# The PDI508Plus™

## Coaxial Cable ARCnet Interface Board for the IBM PC™, PCXT™, PCAT™ and 100% Bus Compatible Computers

Guide to Installation

and Operation

PUREDATA

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**180 West Beaver Creek Road**
**Richmond Hill, Ontario**
**Canada, L4B 1B4**

# INVENTORY CHECKLIST

Your Pure Data PDI508Plus™ ARCnet Interface Board carton contains the following:

- *Pure Data PDI508Plus™ ARCnet Interface Card*
- *Pure Data PDI508Plus™ Support Diskette.*
- *PDI508Plus™ Guide to Installation and Operations (this manual)*
- *Limited Warranty (included in PDI508Plus™ Guide to Operations)*

If any items are missing or damaged, contact your place of purchase immediately.

# The PDI508Plus™

# ARCnet Interface Card

## for the IBM PC™, XT™, AT™, and 100% Bus Compatible Computers.

# Guide to Installation and Operation

Third Edition (July 1989), Document # 0240003203

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## FCC/DOC Compliance

"This product complies with Canadian D.O.C. Radio Interferance Regulations C.R.C.,c1374 governing CLASS A Digital Devices. "

Warning: This equipment generates , uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to correct the interference.

This equipment generates and uses radio frequency and if not installed and used properly in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for class A computing device in accordance with specifications in J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a commercial installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient the receiving antenna*
- *Relocate the computer with respect to the receiver*
- *Move the computer away from the receiver*
- *Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.*

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commissions helpful:

- *"How to Identify and Resolve Radio-TV Interference Problems".*

This booklet, #004-000-00345-4, is available from:
U.S. Government Printing Office, Washington, D.C., 20402

## LIMITED 5 YEAR WARRANTY

Pure Data Ltd. (PD) offers the following warranty with respect to this Personal Computer Product:

The first person who purchases this product for his or her own use (User) shall, during the five years after purchase, have the right to return the Product to PD in the event the Product contained a defect in material and/or workmanship or fails to operate according to specifications contained in this manual. PD will, at its sole discretion replace or repair the Product at no charge to the User. The User is responsible for contacting the PD technical department at the address shown in the manual to secure a Return Material Authorization Number (RMA). The User will then ship the item prepaid and insured to PD with a memo quoting the RMA number.

This warranty is not valid unless the Warranty Registration Card is completed and returned to PD, **within thirty (30) days of the date of purchase.**

Product is supplied by PD on the express condition that except as specifically provided for above, NEITHER PD OR ANY OF ITS EMPLOYEES, AGENTS OR RELATED COMPANIES SHALL UNDER ANY CIRCUMSTANCES BE LIABLE TO USER OR ANY OTHER PERSON ON ACCOUNT OF ANY DEFECT IN PRODUCT OR PRODUCT DESIGN OR ANY FAILURE TO WARN. By taking delivery of and using Product, User and all other persons accept this condition and other terms of this Limited 5 Year Warranty.

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# Table of Contents

# 1. Introduction

Thank you for purchasing the PDI508Plus™ ARCnet Interface Card - a truly innovative ARCnet card for the IBM PC, XT, AT™, and 100% Bus Compatible Computers. Pure Data, as a leading design house of networking hardware, is pleased to add this updated version of the highly successful PDI508™ to its in-house Local Area Networking expertise.

The PDI508Plus™ allows the IBM PC, XT, AT™, and 100% Compatible Computers to be networked via the critically-acclaimed token passing ARCnet Local Area Network to other IBM PC™s, XT™s, AT™s, PS/2s™, mainframes or any other network computer.

The PDI508Plus™ is manufactured to the same high quality which made Pure Data's ARCnet hardware line well-known in the LAN industry. Diagnostic LEDs are on the rear bracket to monitor network and system activity. Each PDI508Plus™ undergoes exhaustive testing and burn-in procedures to maintain quality standards expected of Pure Data products.

The PDI508Plus™ has NO DIP switches. All configurable options are set via a user-friendly menu-driven utility supplied by Pure Data in the Software Package.

The performance of the PDI508Plus™ is greatly improved with the use of Pure Data Enhanced Drivers. When using Novell Netware version 2.1™and above and a PDI516Plus™ in the fileserver the PDI508Plus™ will work in the enhanced mode.

# 1.1. How This Manual is Organized

This manual has 6 chapters.

**Chapter 1** is a brief introduction to the PDI508Plus™ ARCnet Interface Card.

**Chapter 2** provides instructions on configuring and installing the PDI508Plus™.

**Chapter 3** explains the configuration software and how to use it to configure your PDI508Plus™

**Chapter 4** covers the operation of a PDI508Plus™ within an ARCnet environment. Topics covered include: Active and passive hubs, cable lengths, and software considerations.

**Chapter 5** provides problem determination procedures. A variety of symptoms are listed, along with possible causes and solutions.

**Chapter 6** lists technical specifications of the PDI508Plus™ and provides a glossary of commonly used terms within this manual.

**Reading Reference**

For additional information on Pure Data products, ARCnet LAN or on the PDI508Plus™, please refer to the following publications:

- *ARCnet Designers Handbook, Datapoint Corporation, 1983*
- *The PDI508™ ARCnet Interface Card, Guide to Installation and Operation, (P/N 0240001300).*
- *The Pure Data Hub Manual, Active and Passive Hubs, Guide to Installation and Operation (P/N 0240003500).*
- *Pure Data's Bulletin Board System (see page 5-4).*

## 1.2. The PDI508Plus™

The Pure Data PDI508Plus™ board provides an interface to the ARCnet local area network (LAN) for the IBM PC, XT, AT™, and 100% Bus Compatible Computers.

The ARCnet modified token passing local area network was developed by Datapoint Corporation as a high performance LAN used to connect various computing systems and peripherals.

ARCnet operates at a sustained 2.5 Megabit per second data transfer rate and is capable of supporting up to 255 workstations (active devices not including hubs) per network segment.

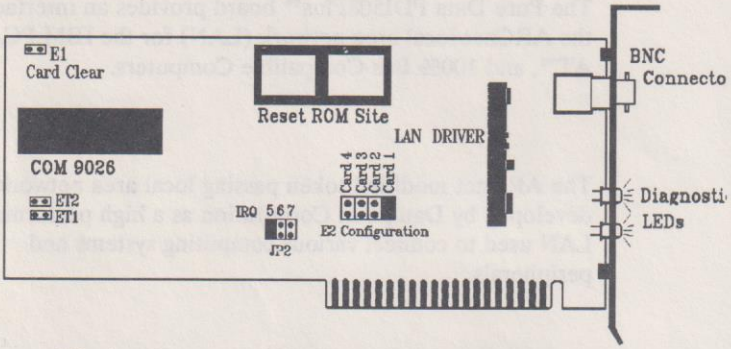
The PDI508Plus™ uses a single-chip ARCnet Controller coupled with a Transceiver chip to provide complete ARCnet protocol handling and compatibility.

All packet buffering is provided on-board, along with an additional PROM area allocated for diskless workstation remote reset PROMs.

The PDI508Plus™ adheres to Datapoint's ARCnet network specifications and may be installed in any full or half length slot of the IBM PC, XT, AT™, or any 100% Bus Compatible Computers.

## 1.3. Features

Below is a diagram of the PDI508Plus™. Familiarize yourself with its major features .




The hardware provides four 512-byte pages of shared RAM buffer for either transmitting or receiving packets.

The ARCnet 9026 LAN Controller can be receiving one packet while another packet is being copied into the buffer.

Two LEDs mounted on the rear bracket of the PDI508Plus™ indicate various types of network and system activity.

A socket is provided on the PDI508Plus™ to allow for up to 8 kilobytes of user-installed PROM. By installing a boot PROM in this socket the need for work station disk drives can be eliminated, as the driveless workstation can use the network hard disk for data storage and retrieval. Contact Pure Data or Pure Data Vendor for information on "Reset ROM" availability for your application.

All memory, I/O and interrupts are selectable via software. Timeouts are selectable via jumpers ET1 and ET2. The E2 card select jumper makes it possible to install up to four cards in one system; each of which are configurable with the supplied software CFGI508.EXE.

Pure Data products are engineered to uncommon standards with an emphasis on flexibility and reliability. Each PDI508Plus™ is fully tested and "burned-in" at elevated temperatures to ensure years of trouble-free operation.

### 1.3.1. Configuration Example

Since there are no DIP switches on the PDI508Plus™, the card can easily be set to any one of a number of different configurations through the menu-driven software utility CFGI508.EXE. The following are the default values the PDI508Plus™ is shipped with:

| | |
|---|---|
| **Memory Address** ..... | **DOOO (hex)** |
| **I/O Base Address** ..... | **2EO (hex)** |
| **Interrupt level** ..... | **2** |
| **Network Address** ..... | **F0h (or F1h) 240 (or 241)** |
| **ARCnet Response time** ..... | **74 us** |

**Note : The PDI508Plus™ is shipped with these default values to accommodate "diskless workstations". Consult with the network supervisor about the availability of the default Network ID before installing the PDI508Plus™. It is recommended to clear the default parameters before installing the PDI508Plus™ in a workstation with a disk drive to avoid any conflicts.(see page 2-2)**

When configuring your PDI508Plus™, take the following points into consideration:

- *Determine which memory and I/O base addresses your software requires.*
- *Determine which system interrupt level your software requires.*
- *Check whether any expansion cards currently installed in your IBM™ or 100% Compatible Computer conflict with the memory or I/O addressing or interrupt level expected to be used by the PDI508Plus™.*

The software program, CFGI508.EXE, supplied with the PDI508Plus™ can set the network address to any value between 1-FF (hex). Make sure to give each station a unique address or your network could "hang". This would cause the green LED on all ARCnet boards and the port status LEDs on the Pure Data Hub to become dim and/or flash erratically.

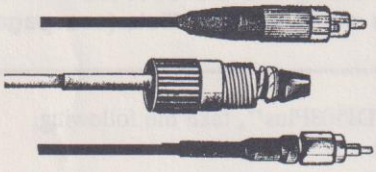
# 1.4. Fibre Optic Option

**Advantages**

- *Extremely wide Bandwidth*
- *Hard to tap, provides data security*
- *Very Durable*
- *Resists interference*
- *Longer Distances*

**Disadvantages**

- *More Expensive*
- *Connectors harder to install*



The PDI508Plus™ is also available with Fibre Optic Transceivers using full duplex dual fibre operation. If you have ordered your PDI508Plus™ with a Fibre option your package should included the PDI508Plus-F™ manual. If the manual is missing, contact Pure Data (see page 5-4).

Other Fiber products from Pure Data include;

- *PDC504A-F™ 4 -port Fiber Active Hub*
- *PDC504A-C3-F1™ 3 -port Coax, 1-port Fiber Active Hub*
- *PDC504A-C2-F2™ 2 -port Coax, 2-port Fiber Active Hub*
- *PDC504A-T3-F1™ 3-port Twist, 1-port Fiber Active Hub*
- *PDC504A-T2-F2™ 2-port Twist, 2-port Fiber Active Hub*

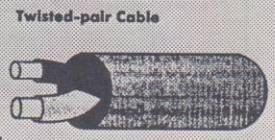
# 1.5. Twisted Pair Option

**Advantages**

- *Extremely Low Cost*
- *Widely available (existing telephone wire see table below)*
- *Easy to install.*

**Disadvantages**

- *Shorter Distances.*
- *Wires must be polarized.*




The PDI508Plus™ is also available with Twisted Pair Transceivers . If you have ordered your PDI508Plus™ with a Twisted Pair option your package should include the PDI508Plus-T™ manual. If the manual is missing, contact Pure Data (see page 5-4).

Other Twisted Pair products from Pure Data include;

- *PDC520A-T™ 20-port Twisted Pair Active Hub*
- *PDC508A-T™ 8 -port Twisted Pair Active Hub*
- *PDC504A-T™ 4 -port Twisted Pair Active Hub*
- *PDC504A-C2-T2™ 2 -port Coax, 2-port Twist Active Hub*
- *PDC504A-T3-F1™ 3-port Twist, 1-port Fiber Active Hub*
- *PDC504A-T2-F2™ 2-port Twist, 2-port Fiber Active Hub*
- *PDI507™ ARCnet Interface Card*

| Twisted Pair Wire Specifications | |
|---|---|
| Wire | 22 - 24 AWG solid copper |
| Number of twists | minimum of 2 per foot |
| DC resistance | 28.6 ohms per 1,000 feet |
| Impedance | 105 ohms +/-20% @5MHz |
| Attenuation | 16.0 dB per 1,000 feet @5MHz |

# 1.6. High Impedance Transceiver (HIT™) Option

**Advantages**

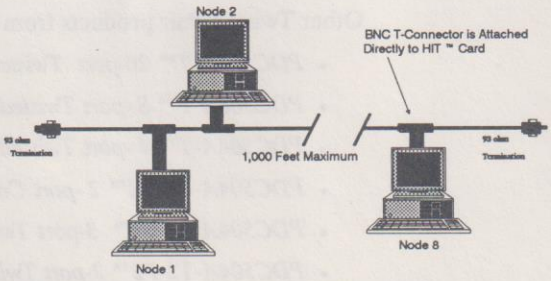
- *Reduces Hardware Cost.*
- *Noise immunity Filtering.*


**Disadvantages**

- *Short distance between nodes*
- *Fault detection more difficult.*

The PDI508Plus-T™ is also available with High Impedance Transceivers (HIT™) . If you wish to order a Pure Data product with a HIT™ port simply add H to the Pure Data Part Number. For example a PDI508Plus-T™ would be PDI508Plus-H™. The PDI508Plus-H™ has a BNC port to connect to coax cable, the PDI508Plus-T™ which also uses the HIT™ transceiver comes with two RJ11 ports for twisted pair wiring.

HIT™ devices are used to take advantage of the linear bus topology.




The PDI508Plus-H™ must be used under the following conditions:

- *1,000 feet maximum bus length.*
- *maximum of eight nodes per bus.*
- *BNC T-connector must be attached directly to the card.*
- *one end of the bus must be terminated with 93 ohms.*
- *one end of the bus must be connected to an Active Hub or 93 ohm termination.*

**Jumper J1 is used to replace the terminator required at the end of bus. J1 must be shorted if the PDI508Plus-H is the last station on the bus.**

# 2. Installation

## 2.1. PDI508Plus™ Before Installation

Unique to the PDI508Plus™ ARCnet Interface Board is its ability to be cleared of its configured values. This can be accomplished through software (see page 3-15) or by temporarily shorting the E1 jumper(see page 1-4) while the computers power is on. This makes the board transparent to the host computer and avoids any conflicts between other memory, I/O, or interrupt mapped devices and other network node IDs when first installed in your system.

## 2.2. The PDI508Plus™ Support Diskette

Supplied with the PDI508Plus™, is the PDI508Plus™ Support Diskette which contains many powerful programs. One of these programs is CFGI508.EXE which is used to configure the PDI508Plus™. This support diskette provides the testing software and configuration program for the PDI508Plus™ when installing and configuring a PDI508Plus™ in an IBM PC, XT, AT™ or 100 % Bus Compatible machine. Any Addendum to the PDI508Plus™ manual will be mentioned in the "README.PLS" file on your support disk.

If you have a system with a 3.5" disk drive, you must first copy the 5.25" support disk to a network drive and then copy all the files, including subdirectories, that were on the 5.25" Support disk to create a 3.5" Support disk.

## 2.3. Configuring the PDI508Plus™

The PDI508Plus™ is ready to be installed in your system without prior configuration unless one of the following situations has occurred;

- *If you have previously installed the PDI508Plus™ in another station, before removing the card from that station, you should either use CFGI508.EXE to "Clear Card Parameters" or short out the E1 jumper momentarily with the power on. To short the E1 jumper use the clip supplied on the Card Select jumper or a small screwdriver.*
- *If the Memory, I/O, or Interrupt you require is not readily available.*
  *(contact Pure Data Technical Support, see page 5-4)*
- *If you are installing more than one PDI508Plus™ in the same computer you must move the E2 jumper clip from the card 1 position to it's new card number. Each card installed must be set for a different card number.*
- *If one or more of the default values conflict with another card or if the default network ID is being used by another station you must clear the card parameters and reconfigure the PDI508Plus™ in a station with a disk drive.*

**Note: The CFGI508.EXE file from the Support disk could be copied to the supervisors directory to allow the supervisor to alter the network ID of workstations without disk drives or to the SYS:LOGIN directory to be used by anyone without having to login.**

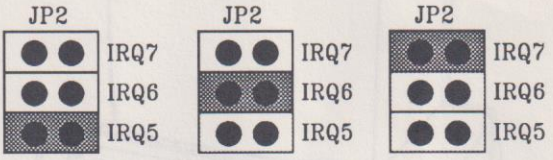
Factory Set Default Parameters (Reset ROM Parameters)

| | |
|---|---|
| **Memory Address** ..... | **DOOO (hex)** |
| **I/O Base Address** ..... | **2EO (hex)** |
| **Interrupt level** ..... | **2** |
| **Network Address** ..... | **F0h (or F1h)**<br>**240 (or 241)** |
| **ARCnet Response time** ..... | **74 us** |

# 2.4. Physical Installation

This section provides information on installing the PDI508Plus™ in your IBM PC, XT, AT™ or 100% Bus Compatible computer.

Before installing the PDI508Plus™ in the computer check the location of the JP2 jumper. The PDI508Plus™ is shipped with the jumper on IRQ5 and must be moved if your system requires IRQ6 or IRQ7.

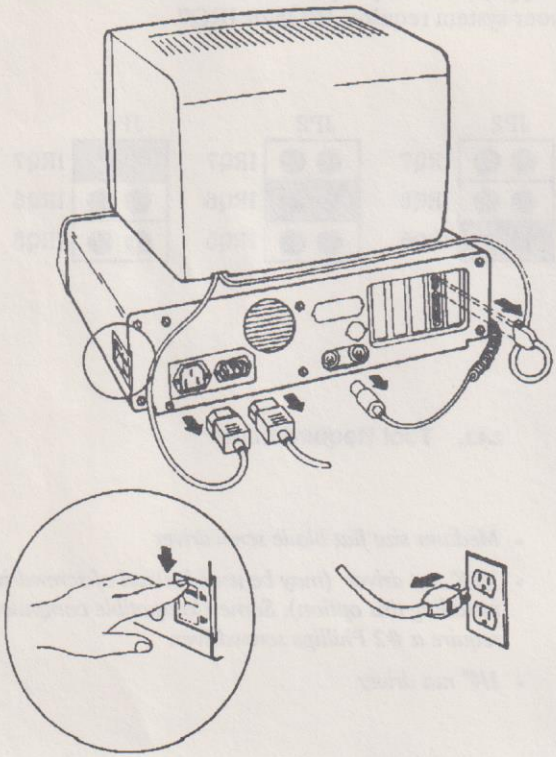



### 2.4.1. Tool Requirements

- *Medium size flat blade screwdriver*
- *3/16" nut driver (may be used instead of screwdriver when installing this option). Some Compatible computers require a #2 Phillips screwdriver.*
- *1/4" nut driver.*

### 2.4.2. Preliminary Steps

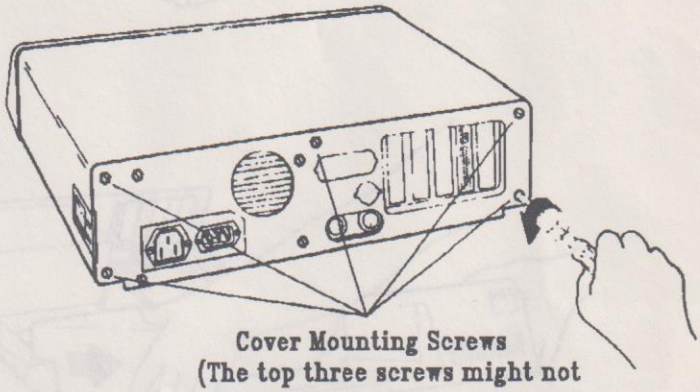
- *Position System Unit switch to OFF.*
- *Position any external option power switches to OFF (printer, monitor, etc.).*
- *Unplug System Unit and all other options from the wall outlet.*
- *Disconnect all cables from rear of System Unit.*



# 2.5. Installing the PDI508Plus™

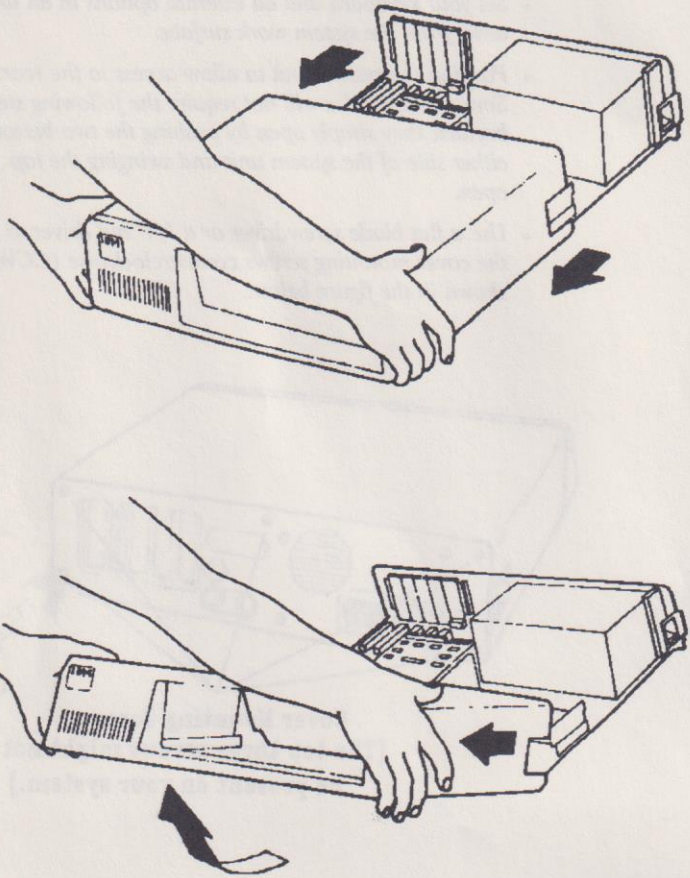
### 2.5.1. Opening the IBM PC

- *Set your keyboard and all external options in an area away from the system work surface.*
- *Position the system unit to allow access to the rear. Some compatibles will not require the following steps because they simply open by pushing the two buttons on either side of the system unit and swinging the top open.*
- *Use a flat blade screwdriver or a 1/4" nut driver to loosen the cover mounting screws counterclockwise (CCW) as shown in the figure below.*

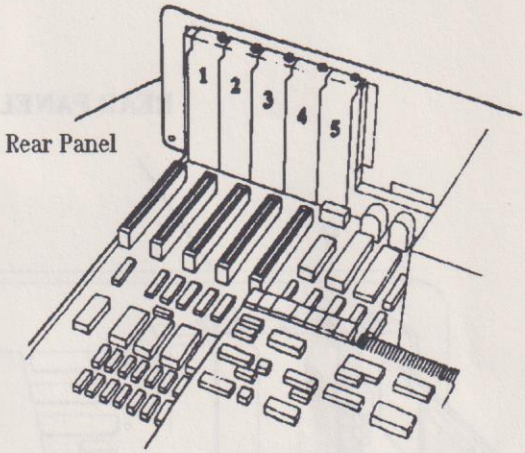


**Cover Mounting Screws**
**(The top three screws might not be present on your system.)**

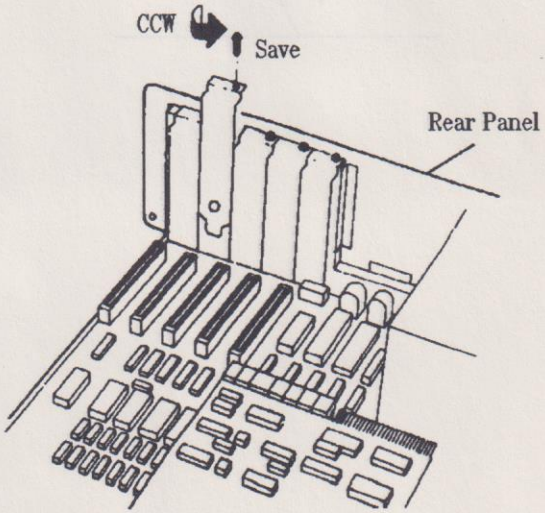
- *Carefully slide the system unit cover away from the rear and towards the front as indicated by the figure below. When the cover will slide no further, tilt it up and remove it from the base. Set the cover aside for now.*



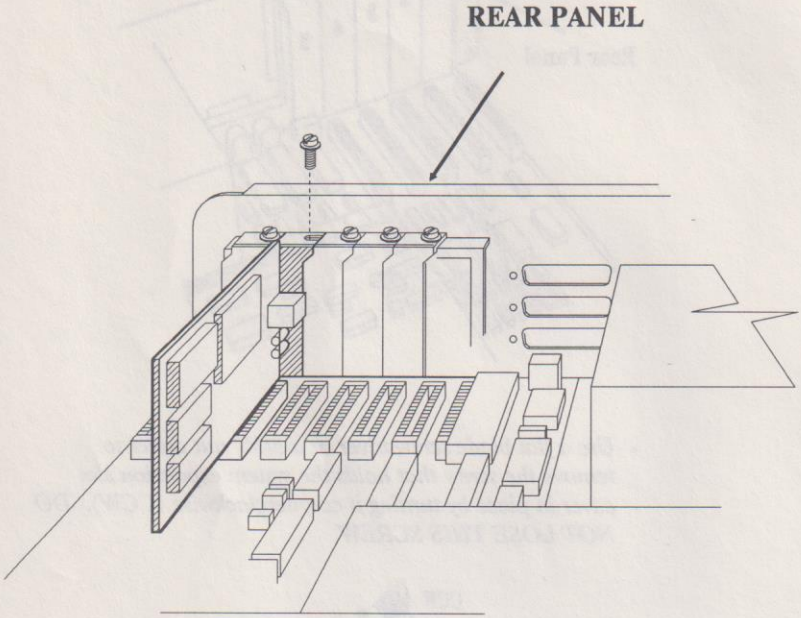
- *Look inside the left rear corner of your system unit. There are five (or eight) system expansion slots. You can install your PDI508Plus™ in any one of the unused slots.*



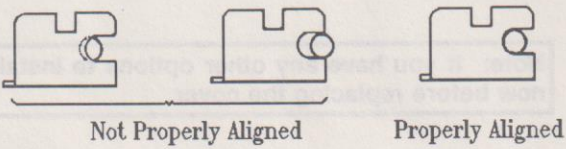

- *Use a flat blade screwdriver or a 3/16" nut driver to remove the screw that holds the system expansion slot cover in place by turning it counterclockwise (CCW). DO NOT LOSE THIS SCREW.*



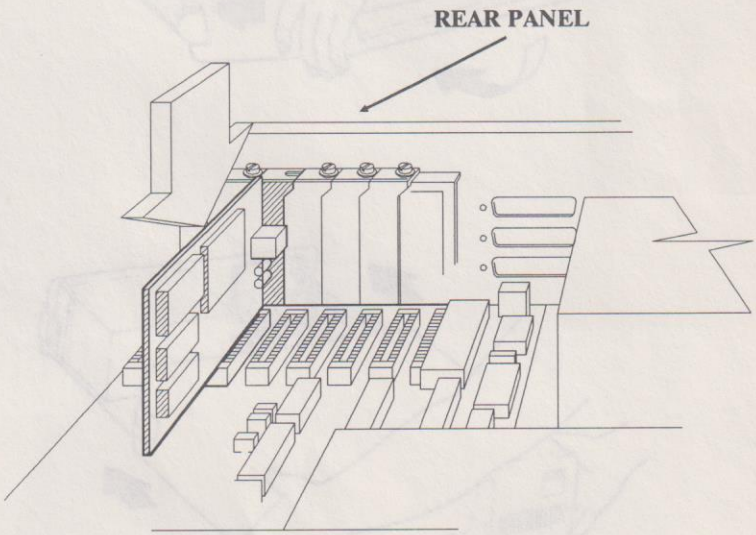
- *Hold the PDI508Plus™ by the upper edge and firmly press into the selected slot.*



- *Align the slot in the option retaining bracket with the hole in the rear panel of the system unit. Finger tighten the screw clockwise (CW) and then tighten with flat blade screwdriver or 3/16" nut driver.*



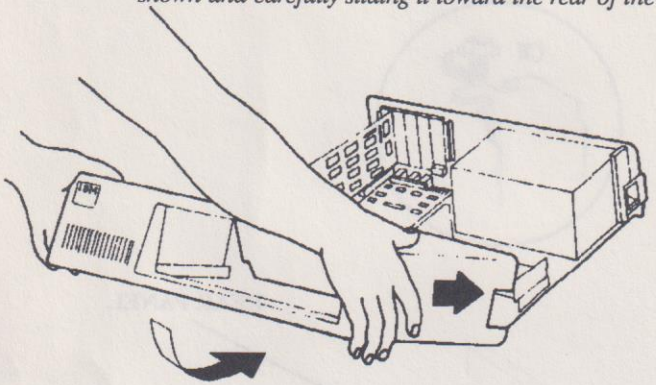
Not Properly Aligned  Properly Aligned

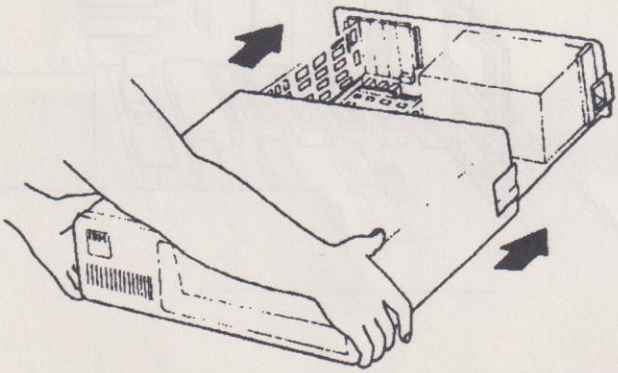



- *The switches on the System Board are not affected by the PDI508Plus™. Do not change the settings of these switches.*

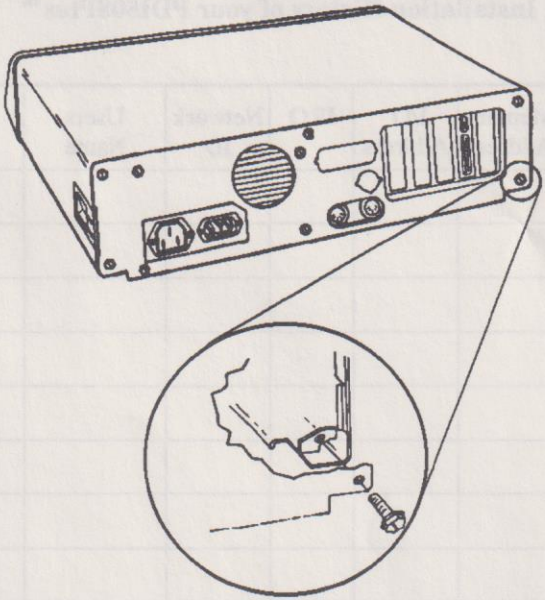
**Note: If you have any other options to install, do so now before replacing the cover.**

- *Replace the system unit cover by positioning the cover as shown and carefully sliding it toward the rear of the unit.*





- *When the cover is all the way to the rear, align the screw with the threaded tabs and tighten. Use the flat blade screwdriver or 1/4" nut driver and turn clockwise (CW).*



- *The system unit is now ready to be reconnected.*

**Note: If there is any problem after installation, one of the following is most likely the cause:**

- *The PDI508Plus™ is not being installed for the first time and has not been cleared resulting in a conflict.*
- *Other options may have been loosened.*
- *There could be a Memory or I/O conflict with other installed cards.*

## Configuration/Installation Notes:

### Installation History of your PDI508Plus™

| Date Installed | Memory Address | I/O Address | IRQ | Network ID | Users Name | Serial Number |
|---|---|---|---|---|---|---|
| | | | | | | |
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# 3. The Software Package

## 3.1. Introduction

This chapter will give you instructions in the operation of the configuration software supplied with your PDI508Plus™.

## 3.2. Running the Software

After you have:

- *cleared the card parameters (when installed in a workstation with a disk drive) or confirmed that the default values will not create any conflicts (in a diskless workstation).*
- *installed the PDI508Plus™ in your system.*
- *decided on a unique node address.*
- *Do Not Attach The Coax Cable To The Network Until You Have Set The Card (except when installed in a diskless workstation).*

You are ready to configure your system.
Turn on your computer.

After you are sure everything is operating normally, boot DOS and insert your PDI508Plus™ Support Disk. The following configuration procedure must be used to complete the installation of the PDI508Plus™ in a fileserver or a workstation. If anything other than the "Network Software Defaults" are required to avoid hardware conflicts, the System Software must be modified to work with these settings.

*When running CFGI508.EXE in anything except a diskless workstation it is recommended not to have the workstation shell loaded .*

## 3.3. Configuration Methods

There are two methods of configuring the PDI508Plus™using the program CFGI508.EXE.

1. The first method is directly from the command line by the use of various parameters to represent the different configurations possible.

2. The second method is by the Pure Data Windowing screens.

## 3.4. Command Line Configuration Method

The CFGI508.EXE configuration program can be used to configure a PDI508Plus™ card directly from the command line. When a string of commands are provided following CFGI508 the card can be configured without enterring the window based portion of the program.

Most of the command line parameters are optional. By default, PDI508Plus™ card 1 will be programmed to packet RAM segment D000, I/O base 2E0 and interrupt level 2. The only mandatory parameter is the network address.

### 3.4.1. CFGI508 Command Line Option Overview

| Option | Default | Description |
|---|---|---|
| /a:xxx | | Set network address,(1-255 decimal). |
| /a:xxh | | Set network address, (01-FF hexdecimal). |
| /f:filename | | Set network address to decimal number located in "filename". |
| | | |
| /c:x | (1) | Select card number. |
| /m:xxxx | (D000) | Set memory base segment. |
| /b:xxx | (2E0) | Set base I/O address. |
| /i:x | (2) | Set interrupt number. |
| ? | | Display command line usage. |

**NOTE: Network Address is the only parameter which must be set.**

Example

**CFGI508 /m:d000/b:2E0/i:2/a:123** or

**CFGI508 /m:d000/b:2E0/i:2/f:filename** if using file to keep track of network IDs.

### 3.4.2. Using CFGI508 to Set Network Address

Type: CFGI508 /a:xxh ( where xx is in hexdecimal ) or

Type: CFGI508 /a:xxx ( where xxx is in decimal ) or

Type: CFGI508 /f:filename ( where the filename specifies the name of a file from which to take a decimal number as the the network address. )

The /f option allows the specification of a network address, using a file to keep track of node ID's. This is particularily handy to the network installer that must set multiple cards. Please note that the network address is a decimal number. As example, you may create this file by typing:

**echo 1 >filename**

This is assuming you wish start numbering at network address 1.

### 3.4.3. Using CFGI508 to Specify Memory Address

Type: CFGI508 /m:xxxx ( where xxxx is a valid packet RAM address in hex )

*Valid Options: A000 C000 C400 CC00 D000 DC00 E000*

### 3.4.4. Using CFGI508 to Specify I/O Base Address

Type: CFGI508 /b:xxx (where xxx is a valid base I/O address )

*Valid options: 2A0 2E0 2F0 300*

### 3.4.5. Using CFGI508 to Specify Interrupt Level

Type: CFGI058 /i:x ( where x is a valid interrupt level,
0 turns interrupts off)

*Valid options: 0 2 3 4 5 6 7*

**Note that option 5, 6, and 7 require the proper jumper selection on JP2.**

### 3.4.6. Using CFGI508 to Select Card Number

Type: CFGI508 /c:x ( where x is the card number, which is selected on E2)

*Valid card numbers are 1, 2, 3, or 4.*

### 3.4.7. Options List

Type: CFGI508 ? (Display command line usage)

Response:

```
Description:  This utlity is used to configure Pure Data PDI508Plus cards.
      When no command line parameters are enterred, a menu based utility
      will be enterred which allows up to 4 cards to be configured.
      A single PDI508Plus card may be configured by enterring the desired
      options on the command line.

Usage: [drive path:] cfgi508 /a:Address [optional parameters]
      [drive path:] cfgi508 /f:Filename [optional parameters]
      [drive path:] cfgi508 (Enters menu based configuration utility)
```

| Parameters | Options | Default |
|---|---|---|
| /m:MemoryBase | A000, C000, C400, CC00, D000, D400, DC00 | D000 |
| /b:BaseIO | 2A0, 2E0, 2F0, 300 | 2E0 |
| /i:IRQLevel | 2, 3, 4 , 5, 6, 7 | 2 |
| /c:CardNumber | 1, 2, 3, 4 | 1 |
| /a:Address | Network Address, xxx (1-255 decimal) | None |
| /a:Address | Network Address, xxH (1-FF hexdecimal) | None |
| /f:Filename | File with Network Address (decimal) | None |

```
Do not enclose optional parameters within the [] symbols.
When using IRQ 5, 6, or 7, verify JP2 is set correct.
```

### 3.4.8. Error Messages

There are a few messages that will be displayed when an inappropriate parameter is specified. These are:

1. Invalid ARCnet™ network address! This means you have specified an address outside the range 1 to 255.

2. Can't open file! This means the file you specified was not found.

3. Invalid packet ram memory location! This means that the segment specified for the card is not supported.

4. Invalid IRQ level! This means that the segment specified for the card is not supported.

5. Invalid I/O base! This means that the base I/O address specified for the card is not supported.

6. Invalid card number! This means that invalid card number was specified.

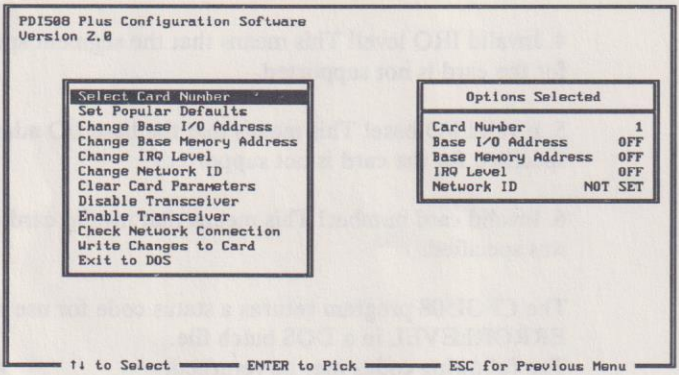
The CFGI508 program returns a status code for use with ERRORLEVEL in a DOS batch file.
The following codes may be returned:

| Return Code | Description |
|---|---|
| 0 | Installation successful. |
| 2 | "?" on command line. |
| 4 | Bad network address. |
| ( 8) | (Not used) |
| 16 | Configuration failure or card not present. |
| 32 | Bad parameter detected. |
| 64 | Bad file name specified. |

# 3.5. Configuration using the Window Method

When you run the program CFGI508.EXE the Menu Select Screen should appear.

A> CFGI508.EXE

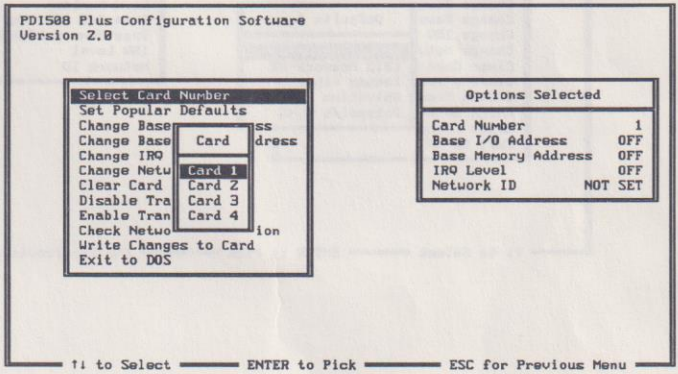



The list on the left of the screen is the "Option Selection Menu" and the list on the right is the options selected ready to be written to the PDI508Plus™.

*Use the arrow keys to move up and down in the menus and the Enter key to select an option. The Escape key will return you to the menu.*

### 3.5.1. To Select the Card Number

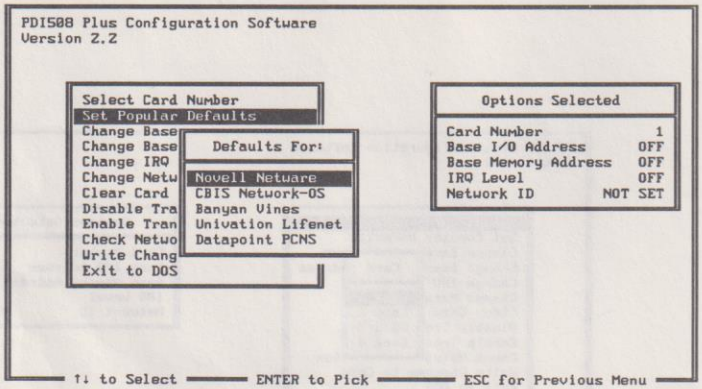
This option is used if there is more than one ARCnet® Interface Card installed in your computer. If you have installed more than one card, you should have first changed the position of the jumper E2 to select a different card number on each card installed in the same computer. This is how the software differentiates between cards during configuration. You can now set the parameters of each individual board by first selecting the "Select Card Number" option and then selecting the appropriate card number.




*When installing more than one card in the same system it is good practice to first clear the card parameters to ensure there are no conflicts between cards on power up.*

### 3.5.2. To Set Some Popular Defaults

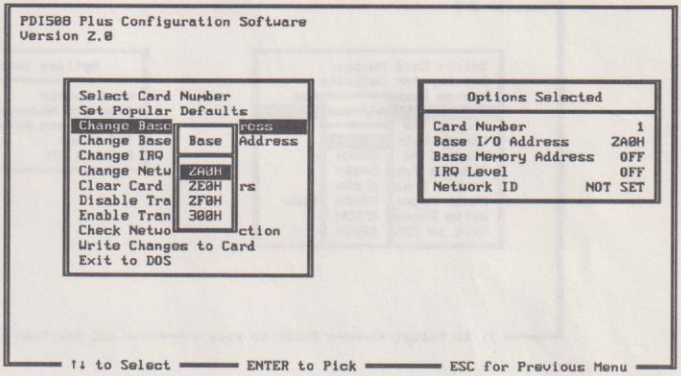
If your network is operating with either Novell NetWare™, Banyan Vines™, Univation Lifenet™, or Datapoint PCNS™ you may simply use this option to set PDI508Plus™ parameters automatically. Simply select the appropriate software package using the up-down arrows keys, press enter and then ESC. You have now set the Base I/O address, base memory address and the IRQ level and can proceed to the Network ID option.




**If you select one of these default settings you may skip the next three sections and proceed to the Network ID section on page 3-8.**

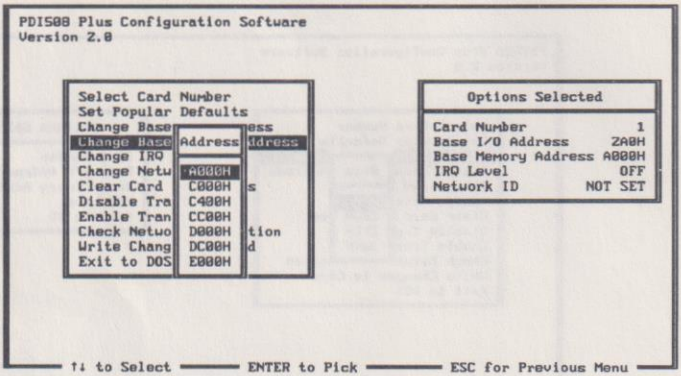
### 3.5.3. To Change the Base I/O Address

To select the "Change Base I/O Address" option, place the selection bar over this option and press Enter. The "Base" option list will appear giving you the choice between four base I/O addresses . If you select a base I/O address different from a default value, in order to avoid a hardware conflict, make sure you modify your network shell to work with this change.



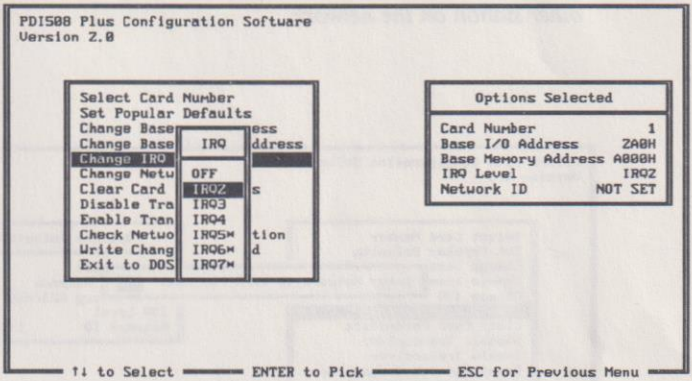
### 3.5.4. To Change the Base Memory Address

To select the "Change Base Memory Address" option, place the selection bar over this option and press Enter. The "Address" option list will appear giving you a choice of seven addresses. Select the appropriate one for your system. If you select a base memory address different from a default value, in order to avoid a hardware conflict, make sure you modify your network shell to work with this change.



### 3.5.5. To Change The Interrupt Request Level

To select the "Change IRQ Level" option, place the selection bar over this option and press Enter. The "IRQ" option list will appear giving you the choice between six interrupt request levels. If you select an IRQ level different from a default value, in order to avoid a hardware conflict, make sure you modify your system software to work with this change.




The PDI508Plus™ is shipped with the JP2 jumper on IRQ5. If you require IRQ2, IRQ3, IRQ4 or IRQ5 there is no need to move this jumper (see figure 1). If you require IRQ6 move the jumper from the IRQ5 position to the IRQ6 position (see figure 2). If you require IRQ7 move the jumper from the IRQ5 position to the IRQ7 position (see figure 3).

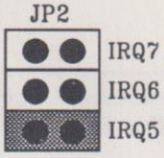



Fig. 1

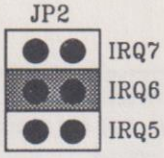



Fig. 2

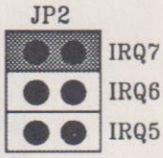
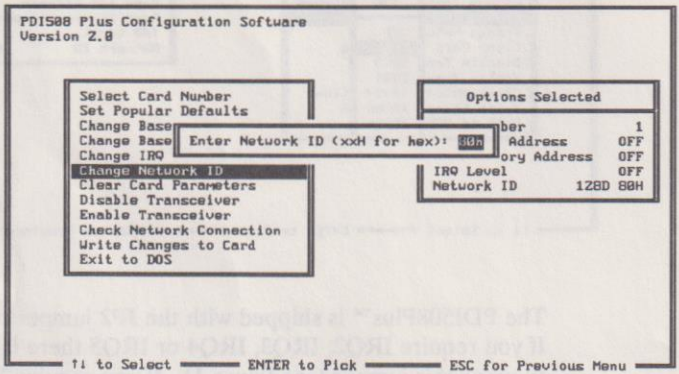



Fig. 3

### 3.5.6. To Change the Network ID

To select the "Change Network ID" option, place the selection bar over this option and press Enter. The "Enter Network ID" option list should appear giving you the choice of any number in hexadecimal between 1 and FF (followed by an h) or in decimal between 1 and 255. *Any number entered that is not followed by an h will be considered decimal. Make sure the address you assign is not being used by any other station on the network.*



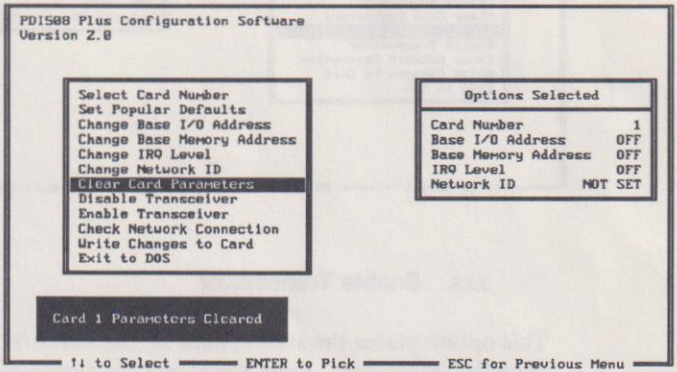

The PDI508Plus™ is now fully configured and you may proceed to section 3.3.11. Other very useful utilities will be discussed on the next few pages.

*Once you have selected all the parameters and written the changes to the card the transceiver will be enabled placing the card on the network.*

### 3.5.7. To Clear Card Parameters

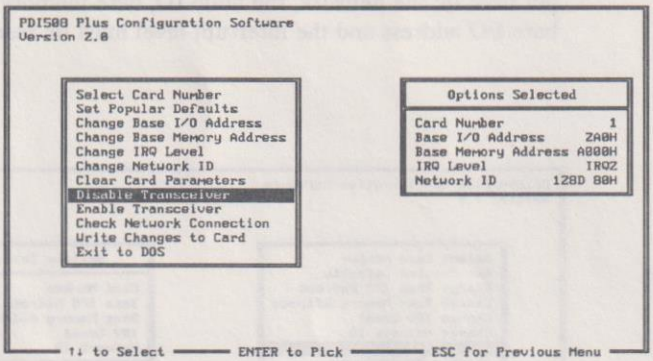
To reset the PDI508Plus™ and make it transparent to the network and the workstation, simply select "Clear Card Parameters" and press Enter. This option will immediately clear the card without selecting Write changes to Card.

After clearing the card, in order for the PDI508Plus™ to be put back on the network, the node ID, base memory address, base I/O address and the interrupt level must be reset.



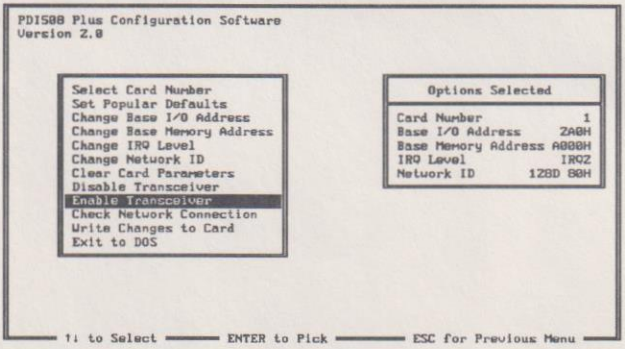
### 3.5.8. Disable Transceiver

This option removes the station from the network and leaves the configuration parameters intact. This is useful in determining a faulty station by preventing the token from being passed to that station. Simply select "Disable Transceiver", press Enter and the card's transceiver will be disabled immediately. If the computer is turned off and on again or CFGI508 is exited and reentered the transceiver will no longer be disabled. This option will only work if the card is configured.



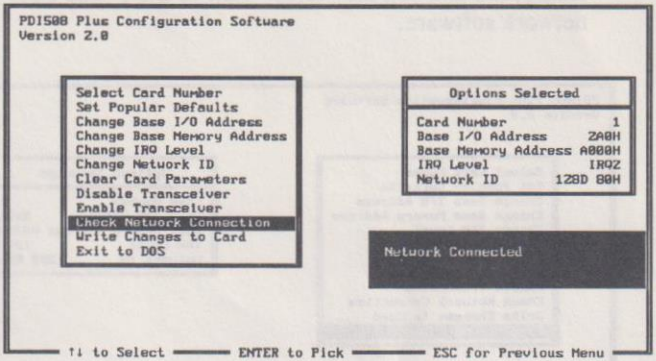

### 3.5.9. Enable Transceiver

This option places the station back on the network. Select "Enable Transceiver", press Enter and the station will once again be passing the token on the network. This option will only work if the card is configured.



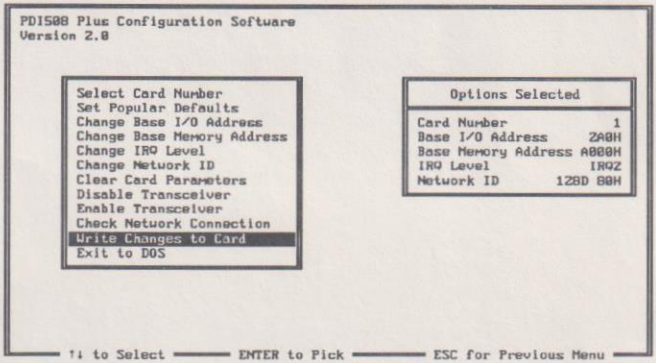
### 3.5.10. To Check Network Connection

This option checks the physical connection of the PDI508Plus™ to the Network. This option will only work if the card is configured.




### 3.5.11. To Write These Changes to the Card

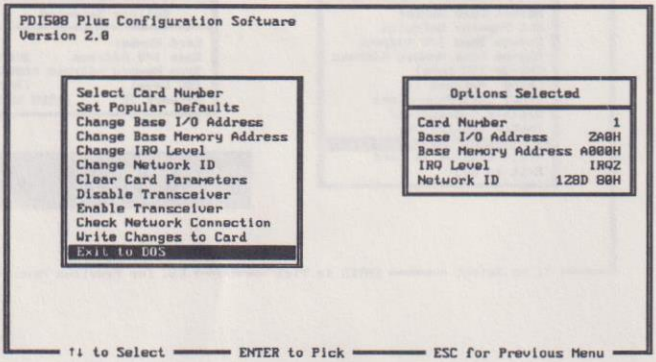
You have now set all the options to suit your needs; these settings will appear in the "Options Selected" list. Review this list and make any necessary changes at this point.




You are now ready to write these options to the PDI508Plus™ by selecting "Write Changes to Card" and pressing Enter.

### 3.5.12. Exit to DOS

The PDI508Plus™ ARCnet Interface Board is now configured and you may select "Exit to DOS" and boot your network software.



# 4. Operation

## 4.1. Introduction

This chapter discusses the operation of the PDI508Plus™ within a network environment. It also describes the topology guidelines of the ARCnet LAN and how to connect the PDI508Plus™ to other network nodes through the use of coaxial cable, passive hubs, and active hubs. It also discusses the use of the PDI508 Plus™ within some of the more popular network operating systems.

## 4.2. Activity Indicators

The rear bracket of the PDI508Plus™ contains two LED activity indicators. One is red, the other is green.

### 4.2.1. System Activity

The red LED is activated whenever the PC is accessing any of the PDI508Plus™'s resources (i.e. memory, I/O). This LED should flash momentarily during system power up and should illuminate whenever the PC is handling information to and from the network. After your PC mounts the network watch the red LED, it should flash periodically telling you the PC is accessing the PDI508Plus™.

**THE RED LED TELLS YOU YOUR PDI508Plus™ AND COMPUTER ARE COMMUNICATING PROPERLY .**

### 4.2.2. Network Activity

The green LED is activated whenever the transceiver on the PDI508Plus™ is active. If the coax cable is disconnected or if no other network node is active, then the green LED will blink at a regular rate. This blinking is caused by the PDI508Plus™'s reconfiguration activities. The rate of blinking is related to the PDI508Plus™'s network address setting; the lower the address, the slower the blinking rate will be. Addresses above 128 decimal (80 hex) will result in a blink rate that may not be noticeable to the human eye.

If the coax cable is connected to an active network, the green LED will be always on, giving an indication of regular token passing.

**THE GREEN LED TELLS YOU THAT YOUR PDI508Plus™ AND THE NETWORK ARE COMMUNICATING PROPERLY .**

## 4.3. Connecting to Other Network Nodes

Connection from the PDI508Plus™ to other network components is made using RG62/U coaxial cable with standard male BNC ends (see pages 1-6,7,8 for details on Fiber, Twisted Pair and HIT interconnections).
A PDI508Plus™ can connect to one of the following:

- *Another ARCnet Network Interface Card (NIC); i.e. PDI508Plus™, PDuC508™, PDI508™, PDT508™, PDN508™ or PDI516Plus™ (in an IBM PCAT™). This would result in a network containing only two network nodes.*
- *An Active Hub (i.e. PDC520A™, PDC508A™ or PDC504A™). An active hub is required if you plan to have more than 4 nodes in your network or cable lengths greater than 100 feet. Active hubs can connect to ARCnet NICs, passive hubs, or other active hubs.*

For example, one PDC520A™ active hub can support 20 nodes if NO passive hubs are used in the network, or up to 60 nodes if 20 PDC504P™ passive hubs are used with the PDC520A™ active hub.

Maximum cable length which may be connected between active nodes is 2,000 feet.

**Note: For environments with portable applications, Pure Data does not recommend the use of passive hubs as there is a general tendency to leave cables unterminated which could bring an entire network down. Using a PDC504A™ would be a safe alternative.**

- *A Passive Hub. A small network of 3 or 4 users can be made using 3 or 4 ARCnet NICs, a PDC504P™ passive hub, and 3 or 4 lengths of cable. Passive hubs themselves may connect to either ARCnet NICs, or active hubs. The maximum cable length that may be attached to any passive hub port is 100 feet.*

**Note: The unused port (if only 3 stations are on the network) MUST be terminated on the PDC508P™ passive hub with the 93 ohm terminator supplied with the hub.**

### 4.3.1. Cables and Cable Lengths

Aforementioned, the PDI508Plus™ and related network components must be connected using RG62/U coaxial cable with standard male BNC connectors. There are restrictions on coax cable length, depending on what you are connecting:

- *Anything connected to a passive hub must have a cable no longer than 100 feet.*
- *Any connection not involving a passive hub (ie. NIC to NIC, NIC to active hub, or active hub to active hub) may have a cable up to 2,000 feet in length.*
- *The maximum combined cable length between the two furthest nodes in the network may not exceed 20,000 feet (assuming jumpers ET1 and ET2 are OUT). Two network nodes thus connected would need at least 9 active hubs connected end to end to achieve this distance.*

Ten Active Hubs connected in a "daisy-chain" fashion is the maximum number that may be in the direct path of any two workstations.

- *As the ARCnet topology is "star" or "tree" structured, no "looping" is allowed (ie. only one path between any 2 hubs; there is no direct connection between any 2 ports in the same hub).*

### 4.3.2. Using Pure Data Active Hubs

Pure Data Active hubs have 20, 8 or 4 female BNC connectors, and may be connected to the PDI508Plus™ ARCnet Interface Board, other ARCnet NICs, PDC504P™ passive hubs, or other active hubs. An active hub is used when you need to connect a network of more than 4 nodes or when cable lengths greater than 100 feet are involved.

**Any length of coax cable attached to an active hub must NOT be more than 2,000 feet in length.**

**Unused connectors on an active hub do NOT require termination.**

**Cables attached to an active hub do NOT need to be connected to anything at the other end.**

For further information on Pure Data Active Hubs, please refer to The *Pure Data Hub Manual, ARCnet Active and Passive Hubs, Guide to Installation and Operation,* Pure Data Part No, 0240003500.

## Active Hubs from Pure Data include;

| | |
|---|---|
| *PDC520A™* | 20-port External Active Hub |
| *PDC508A™* | 8 -port External Active Hub |
| *PDC504A™* | 4 -port External Active Hub |

### 4.3.3. Using PDC504P™ Passive Hubs

The PDC504P™ passive hub has 4 female BNC connectors, and may be connected to PDI508Plus™ ARCnet Interface Boards, other ARCnet NICs , or PDC520™, PDC508A™ and PDC504A™ external active hubs. A passive hub is used when 2 or 3 workstations are connected to the fileserver. You do not need a passive hub if you only want to have a 2-node network. With a passive hub, you can develop a 4 node network.

**A passive hub cannot connect directly to another passive hub.**

**Any length of coax cable attached to a passive hub must not be more than 100 feet in length.**

**The unused port on a passive hub MUST be terminated with the 93 ohm terminator supplied with the hub. The PDC504P™ is not to be used as a joiner with 2 ports unused. Use a longer cable instead.**

Cables attached to a passive hub must be attached to an active signal, either a PDI508Plus™, other ARCnet NICs, or an active hub. **Never** leave cables attached to a passive hub disconnected on the other end. Do not terminate an unused cable, disconnect it and terminate the unused port.

*Attach Passive Hubs at floor level for easier access !*

For further information on the PDC504P™, please refer to The *Pure Data Hub Manual, ARCnet Active and Passive Hubs, Guide to Installation and Operation*, Pure Data Part No, 0240003500.

In some cases where your network consists of only 3 or 4 nodes and your cables are less than 100' the PDC504P™ passive hub is all that is necessary. Caution is advised in making sure each port is connected or terminated to prevent the network from being brought down.

## 4.4. A Summary of Connection Rules

**The PDI508Plus™ ARCnet Interface Board can connect to:**

- *another ARCnet NIC (using no more than 2,000 feet of coax cable)*
- *a PDC520A™, PDC508A™, or PDC504A™, active hub (using no more than 2,000 feet of coax cable)*
- *a PDC504P™ passive hub (using no more than 100 feet of coax cable*

**Pure Data Active Hub can connect to:**

- *a PDI508Plus™ ARCnet Interface Board (using no more than 2,000 feet of coax cable)*
- *another ARCnet NIC (using no more than 2,000 feet of coax cable)*
- *a PDC520A™, PDC508A™, or PDC504A™ active hub (using no more than 2,000 feet of coax cable)*
- *a PDC504P™ passive hub (using no more than 100 feet of coax cable)*

**The PDC504P Passive Hub can connect to:**

- *a PDI508Plus™ ARCnet Interface Board (using no more than 100 feet of coax cable)*
- *another ARCnet NIC (using no more than 100 feet of coax cable)*
- *a PDC520A™, PDC508A™, or PDC504A™ active hub (using no more than 100 feet of coax cable)*

The total cable length separating the two nodes furthest apart on the network shall not exceed 20,000 feet. The greatest number of active hubs (i.e. PDC520A™) between any 2 stations is limited to a maximum of 10.

# 4.5. Selecting Network Timeout Parameters

Two jumpers (ET1 and ET2) allow the network to operate with different timeout values. The maximum distance between the two furthest network nodes determines the setting of these two jumpers; the default setting (both out) gives the shortest timeout value.

The response time timeout is defined as the round trip propagation delay between the two furthest nodes on the network plus the network controller chip's turnaround time (12.6us.). The round trip propagation delay is a function of the length of the cable and the number of active hubs between the two network nodes. The default configuration allows for a round trip propagation delay of about 62 us., or a one way propagation of about 31us. In terms of cable lengths, this translates to about 20,000 feet (6km) of coax cable. It is highly unlikely that these jumpers would ever require changing.

The figure below details the ET jumper settings and their related timeouts.

**All network nodes within the same network segment must be configured for the same timeout.**

**ET1 - ET2 jumper settings and their related timeouts.**

| ET2 | ET1 | Response Time(us.) | Reconfiguration Time(us) | Maximum Coax Cable Length |
|---|---|---|---|---|
| OUT | OUT | 74.7 | 840 | 20,000 feet(6km) |
| OUT | IN | 283.4 | 1680 | |
| IN | OUT | 561.8 | 1680 | |
| IN | IN | 1118.6 | 1680 | |

# 4.6. Operation with Novell's Advanced NetWare™

The following notes refer to Versions 2.0a and later of NetWare™ and provide some helpful information on operating the PDI508Plus™ with NetWare™. Please refer to Novell's documentation for complete operating information.

- *If using anything except the default values the shell must be created first by using the Pure data Drivers supplied on the support disk or Pure Data Bulletin Board.*

  *NetWare 2.0a™* *-use the patching utility to alter ANET3.COM (generated with Pure Data Driver) for the new card settings.*

  *NetWare 2.1™* *-use the patching utility to alter IPX.COM (generated with Pure Data Driver) for the new card settings.*

- *The fileserver's PDI508Plus™ red system activity LED will be constantly illuminated. A workstation's PDI508Plus™ red system activity LED will only be illuminated during network access.*

- *If the fileserver is powered down, the network workstations must "reboot".*

- *If the coax cable connected to the fileserver is disconnected, in some cases the entire network must be "rebooted".*

- *If the coax cable connecting a workstation is disconnected, in some cases the workstation must be rebooted.*

- *DEFAULT SETTINGS*

| | |
|---|---|
| *Memory Address* | *D000:0000* |
| *I/O Address* | *2E0* |
| *IRQ Level* | *INT2* |

- * *Possible Conflicts:*

  *EMS at D000:0000*
  *3270 Emulator uses INT2*
  *EGA often uses INT2*
  *VGA often uses 2E0h*

## 4.7. Operation with Univation's LifeNet™

The following notes refer to Version 2.40 of LifeNet™ and provide some helpful information on operating the PDI508Plus™ with LifeNet™. Please refer to Univation's documentation for complete operating information.

- *Workstation and Fileserver red LED's always on.*
- *IMPORTANT! Server Network Address must be F0.*

- *DEFAULT SETTINGS*

| | |
|---|---|
| *Memory Address* | *D000:0000* |
| *I/O Address* | *2E0* |
| *IRQ Level* | *INT2* |

- **possible conflicts:*
  *EGA A000:0000*
  *3270 Emulator = INT2*
  *EGA = INT2*

## 4.8. Operation with Banyan's Vines™

The following notes refer to the current release of Vines™ and provide some helpful information on operating the PDI508Plus™ with Vines™. Please refer to Banyan's documentation for complete operating information.

- *The default settings described in the Banyan manual are actually different than the values that are used.*
- *use PCCONFIG.EXE from the Banyan Support Diskette to patch BAN.COM for parameters other than the default values.*

- *DEFAULT SETTINGS*

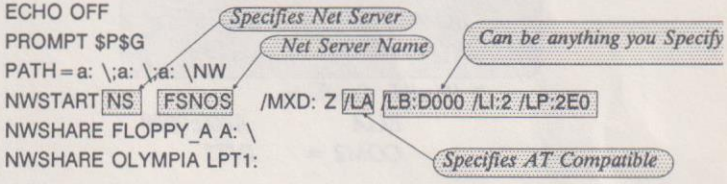
| | |
|---|---|
| *Memory Address* | *D000:0000* |
| *I/O Address* | *2E0* |
| *IRQ Level* | *INT2* |

# 4.9. Operation with CBIS Inc. Network-OS™

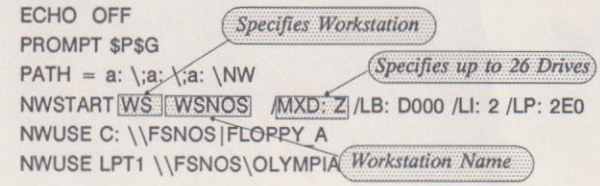
The following notes refer to the current release of Network OS and provide some helpful information on operating the PDI508Plus™. Please refer to CBIS Inc. documentation for complete operating information.

- *There are no "default settings" when using Network-OS.™ You may use any of the settings available from CFGI508.EXE as long as you specify them in setting up your shell.*

Here is an example of a fileserver shell start-up using Novell default values.




Here is an example of a workstation shell start-up using




Novell default values.

# 4.10. Operation with Datapoint PCNS™

The following notes refer to the current release of Datapoint's Personal Computer Networking Service™ and provide some helpful information on operating the PDI508Plus™ with PCNS™. Please refer to Datapoint's documentation for complete operating information.

- *The Resource Management System is for the fileserver, a workstation must run ARCNS (ARCnet Personal Computer Network Server)*

- *DEFAULT SETTINGS*

| | |
|---|---|
| *Memory Address* | *D000:0000* |
| *I/O Address* | *300* |
| *IRQ Level* | *INT3* |

- * *Possible Conflicts:*

| | |
|---|---|
| *EGA* | *A000:0000* |
| *COM2 =* | *INT3* |

# Operation Notes

# 5. Problem Determination

This chapter assumes that you have encountered a problem with the networking functions provided by your Pure Data PDI508Plus™ ARCnet Interface Board.

These procedures will help you to determine whether the problem is related to a configuration error or a hardware malfunction.

Included on your support disk is a diagnostic program, 508PLUS.COM for the PDI508Plus™. The 508PLUS.DOC file should be read over to familiarize yourself with the use of this program. This diagnostic program can be used with a single card to test all the bus functions from the computer to the card. You will need a second PDI508Plus™ set for card number 2) and a short length of BNC cable to test the ARCnet card to cable functions. With two cards you can perform a "loop-back test" which will not only tell you if both cards are transmitting and receiving properly, but by leaving the test running for a period of time it will tell you if either of the cards are susceptible to intermittent problems.

Before testing the card you feel is defective run all the tests with a system you know to be working 100%, including two ARCnet cards that have been working trouble-free. This will give you a benchmark so you can be sure it is the suspected card and not the set-up.

The topology of ARCnet simplifies the isolation of problem stations. By removing one cable at a time from the hub and observing the LEDs the problem station can be tracked down. For example, if one of the LEDs on the active hub is brighter then all the rest, remove that cable. The LEDs on the other ports should return to normal and the network should operate properly. Now you can work your way back along that branch of the network and isolate the defective workstation.

| Symptom | Possible Causes | Solutions |
|---|---|---|
| System will not boot. | Malfunctioning hardware or misconfigured software. | Repair or replace defective hardware, or reconfigure software. |
| | Other Expansion cards are using the same interrupt vector, memory, or I/O space. | Remove cards one at a time until problem is alleviated. The problem is related to the accessory removed at the time of recovery. |
| | | Short E1 Jumper with power on to clear, then reconfigure. |
| RED LED doesn't flash during power-up. | Network software is not accessing the PDI508Plus™. | No problem. Wait until network software accesses the card. |
| | Memory, I/O address, interrupt level not configured correctly. | Using CFGI508.EXE program check and adjust address and interrupt level settings if necessary. Make sure the PDI508Plus™ is configured to network software default values. |
| GREEN LED blinks. | No other station is active in the network. | Activate other network nodes. |
| | Coax cable not connected or defective. | Connect cable to coax connector on rear bracket of PDI508Plus™. Check connections at both ends of cable with ohmmeter for continuity. |
| | Active Hub not powered ON or defective. | Check power indicator on active hub, if out, check power to outlet and adapter if supplied. |

| Symptom | Possible Causes | Solutions |
|---|---|---|
| GREEN LED blinks (cont'd). | Passive Hub defective. | Repair or replace passive hub. If another passive hub is available use to confirm this is the problem |
| | Hardware failure on PDI508Plus™. | Return the PDI508Plus™ for repairs. |
| GREEN LED is OFF. | Network software is not running. | No problem. Run network software and green LED should be ON. |
| | Wrong I/O address setting or defective PDI508Plus™. | Change settings by using CFGI508.EXE or by shorting E1 and resetting all parameters. |
| Network errors when a network node is powered up. | Network Address setting is not unique. | Ensure all network addresses are unique. |
| Flashing LEDs on the Active Hub ( LEDs strobing). | Hardware failure on PDI508Plus™. | Return the PDI508Plus™ for repairs. |
| | Duplicate Node Address. | Change appropriate address to unique setting. |
| | Multiple passive hubs connected together. | Ensure only one passive hub is on any one active signal. |
| | Cable is too long for passive hub. | Ensure cable length does not exceed 100' for cables connected to passive hub. |

# PUREDATA

## Technical Support

### Hotline:

The Pure Data Technical Support Hotline is available every weekday from 8am to 5pm (EST). We have a full staff of knowledgeable personnel ready to assist you with your needs. They are experienced and prepared to help you through any situations which might occur involving our products.

*The support staff can be reached at* **(416) 731-6444 IN CANADA**
**(214) 242-2040 IN USA**

### Pure Data Bulletin Board System (BBS):

The Pure Data BBS is a very useful tool designed to keep the Pure Data customer up-to-date on new utilities, patches & fixes and product news. No need to wait for software when you can download corrective programs to keep your system up and running. To use the Pure Data BBS, you'll need a communications program with your system and a modem device. Once you access the BBS, log-on and follow the prompts given to you. The system is operating up to 2400 baud, no parity, 8 bit word length and 1 stop bit.

Pure Data BBS: **(416) 492-5980 IN CANADA**
**(214) 242-3225 IN USA**

### FAX:

When requesting or sending information, you can make use of Pure Data's FAX line for speedy turn-around.

Pure Data's FAX number is: **(416) 731-7017 IN CANADA**
**(214) 242-9487 IN USA**

# 6. Reference

## 6.1. Glossary

*Address:* A label, name, or number identifying a register, location, or unit where information is stored.

*ARCnet*: A baseband local area network developed in 1977 by Datapoint Corporation. ARCnet uses a modified token-passing protocol and allows up to 255 network nodes to communicate on a token bus at a speed of 2.5 Mbps.

*BNC (bayonet-Neill-Concelman)*: A twist-on bayonet-locking connector for coaxial cable.

*Boot:* A term which means to load or "bootstrap" a computer program into a computer's RAM memory space.

*Coaxial Cable*: An electrical cable consisting of two conductors: a central core within an insulation layer surrounded by a braided shield and then an outer layer of insulation. Round television cable is an example of coaxial cable. There are many different types of coaxial cable; ARCnet uses RG62/U 93 ohm coaxial cable. The term coax cable is synonymous with coaxial cable.

*Diagnostics*: Test programs that drive an electronic device through a range of operating conditions.

*Fileserver*: (also File Server) A network node within a network that provides file storage and file services for other nodes in the network. See Network Node.

*Hex*: Abbreviation for Hexadecimal. A number base commonly used to simplify the expression of binary numbers. An eight bit binary number such as 01010100 can be expressed as 54 in hexadecimal, or 84 in decimal. There are 16 numbers in the hexadecimal system: 0 through 9 and then A, B, C, D, E, or F used in a numerical notation system using a radix of 16..

*Hub*: A signal junction box used for connecting network nodes. There are two types of hubs; active or passive. Active hubs such as the PDC508A™ boost and condition the signal, while passive hubs such as the PDC504P™ merely distribute it.

*I/O:* Abbreviation for Input/Output. A computer usually has two distinct address spaces; a memory space where ROM and RAM are addressed, and an I/O space, where peripheral devices such as disk controllers and communications channels are addressed. See Address, Memory.

*K:* Kilo, a unit of measure expressed as 2 raised to the 10th power in binary, or 1024 in decimal.

*Local Area Network, (LAN)*: A collection of computers connected together in a predefined manner. Computers in a local area network may communicate with one another and share common resources such as hard disks and printers.

*Login*: The processing of authorized access to a computer system.

*M*: Mega, a unit of measure expressed as 2 raised to the 20th power in binary, or 1,048,576 in decimal.

*Mbps*: Mega (million) bits per second. A measure of data transmission speed. ARCnet® transmits at a rate of 2.5 Mbps.

*Memory*: A component of every computer system, memory is used to store or hold information. There are several different types of memory, including ROM (read only memory), and RAM (read/write memory). All of a computer's memory is addressed within it's memory space. The 8088 CPU for example, has a 1 million byte memory space. See Address, RAM, ROM, I/O.

*NIC:* Abbreviation for Network Interface Card.

*Network Node*: A network node is a uniquely addressed component within a network. ARCnet® supports up to 255 network nodes per network segment. Common examples of network nodes are fileservers and workstations. See Fileserver, Workstation.

*Packet:* A group of bits consisting of address, data, and control elements which are switched and transmitted together.

*Packet Buffer:* The memory space reserved for storing a data packet newly received or awaiting transmission.

*Prompt:* One or more characters displayed on a screen by a software package used to indicate its readiness to accept commands from the user.

*RAM:* Random Access Memory. A type of memory which may be written to and read from. Programs stored on diskette must be loaded into RAM before the computer can execute it. RAM memory loses its contents when the power is turned off. See Memory, ROM.

*RG62/U:* see coax cable.

*ROM:* Abbreviation for Read Only Memory. A type of memory which, once programmed, can only be read from. ROM memory retains its information when the power is turned off. See Memory, RAM.

*Tap*: A physical or electrical connection which allows signals to be transmitted onto or off a bus.

*TNC (Threaded-Neill-Concelman)*: A threaded connector for coaxial cable.

*Token*: A unique combination of bits used by a token-passing LAN. A token is passed from node to node passing permission to send a message.

*Token passing*: An access method where tokens are passed from node to node in a LAN.

*Workstation:* A network node at which local processing such as editing and compiling may be done. Workstations in a network may share the common resources provided by network server nodes, such as the fileserver or print server. See Network Node, Fileserver.

## 6.2. Technical Specifications

A brief summary of the PDI508Plus™ specifications is given below:

| | |
|---|---|
| **Coax Connector:** | Isolated female BNC |
| **Cable Type:** | RG62/U 93 ohm |
| **ARCnet Controller:** | 9026 Local Area Network Controller |
| **Cable Transceiver:** | 9032 Local Area Network Transceiver |
| **Data Transfer Rate:** | 2.5 Mbps |
| **Network Address:** | 01-FF hex selectable via software |
| **Network Timeouts:** | Jumper selects one of four timeout values |
| **Indicators:** | Two LEDs mounted on rear bracket provide indication of network and system activity. |
| **Memory:** | Seven base addresses selectable via software .<br>Occupies 16k contiguous bytes of memory. |
| **Memory Consists of:** | 2KB Shared RAM Data Packet Buffers<br>8 KB User Application ROM |
| **I/O:** | Occupies 16 contiguous bytes of I/O space, Base address selectable via software to 1 of 4 options. |
| **Interrupts:** | Software selectable to one of four levels.<br>Hardware selectable toIRQ6 or IRQ7 |

# 6.3. Cable Reference

When installing Pure Data ARCnet Products, the recommended cable type is RG-62A/U (listed as item 3 below). This cable is also available in different ratings, the most popular being the Flame Retardant type (item 5), which requires no conduit for installation. The local building and electrical codes vary significantly, and in many cases you must use the more expensive Flame Retardant cable for large office installations. Please check and verify before you install your cable to ensure that it meets local standards. The list below will assist you in sourcing the proper cable type for your requirements.

The two major manufacturers of cable products in North America are Belden and Alpha. The listing below contains both manufacturer's part numbers where applicable. If you are sourcing cable from other manufacturers please insure that the specifications below compare favourably. The other manufacturers will usually refer to these as Belden or Alpha "crosses" , "equals" or "equivalents".

## CABLE CROSS-REFERENCE LISTING

| Trade Number | U/L# | Alpha No. | Belden No. | Temp. Rating | Nominal Imped. | Nominal Cap/Ft. | Nominal Cap/M |
|---|---|---|---|---|---|---|---|
| 1) RG-62/U JAN-C-17A | N/A | 9062 | 8254 | 80C | 93Ohm | 13.5pF | 44.3pF |
| 2) RG-62A/U | 1354 | 9805 | 9268 | 60C | 93Ohm | 13.5pF | 44.3pF |
| 3) RG-62A/U | 1478 | 9062A | 9269 | 60C | 93Ohm | 13.5pF | 44.3pF |
| 4) RG-62A/U ♣ | N/A | N/A | 9228 | 80C | 93Ohm | 13.5pF | 44.3pF |
| 5) RG-62A/U ♠ | N/A | 9162 | 89269 | 200C | 93Ohm | 12.8pF | 42.0pF |

Items 1-3 are available in Black PVC jacket. All cables feature a 95% shielded coverage.

♣ This cable is commonly called the "Flooded Direct Burial" type with Black High Density Polythylene jacket.

♠ This is known as the Plenum type cable. Available in Black or White tinted Teflon. This cable conforms to NEC Article 725-(b), Class 2 Circuits, U.L. Classified. Meets Subject 13 standard for Non-Conduit installations.

Sources:

- Belden Technical Specifications, Product Engineering Group, (312) 983-5200, Master Catalog No. 885, P.O. Box 1980, Richmond, Indiana, 47375.
- Alpha Technical Specifications, Communications Department, (201) 925-8000, Alpha Wire & Cable Guide W-10, 711 Lidgerwood Ave, Pe.O. Box 711, Elizabeth, NJ 07207-0711.

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NAME TITLE

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CITY PROV./STATE

COUNTRY POSTAL/ZIP

DATA OF PURCHASE PLACE OF PURCHASE

PLEASE CHECK APPLICATION:

❑ BUSINESS ❑ INDUSTRIAL ❑ EDUCATIONAL ❑ PERSONAL ❑ OTHER _____

HOW DID YOU HERE ABOUT THIS PRODUCT? _____

WHAT TYPE OF NETWORK DO YOU HAVE?

❑ ARCnet ❑ ETHERNET ❑ TOKEN RING ❑ ISDN ❑ FDDI ❑ OTHER _____

ARE YOU PLANNING OTHER TYPES OF NETWORKS? ❑ YES ❑ NO

IF YES, INDICATE WHAT TYPES:

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