS stack is not configured correctly.

Action Check and correct your configuration.

Message PCNTND-DOS-8: Bad status for Protocol Manager.

Meaning The NDIS stack is not configured correctly.

Action Check and correct your configuration.

Message PCNTND-DOS-9: Cannot find PROTOCOL.INI entry.

Meaning The NDIS stack is not configured correctly.

Action Check and correct your configuration.

Message PCNTND-DOS-10: Protocol Manager ioctl failed.

Meaning The NDIS stack is not configured correctly.

Action Check and correct your configuration.

Message PCNTND-DOS-11: Protocol Manager registration failed.

Meaning The NDIS stack is not configured correctly.

Action Check and correct your configuration.

Message PCNTND-DOS-13: Physical address from VDS is above 16M, cannot handle it.

Meaning The PCnet-ISA cannot handle buffers above 16 Megabytes. (16-bit addressing)

Action Modify your system configuration to load the driver below 16 Megabytes.

Message PCNTND-DOS-15: Device not found.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message PCNTND-DOS-16: PCI scan specified, device not found.

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Verify that the PCI board is physically installed properly. Otherwise, replace the board.

Message PCNTND-DOS-17: PCI scan can only execute on a 386 and higher processor.

Meaning The PCI bus is not available on your system. The PCI bus is only supported on systems with a 386 or higher processor.

Action Do not specify PCI for BUSTYPE with your current system.

Message PCNTND-DOS-18: PnP scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Verify that the PCnet-ISA+ board is physically installed properly. Otherwise, replace the board.

Message PCNTND-DOS-19: VESA scan specified, device not found.

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Verify that the PCnet-32 board is physically installed properly. Otherwise, replace the board.

Message PCNTND-DOS-20: ISA scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Verify that the PCnet-ISA board is physically installed properly. Otherwise, replace the board.

Message PCNTND-DOS-21: Board failed checksum test. Please run configuration utility.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident board.

Message PCNTND-DOS-22: PCNET DMA doesn't match protocol.ini.

Meaning The specified DMA setting does not match the hardware setting for the PCnet device.

Action Remove the DMA setting from PROTOCOL.INI or match the DMA setting in PROTOCOL.INI with the hardware jumper setting.

Message PCNTND-DOS-23: WARNING: PCNET IRQ found =

Meaning The IRQ setting in PROTOCOL.INI does not match the hardware IRQ setting.

Action Remove the IRQ setting from PROTOCOL.INI or match the IRQ setting in PROTOCOL.INI with the hardware jumper setting.

Message PCNTND-DOS-24: PCNET IRQ doesn't match protocol.ini

Meaning The IRQ setting in PROTOCOL.INI does not match the hardware IRQ setting.

Action Remove the IRQ setting from PROTOCOL.INI or match the IRQ setting in PROTOCOL.INI with the hardware jumper setting.

Message PCNTND-DOS-25: PCI scan specified, PCI bus not found!

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Verify that the PCI board is physically installed properly. Otherwise, replace the board.

Message PCNTND-DOS-26: Interrupt handler is not working, please check your protocol.ini

Meaning IRQ handler is not working. It is possible that PROTOCOL.INI does not match the hardware (PCnet-ISA only).

Action Check your hardware jumper settings.

Message PCNTND-DOS-27: ISA IRQ number out of range

Meaning The PCnet-ISA only supports eight IRQ channels.

Action Specify a valid IRQ number in PROTOCOL.INI to match the jumper setting on the ISA board. Refer to the Software Keyword section of this manual for the available range of values.

Message PCNTND-DOS-28: ISA DMA number out of range

Meaning The PCnet-ISA only supports four DMA channels.

Action Specify a valid DMA number in PROTOCOL.INI to match the jumper setting on the ISA board. Refer to the Software Keyword section of this manual for the available range of values.

Message PCNTND-DOS-29: WARNING: DMA number is not necessary for PCI device

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove the DMA setting in PROTOCOL.INI.

Message PCNTND-DOS-30: WARNING: DMA number is not necessary for VESA device

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove the DMA setting in PROTOCOL.INI file.

Message PCNTND-DOS-31: DMA number is already in use by another PCNET device

Meaning The specified DMA number is already in use by another PCnet device.

Action Modify the DMA setting on the hardware and/or modify the DMA setting in PROTOCOL.INI file.

Message PCNTND-DOS-32: IRQ number is already in use by another PCNET device.

Meaning The specified IRQ number is already in use by another PCnet device.

Action Modify the IRQ setting on the hardware and/or modify the IRQ setting in PROTOCOL.INI file.

Message PCNTND-DOS-33: PCNET device with specified IOBASE is already in use.

Meaning The specified IO Address number is already in use by another PCnet device.

Action Modify the IO Address setting on the hardware and/or modify the IO Address setting in PROTOCOL.INI file.

20.6 NDIS 3.x Driver Error Messages

Windows NT

Windows NT error messages are logged into a log file. The user may view the file with the Event Viewer. Error messages appear with the "PCNTN3" prefix followed by a "Missing Configuration Parameter" message and several hex numbers. The hex numbers must be converted to decimal in order to correspond to the error numbers used in this manual.

Message	PCNTN3-9: IO base address is already in use by another PCNET device.
Meaning	The specified IO Address number is already in use by another PCnet device.
Action	Modify the IO Address setting on the hardware and/or modify the IO Address setting in the setup dialog box.

Message	PCNTN3-13: IRQ and/or DMA number is already in use by another PCNET device.
Meaning	The specified IRQ and/or DMA is already specified by another PCnet device.
Action	Modify the IRQ and/or DMA settings in the setup dialog box.

Message	PCNTN3-17: PCI scan specified, PCI bus not found.
Meaning	PCI scan specified on a non-PCI system..
Action	Modify the bus to scan in setup dialog box to the correct bus to scan.

Message PCNTN3-18: PCI scan specified, device not found.

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Verify that the PCI board is physically installed properly. Otherwise, replace the board.

Message PCNTN3-19: LanceOpenAdapter failed.

Meaning The configuration is setup incorrectly.

Action Re-run the setup program.

Message PCNTN3-20: Device at specified IO base address not found.

Meaning The PCnet device cannot be found at the specified IO Address.

Action Verify that the IO Address matches with the board. Otherwise, remove the IO Address specification from the setup.

Message PCNTN3-21: Device not found.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message PCNTN3-22: PnP scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Verify that the PCnet-ISA+ board is physically installed properly. Otherwise, replace the board.

Message PCNTN3-23: VESA scan specified, device not found.

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Verify that the PCnet-32 board is physically installed properly. Otherwise, replace the board.

Message PCNTN3-24: ISA scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Verify that the PCnet-ISA board is physically installed properly. Otherwise, replace the board.

20.7 NDIS 4.x Driver Error Messages

Message PCNTN4M: Has encountered a conflict in resources and could not load.

Meaning The specified resources such as IRQ, IO address, or DMA has been used by other devices in the system.

Action Modify the resource settings on the hardware and/or modify the resource settings in the setup dialog box.

Message PCNTN4M: Could not find an adapter.

Meaning The NDIS 4.x driver was loaded without the adapter installed.

Action Make sure the adapter is in the system; if not, install an adapter and load the driver again.

Message PCNTN4M: The IO address supplied does not match the jumpers on the adapter.

Meaning The specified IO address on the card does not match with the settings on the setup program.

Action Correct the jumper settings accordingly to match it with the setup program.

Message PCNTN4M: Has encountered an internal error and has failed.

Meaning The system failed to recognize the adapter and/or the adapter itself is malfunctioning.

Action Run diagnostics on your system and/or replace the adapter with a working card.

Message PCNTN4M: Could not allocate the resources necessary for operation.

Meaning The specified resources are not available in the system and all the resources are used by other devices.

Action Remove the unnecessary drivers to free up the resources or remove the unnecessary hardware devices to free up the resources in the system.

Message PCNTN4M: Cannot connect to the interrupt number supplied.

Meaning The specified interrupt is used by another device and/or there are no available interrupts in the system .

Action Use a different interrupt and/or unload unnecessary devices to free up the interrupt.

20.8 SCO UNIX LLI Driver Error Messages

Message pnt0-1: PCI search specified, PCI bus not found!

Meaning PCI scan specified on non-PCI system.

Action Run netconfig to correct BUS to scan.

Message pnt0-2: PCI search specified, PCI device not found!

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Run netconfig to search for another PCnet device or verify that the PCI board is physically installed properly.

Message pnt0-6: Can't allocate memory for the board during interrupt! Please check your Streams parameters

Meaning System is out of Streams memory blocks.

Action Ask your system administrator to run "crash" utility and increase number of Streams blocks for the failing size.

Message pnt0-7: Can't allocate memory for the board during reset! Please check your Streams parameters.

Meaning System is out of Streams memory blocks.

Action Ask your system administrator to run "crash" utility and increase number of Streams blocks for the failing size.

Message pnt0-8: PNP search specified, device not found!

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-ISA+ board is physically installed properly.

Message pnt0-9: VESA search specified, device not found!

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-32 board is physically installed properly.

Message pnt0-10: ISA search specified, device not found!

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-ISA board is physically installed properly.

Message pnt0-11: device not found!

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message pnt0-12: device failed checksum test!

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message pnt0-13: add_intr_handler failed! Interrupts already enabled.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-19: IRQ found for PCnet hardware doesn't match space.c!

Meaning This is a warning message in regards to the IRQ found in the system.

Action Ignore this message if you are sure this is what you want or otherwise run netconfig to modify the IRQ settings.

Message pnt0-20: add_intr_handler failed! Unknown interrupt type.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-21: add_intr_handler failed! Out of range interrupt number.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-22: add_intr_handler failed! Out of range IPL

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-23: add_intr_handler failed! Vector already occupied.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-24: add_intr_handler failed! Vector already shared at different IPL.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-25: DMA found for PCNET hardware doesn't match space.c!

Meaning There is an error with the DMA number found and space.c.

Action Run netconfig to set the correct DMA setting.

Message pnt0-26: DMA number is not necessary for PCI device.

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove the DMA number setting for the PCI board.

Message pnt0-27: DMA number is not necessary for VESA device.

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove the DMA number setting for the VL board.

Message pnt0-28: DMA number is already in use by another PCNET device.

Meaning The specified DMA number is already in use by another PCnet device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-29: IRQ number is already in use by another PCNET device.

Meaning The specified IRQ number is already in use by another PCnet device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-30: device with specified IOBASE is already in use.

Meaning The specified IO Address is already in use by another device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-31: IO address is not necessary for PCI device.

Meaning The IO Address is not necessary for the PCI device.

Action Remove the assigned IO Address for the PCnet-PCI device.

20.9 SCO Unixware DLPI Driver Error Messages

Message pnt0-1: PCI search specified, PCI bus not found!

Meaning PCI scan specified on non-PCI system.

Action Run netconfig to correct BUS to scan.

Message pnt0-2: PCI search specified, PCI device not found!

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Run netconfig to search for another PCnet device or verify that the PCI board is physically installed properly.

Message pnt0-6: Can't allocate memory for the board during interrupt! Please check your Streams parameters.

Meaning System is out of Streams memory blocks.

Action Ask your system administrator to run "crash" utility and increase number of Streams blocks for the failing size.

Message pnt0-7: Can't allocate memory for the board during reset! Please check your Streams parameters.

Meaning System is out of Streams memory blocks.

Action Ask your system administrator to run "crash" utility and increase number of Streams blocks for the failing size.

Message pnt0-8: PNP search specified, device not found!

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-ISA+ board is physically installed properly.

Message pnt0-9: VESA search specified, device not found!

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-32 board is physically installed properly.

Message pnt0-10: ISA search specified, device not found!

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-ISA board is physically installed properly.

Message pnt0-11: device not found!

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message pnt0-12: device failed checksum test!

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message pnt0-13: add_intr_handler failed! Interrupts already enabled.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-19: IRQ found for PCnet hardware doesn't match space.c!

Meaning This is a warning message in regards to the IRQ found in the system.

Action Ignore this message if you are sure this is what you want or otherwise run netconfig to modify the IRQ settings.

Message pnt0-20: add_intr_handler failed! Unknown interrupt type.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-21: add_intr_handler failed! Out of range interrupt number.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-22: add_intr_handler failed! Out of range IPL.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-23: add_intr_handler failed! Vector already occupied.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-24: add_intr_handler failed! Vector already shared at different IPL.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-25: DMA found for PCNET hardware doesn't match space.c!

Meaning There is an error with the DMA number found and space.c.

Action Run netconfig to set the correct DMA setting.

Message pnt0-26: DMA number is not necessary for PCI device.

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove the DMA number setting for the PCI board.

Message pnt0-27: DMA number is not necessary for VESA device.

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove the DMA number setting for the VL board.

Message pnt0-28: DMA number is already in use by another PCNET device.

Meaning The specified DMA number is already in use by another PCnet device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-29: IRQ number is already in use by another PCNET device.

Meaning The specified IRQ number is already in use by another PCnet device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-30: device with specified IOBASE is already in use.

Meaning The specified IO Address is already in use by another device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-31: IO address is not necessary for PCI device.

Meaning The IO Address is not necessary for the PCI device.

Action Remove the assigned IO Address for the PCnet-PCI device.

20.10 SunSoft Solaris Driver Error Messages

Message pnt0-1: PCI search specified, PCI bus not found!

Meaning PCI scan is specified on non-PCI system.

Action Run netconfig to correct BUS to scan.

Message pnt0-2: PCI search specified, PCI device not found!

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Run netconfig to search for another PCnet device or verify that the PCI board is physically installed properly.

Message pnt0-6: Can't allocate memory for the board during interrupt parameters!

Meaning System is out of memory blocks.

Action Ask your system administrator to run "crash" utility and increase number of blocks for the failing size.

Message pnt0-7: Can't allocate memory for the board during reset!

Meaning System is out of memory blocks.

Action Ask your system administrator to run "crash" utility and increase number of blocks for the failing size.

Message pnt0-8: PNP search specified, device not found!

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-ISA+ board is physically installed properly.

Message pnt0-9: VESA search specified, device not found!

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-32 board is physically installed properly.

Message pnt0-10: ISA search specified, device not found!

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Run netconfig to search for another PCnet device or verify that the PCnet-ISA board is physically installed properly.

Message pnt0-11: device not found!

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message pnt0-12: device failed checksum test!

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message pnt0-13: add_intr_handler failed! Interrupts already enabled.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-14: Can't locate hardware.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet adapter card is installed or replace the resident PCnet card.

Message pnt0-15: No more devices to open!

Meaning The driver cannot find any more PCnet devices.

Action Verify that additional PCnet adapter cards are present or replace the PCnet card that fails to respond.

Message pnt0-17: Device fault... Reset initiated!

Meaning The driver has been reset due to a device fault.

Action Replace the PCnet adapter card.

Message pnt0-19: IRQ found for PCnet hardware doesn't match pnt.conf!

Meaning This is a warning message in regards to the IRQ found in the system.

Action Ignore this message if you are sure this is what you want or otherwise run netconfig to modify the IRQ settings.

Message pnt0-20: add_intr_handler failed! Unknown interrupt type.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-21: add_intr_handler failed! Out of range interrupt number.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-22: add_intr_handler failed! Out of range IPL.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-23: add_intr_handler failed! Vector already occupied.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-24: add_intr_handler failed! Vector already shared at different IPL.

Meaning The IRQ specified or found conflicts with other devices in the system.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

settings.

Message pnt0-25: DMA found for PCNET hardware doesn't match pnt.conf!

Meaning There is an error with the DMA number found and pnt.conf.

Action Run netconfig to set the correct DMA setting.

Message pnt0-26: DMA number is not necessary for PCI device.

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove the DMA number setting for the PCI board.

Message pnt0-27: DMA number is not necessary for VESA device.

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove the DMA number setting for the VL board.

Message pnt0-28: DMA number is already in use by another PCNET device.

Meaning The specified DMA number is already in use by another PCnet device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-29: IRQ number is already in use by another PCNET device.

Meaning The specified IRQ number is already in use by another PCnet device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-30: device with specified IOBASE is already in use.

Meaning The specified IO Address is already in use by another device.

Action Modify your hardware settings and/or run netconfig to match the hardware settings.

Message pnt0-31: IO address is not necessary for PCI device.

Meaning The IO Address is not necessary for the PCI device.

Action Remove the assigned IO Address for the PCnet-PCI device.

20.11 VxWorks Driver Error Messages

Message	InPciInit: "Unknown Board Type. Lance Memory Error while initialization. Device initialization failed."
Meaning	TheVxWorks driver is compatible with the PCI-II and PCnet-FAST network controllers. If other cards are used this error is displayed.
Action	Use the PCnet-PCI II or the PCnet-FAST cards and reboot the system. If the error comes up again, check if there is an embedded PCI card on the system. If the card is present, use another clean system which does not have the embedded card.
Note	This error comes up even if we disable the embedded PCI chip from the BIOS. So, a clean system has to be used.

20.12 Packet Driver Error Messages

Message PCNTPK-DOS-1: PCNTPK [-n] [-d] [-w]
<INT=packet_int_no>
[IRQ=int_no] [IOADDR=io_addr] [DMA=dma_no]
[BUSTYPE=bus] [DMAROTATE] [TP] [LED0=xx]
[LED1=xx] [LED2=xx] [LED3=xx]

Meaning The command line entered with associated parameters is incorrect.

Action Refer to the board user manual and make sure that the command line and its associated parameters are correct.

Message PCNTPK-DOS-2: Unable to reset the PCnet device.

Meaning The software could not reset the board.

Action Verify that a PCnet board is physically installed properly or replace the PCnet board.

Message PCNTPK-DOS-3: Unable to initialize the PCnet device.

Meaning The software could not initialize the board.

Action Check the I/O address, Interrupt, and DMA settings of the board. Make sure that the driver settings of these three parameters match the hardware setting. If the settings are correct, and you still get this message, then replace the board.

Message PCNTPK-DOS-4: VDS memory allocation failed.

Meaning The driver could not allocate memory for the virtual board.

Action Check the system configuration.

Message PCNTPK-DOS-5: There is already a packet driver at
xxxx.

Meaning The driver is already loaded at this memory location.

Action Do not load the driver again.

Message PCNTPK-DOS-6: <IRQ=int_no> should be between 0 and
15 inclusive.

Meaning The specified IRQ is out of range for the PCnet board.

Action Use valid IRQ values. Refer to the Software Keyword section of this
manual for valid ranges.

Message PCNTPK-DOS-7: Packet driver failed to initialize the
board.

Meaning The board initialization failed.

Action Replace the board.

Message PCNTPK-DOS-8: <INT=packet_int_no> should be in the
range 0x60 to 0x80.

Meaning The specified software interrupt is out of the allowable range.

Action Modify the INT value.

Message PCNTPK-DOS-9: DMA number is not necessary for PCI
device.

Meaning The PCnet-PCI board does not require a DMA setting.

Action Remove the DMA setting.

Message PCNTPK-DOS-10: DMA number is not necessary for VESA device.

Meaning The PCnet-32 board does not require a DMA setting.

Action Remove the DMA setting.

Message PCNTPK-DOS-11: PnP device DMA number mismatch.

Meaning The specified DMA number mismatches with the DMA number assigned by the PnP Configuration Manager or by the on-board EEPROM if PnP is disabled.

Action Remove the DMA setting.

Message PCNTPK-DOS-12: PCI device IRQ number mismatch.

Meaning The specified IRQ number mismatches with the IRQ number assigned by the PCI BIOS.

Action Remove the IRQ setting.

Message PCNTPK-DOS-13: VESA device IRQ number mismatch.

Meaning The specified IRQ number mismatches with the IRQ setting designated by the on-board EEPROM.

Action Remove the IRQ setting.

Message PCNTPK-DOS-14: PnP device IRQ number mismatch.

Meaning The specified IRQ number mismatches with the DMA number assigned by the PnP Configuration Manager or by the on-board EEPROM if PnP is disabled.

Action Remove the IRQ setting.

Message PCNTPK-DOS-15: Device not found.

Meaning The driver cannot find any PCnet device.

Action Verify that a PCnet board is installed or replace the resident PCnet board.

Message PCNTPK-DOS-16: Device not found at IOADDRESS.

Meaning The PCnet device cannot be found at the IO Address specified.

Action Verify that the specified IO Address matches with the board. Otherwise, remove IOADDR keyword during installation.

Message PCNTPK-DOS-17: PCI scan can only execute on a 386 and higher processor.

Meaning The PCI bus is not available on your current system. The PCI bus is only supported on systems with a 386 or higher processor.

Action Do not specify PCI for BUSTYPE during installation.

Message PCNTPK-DOS-18: PCI scan specified, device not found.

Meaning The driver cannot locate the PCnet-PCI board on the PCI bus.

Action Verify that the PCI board is physically installed properly. Otherwise, replace the board.

Message PCNTPK-DOS-19: VESA scan specified, device not found.

Meaning The driver cannot locate the PCnet-32 board on the VL bus.

Action Verify that the VL board is physically installed properly. Otherwise, replace the board.

Message PCNTPK-DOS-20: PnP scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA+ board on the ISA bus.

Action Verify that the PCnet-ISA+ board is physically installed properly. Otherwise, replace the board.

Message PCNTPK-DOS-21: ISA scan specified, device not found.

Meaning The driver cannot locate the PCnet-ISA board on the ISA bus.

Action Verify that the PCnet-ISA board is physically installed properly. Otherwise, replace the board.

Message PCNTPK-DOS-22: ISA DMA number out of range.

Meaning The PCnet-ISA only supports four DMA channels.

Action Specify a valid DMA number to match the jumper setting on the ISA board. Refer to the Software Keyword section of this manual for the available range of values.

Message PCNTPK-DOS-23: ISA IRQ number out of range.

Meaning The PCnet-ISA only supports eight IRQ channels.

Action Specify a valid IRQ number to match the jumper setting on the ISA board. Refer to the Software Keyword section of this manual for the available range of values.

Message Packet driver is at segment xxxx.

Meaning The memory address where Packet Driver is loaded is xxxx.

Action None.

Message Packet interrupt number xxxx.

Meaning The interrupt number used by the Packet Driver is xxxx.

Action None.

Message My Ethernet address is xxxx.

Meaning The Ethernet address of this station is xxxx.

Action None.

Message My ARCnet address is xxxx.

Meaning The ARCnet address of this station is xxxx.

Action None.

21. APPENDIX D: Software Certification

Listed below is contact information for software certification with various software vendors.

Note: The information listed below is subject to change by the respective companies.

Artisoft

Artisoft Labs (602) 293-4000
Artisoft, Inc.
691 East River Road
Tucson, AZ 85704

IBM

Integration Text Lab (ICL) (512) 838-0743
IBM Corporation
11400 Burnet Road
Austin, TX 78758

Microsoft

Microsoft Compatibility Labs (MCL) (206) 882-8080
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Novell

Novell Labs (801) 429-5544
Novell Corporation
122 East 1700 South
Provo, UT 84606-6194

SCO

Santa Cruz Operation (SCO) (408) 427-7814
400 Encinal Street
P.O. Box 1900
Santa Cruz, CA 95061-1900

22. APPENDIX E: PCnet Family AMINSTAL Utility OEM Customization Guide

22.1 AMINSTAL Utility Software

Included in the PCnet Family Licensable Technology Kits are a software driver installation utility called AMINSTAL and the *PCnet Family Network Driver Installation Guide*. The AMINSTAL utility is DOS based and runs on version 3.3 or higher. The AMINSTAL utility allows the end user to configure the following PCnet-based Ethernet adapter cards:

- PCnet-ISA (Am79C960)
- PCnet-ISA+ (Am79C961)
- PCnet-ISA II (Am79C961A)
- PCnet-32 (Am79C965)
- PCnet-PCI (Am79C970)
- PCnet-PCI II (Am79C970A)

and install the corresponding software drivers. The *PCnet Family Network Driver Installation Guide* explains how to use the AMINSTAL utility to configure the adapter card and install software drivers.

The AMINSTAL utility software and the *PCnet Family Network Driver Installation Guide* are included as part of the PCnet licensable technology kits. OEMs may distribute The AMINSTAL utility and the Installation Guide with their Ethernet adapter cards to end-users. All AMD-specific text, graphics, and part references must be replaced with OEM-specific text, graphics, and part references. The AMINSTAL utility is configurable through a text file. The *PCnet Family Network Driver Installation Guide* is provided in a file in Microsoft Word for Windows 2.0 format.

22.2 AMD's AMINSTAL Utility Software Policy

Below is a summary of AMD's acquisition, modification, and distribution policy for the AMINSTAL utility.

22.3 Object Code for Internal Testing

The AMD AMINSTAL utility is provided FREE of charge for ***evaluation purposes only***. Distribution rights must be obtained as detailed below. Copies of The AMINSTAL utility can be obtained by contacting your local AMD sales representative.

22.4 Object Code for Distribution

Unlimited, royalty-free rights to distribute the AMINSTAL object code, after OEM customization, must be obtained by purchasing a PCnet Licensable Technology Kit. Contact your local AMD sales representative for more information.

22.5 AMINSTAL Utility Customization

The AMINSTAL utility can be customized in the following three ways:

1. The “PCnet Family Installation Main Window” must be customized by replacing the AMD-specific graphics and text with OEM-specific graphics and text.
2. The FFFF card place holder must be changed to the manufacturer’s IEEE address prefix.
3. The button labels, window titles, data labels, screen text, and help messages of each screen are customizable and can be in any language.

The pcnet.txt text file specifies the AMINSTAL utility’s characteristics. By changing keywords and text strings in pcnet.txt, the utility can be customized without editing and recompiling the program. The pcnet.txt file is located in the a:\aminstal directory on the “All Drivers” disk. It is important to test run the AMINSTAL utility after each text string modification to identify editing mistakes. Editing mistakes such as deleted or extra quotes and missing text will prevent the program from running

22.5.1 Main Window Customization

The Main Window, “PCnet Family Installation Main Window”, must be changed from AMD-specific to OEM-specific. The Window Title, Title Line, Logo, and Text Lines must be customized. See Figure E-1.

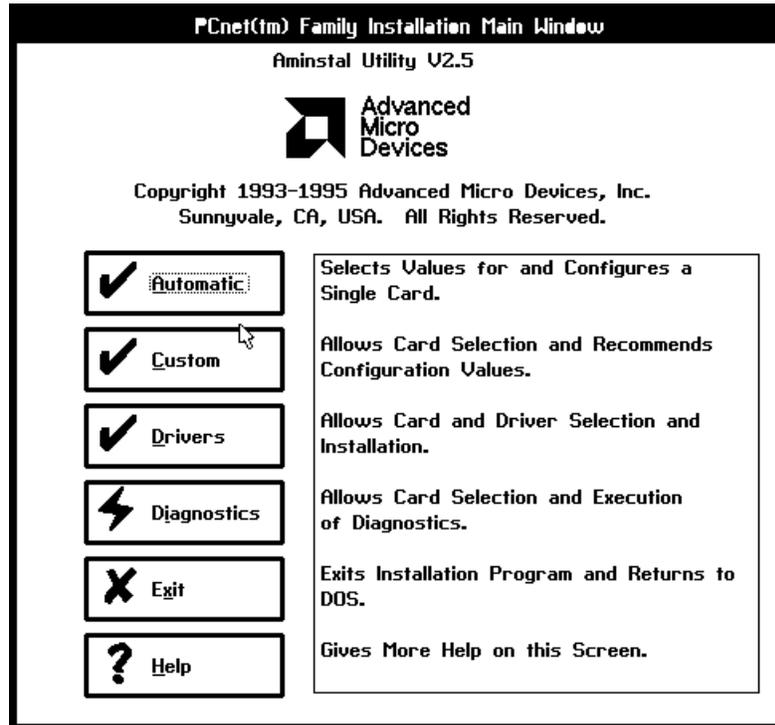


Figure E-1. Main Window

The following sections describe how to edit the pcnet.txt file to customize the Main Window.

22.5.1.1 Window Title

The Main Window title is found under the “#NAME MAIN_WINDOW_TITLE” name token in the Main Window Items section of the pcnet.txt file. The text entered under the designated language statement is displayed in the Main Window title bar. The words “PCnet(tm) Family Installation Main Window” are the current title and must be changed.

For example:

#NAME MAIN_WINDOW_TITLE	
#LANGUAGE ENGLISH	
“PCnet(tm) Family Installation Main Window”	AMD-specific text must be changed to OEM-specific text.
.	
.	
.	
#NAME MAIN_WINDOW_TITLE	Note, AMD-specific text has been changed.
#LANGUAGE ENGLISH	
“SuperFast Ethernet Card Install Main Window”	
.	
.	
.	

22.5.1.2 Title Line

The title line is the first text line of the Main Window. The title text is found under the “#NAME TEXT_TITLE” name token in the Main Window Items section of the pcnet.txt file. The words “AMINSTAL Utility V2.5” are the current title and must be changed. For example:

#NAME TEXT_TITLE	
#LANGUAGE ENGLISH	
“Aminstal Utility V2.5”	AMD-specific text must be changed to OEM-specific text.
.	
.	
.	
#NAME TEXT_TITLE	Note, AMD-specific text has been changed.
#LANGUAGE ENGLISH	
“SuperFast Install V1.0”	
.	
.	
.	

22.5.1.3 AMD Logo

The Main Window logo must be changed by inserting a bit map image text file into the pcnet.txt file and specifying its dimensions. The “Main Window” logo is specified with the following tokens:

#NAME LOGO_LEN

"192 40"	Pixels wide by pixels high for logo image
#NAME LOGO	
'070707070707070...'	Bitmap file of the logo
.	
.	
.	

The tokens are located in the "Compressed Bitmaps and their expanded sizes" section of the pcnet.txt file.

#NAME LOGO_LEN and the two numbers on the line following the token specify the width and height of the logo in pixels. The maximum width is 192 pixels and the maximum height is 40 pixels.

#NAME LOGO specifies the bitmap image used to create the logo. The lines following the token are an ASCII representation of the bitmap image. Each line begins and ends with a single quote. The outline of a simple image can be seen in the character pattern.

To display a different logo on the "Main Window":

1. Determine the width and height of the bitmap image in pixels.
2. Enter the dimensions on the line below the "#NAME LOGO_LEN" token.
3. Delete the bitmap image lines following the " token.
4. Insert the file into the pcnet.txt file after the "#NAME TEXT_LOGO" token.
5. Add single quotes before and after each bitmap image line.
6. Save the file.

22.5.1.4 Copyright Text Lines

The first and second text lines are below the logo. These text lines are found under the "#NAME COPYRIGHT_1" token in the "Main Window" Items section of the pcnet.txt file. The words "Copyright 1993-1994 Advanced Micro Devices, Inc., Sunnyvale, CA, USA. All Rights Reserved." must be changed.

For example:

```
#NAME COPYRIGHT_1
#LANGUAGE ENGLISH
"Copyright 1993-1994 Advanced Micro Devices, Inc." AMD-specific text
"  Sunnyvale, CA, USA. All Rights Reserved.      must be changed to
.                                                  OEM-specific text.
.
.
```

```
#NAME COPYRIGHT_1
#LANGUAGE ENGLISH
"Copyright 1994 SuperFast Systems, Inc."          Note, AMD-specific
"  Oahu, HI, USA. All Rights Reserved.           text has been
.                                                  changed.
.
.
```

22.5.2 PCnet Adapter Card Customization

22.5.2.1 IEEE Address

Part of the IEEE address is determined by the Ethernet adapter card's manufacturer designation. The AMINSTAL utility recognizes adapter cards with IEEE addresses matching the IEEE address manufacturer designation in the pcnet.txt file. The manufacturer designation is entered on the line below the

"#NAME MANUFACTURERS_DEVICE_LIST"

name token in the pcnet.txt file (near the top of the file). For example:

```
#NAME MANUFACTURERS_DEVICE_LIST
"FFFF"                                     Must be changed to an
.                                           OEM-specific address
.                                           prefix.
.
```

```
#NAME MANUFACTURERS_DEVICE_LIST
"ABCD"                                     Note, has been changed
.                                           to "ABCD".
.
.
```

22.5.2.2 PCnet Adapter Card Names

All text strings in the pcnet.txt file containing the AMD-specific names: "PCnet," "PCnet-ISA," "PCnet-ISA+," "PCnet-ISA II," "PCnet-32," and "PCnet-PCI" must be edited to

specify the OEM-specific adapter card name. (Use a “Find” utility in a text editor to find all occurrences of “PCnet” and edit the text.) Text strings with many spaces after the PCnet name must remain the original length. All other text strings may change length provided the display window is adjusted. See Positioning the Text (page 9) for details.

22.5.3 Foreign Language Support

The button labels, window titles, data labels, screen text, error messages, and help messages of The AMINSTAL utility are customizable and can be expressed in any language. There are three steps needed to add foreign language text:

1. Specifying A Language
2. Adding the Language
3. Positioning the Text

22.5.3.1 Specifying A Language

The language the AMINSTAL utility uses can be hard coded or user selectable. The hard coded language is specified using the “:LANGUAGE:<keyword>” token and “#LANGUAGE <keyword>” language statement. The language menu selections are specified by the “:LANGUAGE:<keyword1>:<keyword2>:<keyword3>:” token.

To activate language hard coding, any spaces before the hard coding language token should be removed and the language menu should be deactivated by inserting a space before the “ :LANGUAGE:<keyword1>:<keyword2>:<keyword3>:” token. The “:LANGUAGE:<keyword>” token specifies the language used and is located near the top of the pcnet.txt file. Currently, keywords for: ENGLISH, SPANISH, PORTUGUESE, and GERMAN are defined. Other languages can be supported by defining new language keywords. A language keyword is specified by entering the keyword after the “:LANGUAGE:<keyword>” token, for example:

:LANGUAGE:ENGLISH	Language Token specifying English
.	
.	
.	

The pcnet.txt file can contain the text for more than one language. Therefore, the same pcnet.txt file can support all desired languages by changing the language keyword. If more than one language is in the pcnet.txt file, the language menu selection can be utilized. The hard coding language token should be deactivated by inserting a space before the first colon “ :LANGUAGE:<keyword>”. The menu selection token should be activated by removing the space before the colon:

“:LANGUAGE:ENGLISH:SPANISH:FRENCH:”.

The desired languages keywords can then be entered. Each language is separated by a colon. When The AMINSTAL utility begins, it will give a language menu selection before the Main Window appears. The language selected will utilize the text strings and locations associated with the language's keyword.

22.5.3.2 Adding the Language

The "#LANGUAGE <keyword>" statements follow each name and location token to determine which text strings and text locations are used for the language. For example:

#NAME TEXT_TITLE_LOC	Location Token
#LANGUAGE ENGLISH	Language statement
"Gy230,0,200"	Color and location for English text
#LANGUAGE SPANISH	
"Gy240,0,250"	Color and location for Spanish text
#NAME TEXT_TITLE	Name Token
#LANGUAGE ENGLISH	Language statement
"PCnet Install V2.4B"	English Text
#LANGUAGE SPANISH	
"Se habla espanol?"	Spanish Text
.	
.	
.	

Location and name tokens followed by text without language statements, allows the text to be displayed regardless of language. For example:

#NAME MAIN_AUTOMATIC_BUTTON_LOC	Location Token.
"Nz60,80,180"	Color and location regardless of language.
#NAME AUTOMATIC_BUTTON	Display Token.
"&Automatic"	Text displayed regardless of language.

To add a new language, such as French, the "FRENCH" keyword and language statements are added under the location and name tokens. The text location and French text is added under the "#LANGUAGE FRENCH" language statements. For example:

:LANGUAGE:FRENCH	Language Token specifying French
.	
.	

#NAME TEXT_TITLE_LOC	Location Token
#LANGUAGE ENGLISH "Gy230,0,200"	Color and location for English text
#LANGUAGE SPANISH "Gy240,0,250"	Color and location for Spanish text
#LANGUAGE FRENCH "Gy240,0,250"	French language statement Color and location for French text
#NAME TEXT_TITLE	Display Token
#LANGUAGE ENGLISH "PCnet Install V2.4B"	English Text
#LANGUAGE SPANISH "Se habla espanol?"	Spanish Text
#LANGUAGE FRENCH "Parlez vous franais?"	French language statement French Text

22.5.3.3 Positioning the Text

Since text strings may vary in length depending on language, the translated text can be too long or too short for the previously defined display box. It may be necessary to adjust the width and distance from the left screen edge to the display box. The display box position is determined by location coordinates: "Cx, y, w, h". See Figure E-2. Where:

- C = Text color
- x = Distance from left screen edge to upper-left corner of the display box
- y = Distance from upper screen edge to upper-left corner of the display box
- w = Display box width
- h = Display box height (assumes one character when not specified)

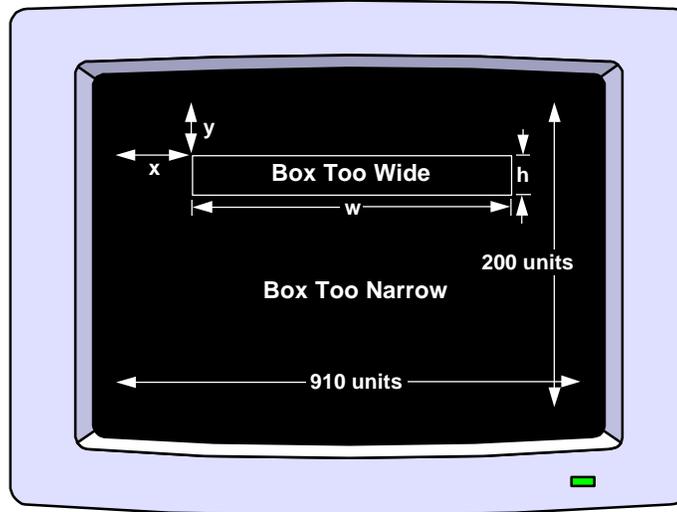


Figure E-2. Text Field Location

The screen is 910 units wide and 200 units high. Each character is 10 units wide and 10 units high. Therefore, the screen is 91 characters wide and 20 characters high. For example:

```
#NAME TEXT_TITLE_LOC           Location Token
#LANGUAGE ENGLISH
"Gy230,0,200"                   Color and location for English text
```

Gy specifies black text with gray background

x = 230 units and specifies the upper-left display box corner will be 23 characters from the screen's left edge.

y = 0 units and specifies the upper-left display box corner will be 0 characters from the screen's top edge.

w = 200 units and specifies the display box will be 20 characters wide.

h = 10 units since there is no entry, the default of 10 units is used. The display box will be 1 character high.

The x and w variables are the only variables requiring changes as text width changes. There are two ways to position text: centered and left justified.

Centered text, such as window titles, are placed so the center of the text string is a desired distance from the left screen edge (d). As the width (w) of the text string increases by two characters, the distance from the left screen edge to the upper-left corner of the display box (x) decreases by one character. The following formulas may be helpful:

$$\Delta x = -\Delta w/2$$

$$x = d - w/2$$

$$x_{\text{new}} = x + \Delta x$$

Left justified text, such as button labels, are placed so the first character of the text string is a desired distance from the left screen edge (d). As the width (w) of the text string increases by two characters, the distance from the left screen edge to the upper-left corner for the display box (x) remains the same. The following formulas may be helpful:

$$\Delta x = 0$$

$$x = d$$

23. APPENDIX F: Glossary

Access Protocol	The set of traffic rules that network workstations obey to avoid data collisions when sending messages and packets over shared network media (sometimes referred to as the media access control (MAC) protocol). Common examples include Carrier Sense Multiple Access (CSMA) and Token Passing.
Adapter	Generally refers to a network adapter card. These boards are expansion cards which are inserted inside each workstation or server on a network. The adapter card allows each device on the network to listen and communicate with other nodes on the network.
Address	A unique location in memory.
Administrator	A network user who is responsible for setting up, configuring, maintaining, and managing the network.
AMINSTAL (Utility)	A PCnet Family card configuration and software driver installation utility made by Advanced Micro Devices, Inc.
AppleTalk	A proprietary Apple LAN capable of transmitting data at a rate of 230-Kbs over shielded twisted pair wire. AppleTalk is based on a bus topology and is built into all Apple Macintosh computers and laser printers. The most common cabling scheme used with AppleTalk is known as LocalTalk.
AUI	<u>A</u> ttachm <u>e</u> nt <u>U</u> n <u>i</u> t <u>I</u> nterface. An IEEE specification for a node or repeater connection interface to an external medium attachment unit (MAU).

AUI Cable	A cable used to connect an external transceiver to a computing device. The AUI cable is also sometimes known as the transceiver cable.
Backbone	Generally, a coax or fiber optic cable used as the main transmission medium for connecting network areas called workgroups.
Base Address	The first address in a series of addresses in memory, i.e., the beginning location of a section of code or data. It is often used to describe the start of a network interface card's (NIC) I/O space (i.e., I/O base address).
Baseband	A network that transmits signals as a pulse rather than as variations in a carrier wave (signal).
Bit	<u>B</u> inary <u>d</u> igit. A bit is the smallest unit of information represented on a computer. A bit can contain either a zero (0) or a one (1).
BIOS	<u>B</u> asic <u>I</u> nput <u>O</u> utput <u>S</u> ystem. BIOS is built-in software typically contained in a ROM (Read Only Memory) chip that determines what a computer can do without accessing programs from disk. On IBM PCs, BIOS contains code required to control the keyboard, display screen, disk drives, serial communications, etc. A Plug and Play BIOS supplements the BIOS functions with routines that support Plug and Play operations.
Boot PROM	<u>B</u> oot <u>P</u> rogrammable <u>R</u> ead <u>O</u> nly <u>M</u> emory. A memory chip that allows the network workstation to communicate with the network file server and to read a DOS boot program from the server. These diskless workstations are then capable of operating on the network without having a disk drive.
Broadband	A network that transmits signals as variations of carrier waves rather than directly as pulses. Broadband networks provide greater network bandwidth capacity, but are also more complex.

Broadcast	To send a message to all workstations connected on the network.
Buffer	A temporary storage space. Data may be stored in a buffer before, during, or after a data transmission. Buffers are often used to compensate for the difference between the speed of data packet transmission and the speed of data packet processing.
Bus (Topology)	A network topology where all devices are connected to a central cable called the bus or backbone. Bus networks are relatively inexpensive and easy to install. Ethernet, a very popular LAN, uses a bus topology.
Byte	A group of eight consecutive bits which are treated as one unit.
Channel	A path between a sender and receiver that carries one stream of information. A two-way path is called a circuit.
Client/Server (Architecture)	A networking architecture in which each computer or process on the network is either a client or server. A server is a powerful computer or process dedicated to managing disk drives (file servers), printers (printer server), or network traffic (network server). Clients are less powerful PCs or workstations on which users run applications and issue requests to servers for resources.
Coax Cable	A type of network media. Coaxial cable contains a copper inner conductor surrounded by plastic insulation and then a woven copper or foil shield. It is commonly used in cable television and Ethernet networks.
Command	An instruction to a computer or device to perform a specific task.
Configuration Manager	The component of the Plug and Play system responsible for managing the software configuration associated with a system's current hardware configuration.

- CSMA** Carrier Sense Multiple Access. CSMA is a media-sharing scheme in which network workstations listen on the network media and transmit only if the cable is not in use. CSMA is often combined with a collision detection scheme for a more efficient data transmission.
- CSMA/CD** Carrier Sense Multiple Access with Collision Detection. An enhancement to CSMA in which a network station stops transmitting if it detects a collision on the network cable.
- CRC** Cyclic Redundancy Check. A CRC is calculated by the media access control (MAC) transmit process and checked by the MAC receive process of a workstation to ensure integrity of the frame contents.
- Diagnostic Test** A test used to detect and/or isolate hardware or software problems.
- DLL** Dynamic Link Library. A library of shared functions that applications can link in at runtime as opposed to compile time.
- Domain** A collection of network servers and resources in a logical grouping.
- Driver** A software program that controls the underlying network hardware (such as adapters and controllers) or implements the protocol stacks through which higher-level applications can communicate with the network hardware.
- EEPROM** Electrically Erasable Programmable Read Only Memory. An EEPROM is a special type of PROM that can be erased by exposure to an electrical charge.
- EISA** Extended Industry Standard Architecture. A PC system bus that is an alternative to IBM's Micro Channel Architecture (MCA). EISA is a bus architecture designed for IBM PCs and compatibles using an Intel 386 or 486 microprocessor. An EISA bus is 32 bits wide and supports multiprocessing. The main difference between EISA and

MCA is that EISA is backwards compatible to the ISA bus (also known as the AT bus), while MCA is not.

- Ethernet** A LAN protocol originally developed by Xerox in cooperation with DEC (Digital Equipment Corporation) and Intel. Ethernet uses a bus topology and supports data transmission rates of 10-Mbs. It has also been standardized by the IEEE 802.3 group.
- Ethernet Address** Also known as the IEEE address, this is a unique numeric identifier of a node on a LAN.
- Fiber Optic** A data transmission method that uses light pulses sent over glass (or plastic) threads (fibers). Message transmission is close to the speed of light.
- Flash Memory** A special type of EEPROM that can be erased and reprogrammed inside a computer. Conventional EEPROMs require a special device called a PROM reader. Flash memory is non-volatile and does not lose its contents when power is turned off.
- Frame** A group of bits that include data plus one or more addresses. A frame generally refers to a link layer (OSI Model layer 2) protocol.
- Hub** A general term frequently used instead of repeater.
- IEEE** Institute of Electrical and Electronics Engineers. Founded in 1963, the IEEE is an organization composed of scientists, engineers, and students. The IEEE is best known for its work in establishing standards for the computer and electronics industry.
- IEEE 802** A committee of the Institute of Electrical and Electronics Engineers (IEEE). IEEE 802 was organized to establish standards for the physical and electrical connections for LANs.

IEEE 802.3	A subcommittee of the Institute of Electrical and Electronics Engineers (IEEE) 802 committee. IEEE 802.3 was organized to establish standards for Ethernet, a 10-Mbps baseband LAN.
Interrupt	A signal that suspends a program temporarily while transferring control to the operating system when input or output is required. Interrupts are given priority levels such that higher priority interrupts are processed first.
I/O	Input/Output.
I/O Port	An addressable location on the Intel 386 microprocessor to and from which hardware control information can be read and written.
IPX	<u>I</u> nternet <u>P</u> acket <u>E</u> xchange. IPX is Novell NetWare's native transport protocol. It is used to transfer data between a server and/or client programs running on different network nodes. IPX packets are not related to packets used in other systems such as Ethernet or token ring.
IRQ	<u>I</u> nterrupt <u>R</u> equest. An IRQ is a computer instruction used to interrupt a program for an I/O task. Each hardware device raises interrupts on a predetermined IRQ (numbered 0 through 15). The microprocessor associates specific interrupts with different interrupt service routines (ISR).
ISA	<u>I</u> ndustry <u>S</u> tandard <u>A</u> rchitecture. The ISA bus is the system bus used on the IBM PC/XT and IBM PC/AT computers. The version of the bus used on the AT is often referred to as the AT bus. The XT bus is 8 bits wide and the AT bus is 16 bits wide. The AT bus has become a de facto industry standard.
ISR	<u>I</u> nterrupt <u>S</u> ervice <u>R</u> outine. A sequence of software instructions which are executed as a result of a hardware interrupt.

Jumper	A plastic and metal shorting bar that slides over two or more electrical contacts to set certain conditions. Older (legacy) ISA network adapter cards require the user to set the DMA channel and IRQ via jumpers on the card itself. Newer network cards no longer require the user to set jumpers. The DMA channel, IRQ, etc., can be set via software or are done automatically via Plug and Play.
Keyword	A word reserved for special use by a program.
Kilobyte	K. A unit of information consisting of 1,024 bytes.
LAN	<u>L</u> ocal <u>A</u> rea <u>N</u> etwork. A computer network that spans a relatively small area (typically within a single building or group of buildings).
Legacy	Term used to refer to older hardware and software still in use. In the Plug and Play context, legacy means the installed base of adapter cards that do not conform to the Plug and Play standard.
Local	Programs, files, peripherals, and computation power accessed directly in the user's own system rather than through the network.
LocalTalk	The cabling scheme supported by the AppleTalk network protocol for Apple Macintosh computers. LocalTalk is a 230-Kbs media access method which is relatively slow, but popular because it is inexpensive and easy to install and maintain.
Loopback Test	A diagnostic test in which a transmitted signal is returned to the sending device after passing through all, or a part of, a network. Loopback provides a way of comparing the transmitted signal with the returned signal for integrity.
MAC	<u>M</u> edia <u>A</u> ccess <u>C</u> ontrol. The MAC sublayer defines the medium independent capability for frame transmission and reception using the CSMA/CD access method.

MAC Driver	<u>M</u> edia <u>A</u> ccess <u>C</u> ontrol driver. A driver responsible for the lowest level of network device control. A MAC device driver deals directly with the network adapter.
MAU	<u>M</u> edium <u>A</u> ttachment <u>U</u> nit. The physical and electrical interface between a workstation or repeater and the actual medium. The MAU is connected to the station by an attachment unit interface (AUI). A different MAU is required to support each different type of medium (cable type).
MCA	<u>M</u> icro <u>C</u> hannel <u>A</u> rchitecture. MCA is the architectural basis for IBM's Micro Channel bus which is used in high-end models of IBM's PS/2 series of computers.
Media	The cabling or wiring used to carry network signals. Common media types include coax, fiber optic, and twisted pair. Plural of medium.
NDIS	<u>N</u> etwork <u>D</u> river <u>I</u> nterface <u>S</u> pecification. NDIS is a software specification that defines the interaction between a network transport and an underlying network device driver. NDIS is vendor independent, and like ODI, supports multiple protocols and adapters.
NetBIOS	<u>N</u> etwork <u>B</u> asic <u>I</u> nterface <u>S</u> ystem. NetBIOS was originally developed by IBM and Sytek to link a network operating system with a specific hardware. Today, many vendors either provide a version of NetBIOS to interface with their hardware or emulate its session layer communications in their network products.
NetBEUI Transport	<u>N</u> et <u>B</u> IOS <u>E</u> xtended <u>U</u> ser <u>I</u> nterface transport. A network transport commonly used in Microsoft networks.
NetWare	A series of network operating systems and related products developed and sold by Novell, Inc.

Network	A group of two or more computers that are connected together that facilitates sharing of files and resources.
Network Transport	The lowest layer in the network subsystem, network transport is responsible for transmitting and receiving data packets via the underlying network device driver.
NIC	<u>N</u> etwork <u>I</u> nterface <u>C</u> ard. An expansion card that can be inserted into a computer so that the computer can be part of a network. Most NICs are designed for a particular type of network, protocol, and media, although some can be used in multiple network environments.
NLM	<u>N</u> etWare <u>L</u> oadable <u>M</u> odule. NLMs are applications and drivers that run in the NetWare server that can be loaded and unloaded on the fly.
Node	In a network, a node can be a computer or some other device such as a printer.
ODI	<u>O</u> pen <u>D</u> ata-Link <u>I</u> nterface. ODI supports multiple protocols and adapters and is Novell's network device driver interface standard.
OSI Model	<u>O</u> pen <u>S</u> ystems <u>I</u> nterconnection Reference Model. OSI is a network model developed by the International Standards Organization (ISO) which divides network functions into seven connected layers (physical, data link, network, transport, session, presentation, application). Each layer builds on the services provided by those below.
Packet	A unit of information that is transmitted over the network. A packet consists of a preamble, a destination address, a source address, data being transmitted, and a code (e.g., CRC) for testing correct transmission of the packet.

PCI	<p><u>P</u>eripheral <u>C</u>onnect <u>I</u>nterface. The PCI local bus is a high performance, 32-bit or 64-bit bus with multiplexed address and data lines. It is intended for use as an interconnect mechanism between highly integrated peripheral controller components, peripheral add-in boards, and processor/memory systems.</p>
PCnet	<p>A product family of single-chip, Ethernet controllers for the ISA, VL, and PCI system buses made by Advanced Micro Devices, Inc.</p>
Peer-To-Peer (Architecture)	<p>A network architecture in which each node on the network has equal responsibility, i.e., any station can contribute resources to the network while still running local application programs.</p>
Plug and Play	<p>Referred to as PNP, a specification originated by Microsoft for hardware and software architecture that allows for automatic device identification and configuration.</p>
PROM	<p><u>P</u>rogrammable <u>R</u>ead <u>O</u>nly <u>M</u>emory. A memory chip which can be written to only once. The difference between a PROM and a ROM is that a PROM is manufactured blank, whereas a ROM is programmed during manufacturing. To write data to a PROM a special device called a PROM programmer (or burner) is needed. Programming a PROM is often referred to as burning a PROM.</p>
Protocol	<p>A formalized set of rules that describes how data should be exchanged between two entities. Protocols are typically divided into modular layers where each layer performs a specific function for the layer above. Protocols allows products from different vendors to communicate on the same network. One of the most popular LAN protocols is Ethernet. Another common LAN protocol is IBM's token-ring network.</p>
Protocol Stack	<p>The collection of software modules that implements a particular network protocol (such as TCP/IP).</p>

- RAM** Random Access Memory. Any type of computer memory that can be accessed randomly. RAM is the most common type of memory found in computers. RAM comes in two basic types: SRAM (Static RAM) and DRAM (Dynamic RAM). SRAM and DRAM differ in the technologies used to store their data. SRAM is faster, and hence, more expensive than DRAM. RAM is volatile in nature and will not retain its contents when power is turned off. In common usage, RAM is often referred to as main memory which is used to store programs and data.
- Redirector** A software module that is loaded into every network station. It captures application program requests for file and peripheral services and routes them through the network, i.e., the redirector transforms client-side requests into network requests.
- Registry** A database maintained by Microsoft Windows 95 for storing hardware and software configuration information. The registry is used heavily in Plug and Play systems.
- Repeater** A repeater is used to extend the physical topology of the network allowing two or more cable segments to be coupled together. No more than four repeaters are permitted between the path of any two stations.
- Ring
(Topology)** A network topology where all devices are connected together in the shape of a closed loop. Ring networks are relatively expensive and difficult to install. However, they are robust (one failed device will not cause the entire network to fail). Most ring networks use a token-passing protocol which allows a device on the ring to send messages out when it receives a special bit pattern called a token.
- ROM** Read Only Memory. Computer memory on which data has been pre-written. Once data is written to a ROM it cannot be changed and can only be read. Unlike main memory (RAM), ROM maintains its contents when power is turned off. ROM is referred to as being non-volatile, whereas RAM is volatile.

Server	Any computer on a network that makes file, print, or communication services available to other network stations.
SPX	<u>S</u> equenced <u>P</u> acket <u>E</u> xchange. SPX is an enhanced set of commands implemented on top of IPX that provides for more functions (such as guaranteed packet delivery).
Star (Topology)	A network topology where all devices are connected to a central hub. Star networks are relatively easy to install and manage, but network bottlenecks can occur since all data must pass through the hub.
10BASE2	<u>10</u> -Mbs <u>B</u> aseband <u>2</u> 00 m. A low-cost version of 10BASE5. Commonly known as Cheapernet. Maximum of 30 nodes on cable segment, 185 m per segment.
10BASE5	<u>10</u> -Mbs <u>B</u> aseband <u>5</u> 00 m. Commonly known as Ethernet. Maximum of 100 nodes on cable segment.
10BASE-FB	<u>10</u> -Mbs <u>B</u> aseband <u>F</u> iber Optic <u>B</u> ackbone. Covered by Section 17 (Draft) of IEEE 802.3. Uses IEEE 802.3 protocol, dual fiber point-to-point cabling with synchronous signaling to provide an inter-repeater "backbone" link. No defined maximum node count, maximum fiber distance 2 km, depending on system configuration.
10BASE-FL	<u>10</u> -Mbs <u>B</u> aseband <u>F</u> iber Optic <u>L</u> ink. Covered by Section 18 (Draft) of IEEE 802.3. Uses IEEE 802.3 protocol, dual fiber point-to-point cabling and repeaters to provide the network architecture. No defined maximum node count, maximum fiber distance 1-2 km, depending on system configuration.
10BASE-FP	<u>10</u> -Mbs <u>B</u> aseband <u>F</u> iber Optic <u>P</u> assive. Covered by Section 16 (Draft) of IEEE 802.3. Uses IEEE 802.3 protocol, dual fiber point-to-point cabling and passive optical star to provide network

architecture. No defined maximum node count, maximum fiber distance 0.5 km, depending on system configuration.

10BASE-T	<u>10</u> -Mbs <u>Base</u> band <u>T</u> wisted Pair. Covered by Section 14 of IEEE 802.3. Uses IEEE 802.3 protocol, point-to-point twisted pair cabling and repeaters to provide network services. No defined maximum node count, maximum cable distance is 100 m.
T-connector	A coax connector, shaped like a “T”, that connects two thin Ethernet cables while supplying an additional connector for a network interface card (NIC).
TCP/IP	<u>T</u> ransmission <u>C</u> ontrol <u>P</u> rotocol/ <u>I</u> nternet <u>P</u> rotocol. The Internet protocol stack which defines a wide range of network services allowing heterogeneous network system operation. TCP/IP is the default wide area network protocol used by both Microsoft Windows 95 and Windows NT.
Thick Ethernet	A cabling system that uses large-diameter, relatively stiff cable to connect transceivers. The transceivers connect to the nodes through flexible multiwire cable.
Thin Ethernet	A cabling system that uses a thin and flexible coax cable to connect each node to the next node in the line.
Token Passing	An access protocol which uses a special message (called a token) comprised of a bit pattern which is circulated around the network nodes giving them permission to transmit.
Topology	The geometric map of a LAN. Common LAN topologies include the bus, ring, and star.
Transceiver	A hardware device that links a node to a baseband network cable and functions as both a transmitter and receiver.

Twisted Pair Wiring	Cable comprised of two wires twisted together at six turns per inch to provide electrical shielding. Some telephone wiring uses twisted pair wiring.
Unicode	A standard that defines an international character set encoding scheme.
VL	<u>V</u> ESA <u>L</u> ocal Bus. A high performance, 32-bit system bus originating from the Video Electronics Standards Association (VESA).
VxD	<u>V</u> irtual <u>D</u> evice Driver. A low-level software component that manages a single resource, such as a display screen or a serial port.