ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *WinSystems PCM-NE2000-16* at our website: *Click HERE*

OPERATIONS MANUAL
PCM-NE2000

NOTE: *This manual has been designed and created for use as part of the WinSystems' Technical Manuals CD and/or the WinSystems' website. If this manual or any portion of the manual is downloaded, copied or emailed, the links to additional information (i.e. software, cable drawings) will be inoperable.*

WinSystems reserves the right to make changes in the circuitry
and specifications at any time without notice.
©Copyright 1995 by WinSystems. All Rights Reserved.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

REVISION HISTORY

P/N 403-238-000

ECO Number	Date Code	Rev Level
Originated	951128	B
97-38	970715	B1

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TABLE OF CONTENTS

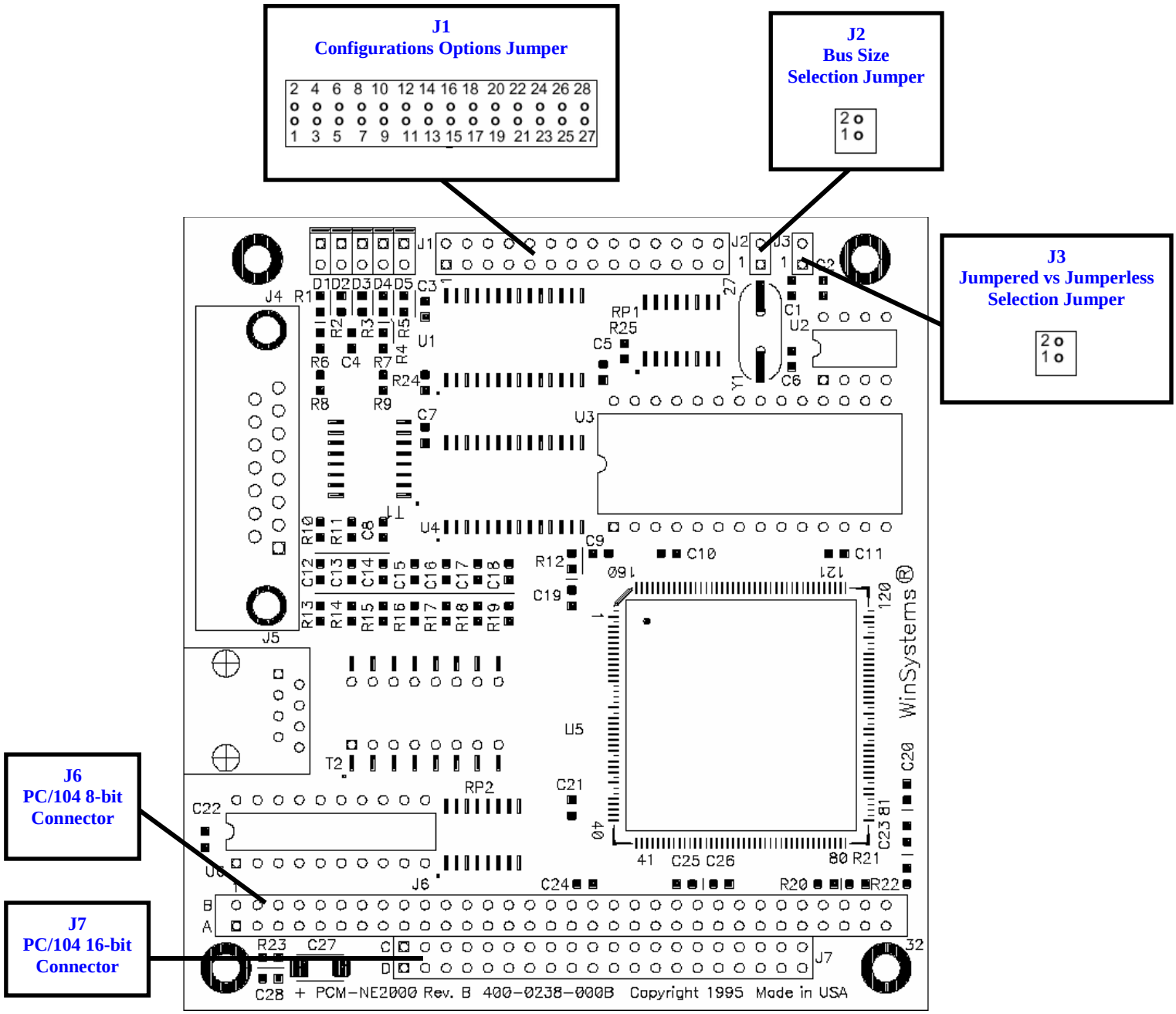
Section	Paragraph Title	Page
	Visual Index – Quick Reference	i
1	General Information	1-1
1.1	Features	1-1
1.2	General Description	1-1
1.3	Ehternet Overview	1-1
1.4	Specifications	1-3
2	PCM-NE2000 Technical Reference	2-1
2.1	Introduction	2-1
2.2	Bus Size Selection	2-2
2.3	Jumpered vs Jumperless Mode	2-3
2.4	I/O Port Selection	2-4
2.5	Interrupt Selection	2-5
2.6	I/O vs. Shared Memory Mode	2-6
2.7	Media Type Selection	2-6
2.8	Boot ROM Selection	2-7
2.9	Compatible vs. Enhanced Mode	2-7
2.10	Status LEDs	2-8
2.11	Pluscfg Configuration Utility Usage	2-8
2.12	PC/104 Bus Pin Definitions	2-14
2.13	Connector/Jumper Summary	2-15
	APPENDIX DP83905AT/LANTIC™ Controller DataSheet, Cable Drawings and Software	
	Warranty and Repair Information	

Trademarks
AT/LANTIC™ is a registered trademark of National Semiconductor Corporation.
Ethernet™ is a registered trademark of Xerox Corporation
EtherCard PLUS™ and EtherCard PLUS 16™ are trademarks of Standard Microsystems Corporation.
IBM™, OS/2™, PC™, PC- AT™, PC- XT™ are registered trademarks of International Business Machines
MS™, MS- DOS™, MS- Windows™ are registered trademarks of Microsoft Corporation
Netware™ and Novell™ are registered trademarks of Novell Inc.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Visual Index – Quick Reference

For the convenience of the user, a copy of the Visual Index has been provided with direct links to connector and jumper configuration data.



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1 General Information

1.1 FEATURES

- NE2000 Compatible PC/104 Ethernet Controller
- Uses National AT/LANTIC™ High Integration Controller
- 802.3 Ethernet Compliant with 10BASE5 and 10BASE-T support
- +5Volt only required in 10BASE-T Mode
- Can be configured via jumpers or jumperless through configuration software
- Onboard EEPROM stores configuration information
- Boot ROM socket for Diskless Network access

1.2 General Description

The PCM-NE2000 is a PC/104 Ethernet adapter which is software compatible with the Novell NE2000 ISA bus Ethernet card. This compatibility allows the use of a wealth of driver software existing for the NE2000. Nearly all Network software vendors and real-time O/S vendors support the NE2000 architecture directly or with drivers they supply themselves. Support includes Netware, Lantastic, Windows for Work Groups, Windows 95, QNX, and a host of others.

The PCM-NE2000 can be configured either by using the onboard jumper block or can be used in a software-configured “jumperless” mode.

The supplied utility/driver diskette includes the configuration utility as well as ODI, NDIS, and Packet drivers.

1.3 Ethernet Overview

Ethernet is the most widely installed LAN standard for connecting personal computers and workstations with information resources, servers, and other peripherals.

The 10MBS Ethernet CSMA/CD (Carrier Sense Multiple Access with Collision Detection) protocol defines how a node will gain access to the network. The node first monitors the media to ensure that no transmissions are in progress (Carrier Sense). The node may then decide to transmit (Multiple Access). If more than one node decides to transmit simultaneously, then a collision will occur. All nodes will be able to detect this condition (Collision Detection), stop their transmissions, and retry after a random period of time.

Ethernet physical layer specifications include 10BASE5 which defines the use of thick, double-shielded coax in a bus topology. 10BASE2 defines the use of thin coax in a bus configuration. 10BASE-T defines the use of unshielded twisted pair cable in a star configuration. The table on the following page contrasts the three most common Ethernet media types.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Parameter	10BASE5	10BASE2	10BASE-T
Designator	Thick Coax	Thin Coax	Twisted-Pair
Segment Length	500 Meters	185 Meters	100 Meters Nominal
Topology	BUS (Multi-Point)	BUS (Multi-Point)	Star (point-to-point)
Cable Type	0.4" Diam. 50 OHM Double Shielded COAX (RG11)	0.2" Diam. 50 OHM Single Shield COAX (RG58)	24 Guage 100 OHM Twisted-Pair
Connection	Precision TAP	BNC "T"	8-pin RJ-45

1.3.1 National DP83905 AT/LANTIC™ Controller

The PCM-NE2000 incorporates the National Semiconductor DP83905 AT/LANTIC™ Local Area Network Twisted-Pair Interface Controller (See complete datasheet reprint in Appendix C).

The AT/LANTIC™ Controller is a CMOS VLSI device used in the implementation of CSMA/CD local area networks. Unique to the AT/LANTIC™ is the integration of the entire bus interface for PC-AT ISA and PC/104 bus systems. Hardware and software selectable options allow the AT/LANTIC™ to be configured to be software compatible to either an NE2000 or an EtherCard PLUS 16™. Supported network interfaces include 10BASE5 or 10BASE2 via an external transceiver connected to its AUI port, and twisted-pair Ethernet (10BASE-T) using the onboard transceiver. The AT/LANTIC™ provides the Ethernet Media Access Control (MAC), Encode-Decode (ENDEC) with an AUI interface, and 10BASE-T transceiver functions in accordance with the IEEE 802.3 standards.

This functional block incorporates the receiver, transmitter, collision, heartbeat, loopback, jabber, and link integrity blocks as defined in the standard. The transceiver when combined with the equalization resistors, transmit/receive filters, and pulse transformers provide a complete physical interface from the AT/LANTIC™ Controller's ENDEC module and the twisted pair medium.

The integrated ENDEC module allows the Manchester encoding and decoding via a differential transceiver and phase lock loop decoder at 10 Mbit/sec. Also included are a collision detect translator and diagnostic loopback capability. The ENDEC module interfaces directly to the transceiver module, and also provides a fully IEEE compliant AUI (Attachment Unit Interface) for connection to other media transceivers.

The Media Access Control (MAC) function is provided by the Network Interface Control module (NIC) which provides simple and efficient packet transmission and reception control by means of off-board memory which can be accessed either through an I/O port or mapped into the system memory map.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.4 SPECIFICATIONS

1.4.1 Electrical

Bus Interface: PCM-NE2000-8 PC/104 8-Bit stackthrough
PCM-NE2000-16 PC/104 16-Bit stackthrough

Power Requirements: +5V +/-5% at 100mA. typ.
+12V +/-5% for AUI use only

1.4.2 Mechanical

Dimensions: 3.6" X 3.8" X 0.6"

PC Board : FR4 Epoxy glass with 2 signal layers and 2 power planes with screened component
legend and plated through holes.

Jumpers : 0.025" square posts on 0.10" centers.

Connectors : 10BASE-T - RJ45
10BASE2 - DB15M

1.4.3 Environmental

Operating Temperature : -40° to +85° C

Non-Condensing relative Humidity : 5% to 95%

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2 PCM-NE2000 Technical Reference

2.1 Introduction

This section of the manual is intended to provide sufficient information regarding the configuration and usage of the PCM-NE2000 PC/104 Ethernet module. WinSystems maintains a Technical Support Group to help answer questions regarding the configuration and usage of the board. For answers to questions not adequately addressed in this manual contact Technical Support at (817) 274-7553 between 8AM and 5PM Central Time. Technical support can also be requested by mail or via FAX at (817) 548-1358.

The PCM-NE2000 is designed to offer flexible, high-performance, networking capability for the PC/104 bus. It is available with either an 8-bit or 16-bit interface for maximum flexibility and performance.

The PCM-NE2000 uses the National DP83905 high integration Ethernet Controller described in section 1. A complete datasheet reprint for the AT/LANTIC™ DP83905 is reprinted in APPENDIX C for users requiring detailed information.

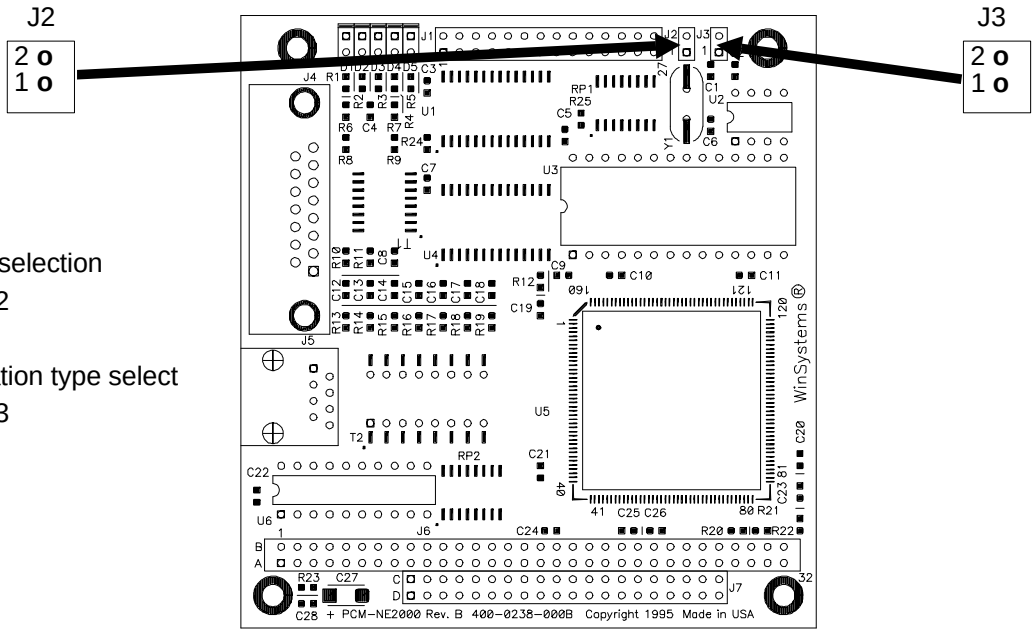
The PCM-NE2000 supports direct connection to 10BASE5 networks via its AUI connector at J4. Using third party transceivers connected to the AUI port it is possible to also support 10BASE2 (Thin Ethernet) or 10BASE-F (Fiber-optic Ethernet). Support for twisted-pair 10BASE-T is provided directly through the RJ45 connector at J5.

An onboard EEPROM holds the Ethernet Address and optional configuration information. This allows for "jumperless" configuration using software to configure the board for it's operating mode, media type, I/O address, interrupt, etc. A software utility "Pluscfg" is provided to configure the module. Refer to Section 2.11 for use of the configuration program. The PCM-NE2000 also supports "jumpered" configuration usable for non-DOS applications where the configuration utility is not usable.

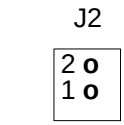
Probably the PCM-NE2000's most attractive features is the software compatibility with the industry standard NE2000 architecture. This compatibility virtually assures the availability of supporting software and drivers for everything from Netware to Windows 95. Although a number of drivers are provided with the PCM-NE2000, on the driver/utility diskette, the board is fully compatible with any software or drivers written for the NE2000 architecture.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

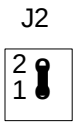
2.2 Bus Size Selection



The PCM-NE2000 is supplied in either of 2 models the PCM-NE2000-8 is supplied for 8-bit PC/104 usage and the PCM-NE2000-16 is supplied for use with 16-bit PC/104 systems. The jumper block at J2 should be configured as shown below for the proper board type.



8-bit operation



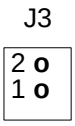
16-bit operation

Note : The PCM-NE2000-16 can be used in an 8-bit mode by simply setting the J2 jumper to the 8-bit mode. However, the PCM-NE2000-8 should never be jumpered for 16-bit mode or improper operation will result.

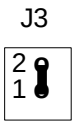
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.3 Jumpered vs. Jumperless Mode

The PCM-NE2000 can be configured either through the jumper block at J1 (detailed in later sections) or via the configuration information stored in the onboard EEPROM. The source for the configuration information is made at jumper J3 as shown below:



Jumperless Operation

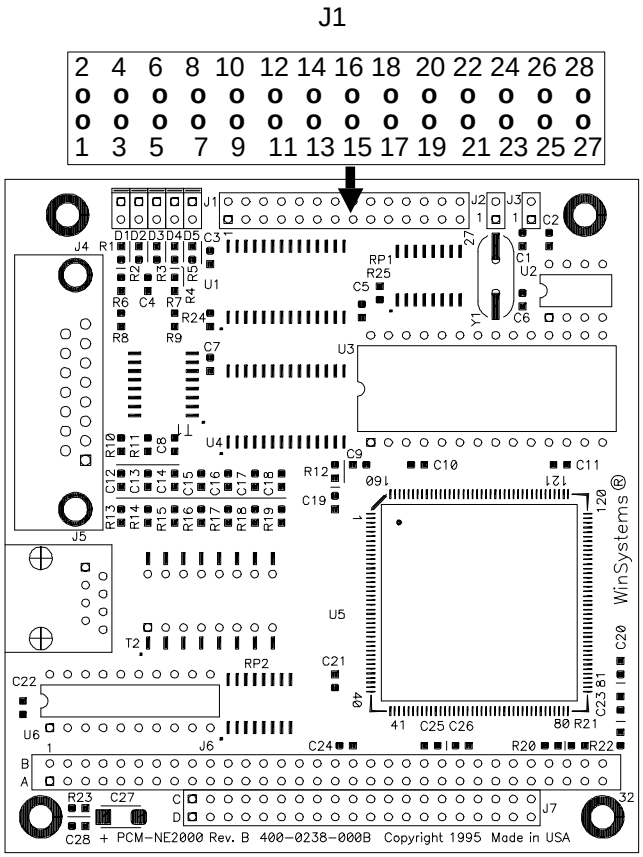


Jumpered operation

NOTE : The choice of “jumpered” or “jumperless” is totally exclusive. This means that if “jumperless” mode is selected all of the jumpers on J1 are ignored and the configuration information comes totally from the EEPROM. Similarly, if “jumpered” mode is selected the information in the EEPROM (Except for the Ethernet Address) is ignored.

The following sections detail the J1 jumpering when the “jumpered” mode is selected.

Configuration Jumper J1



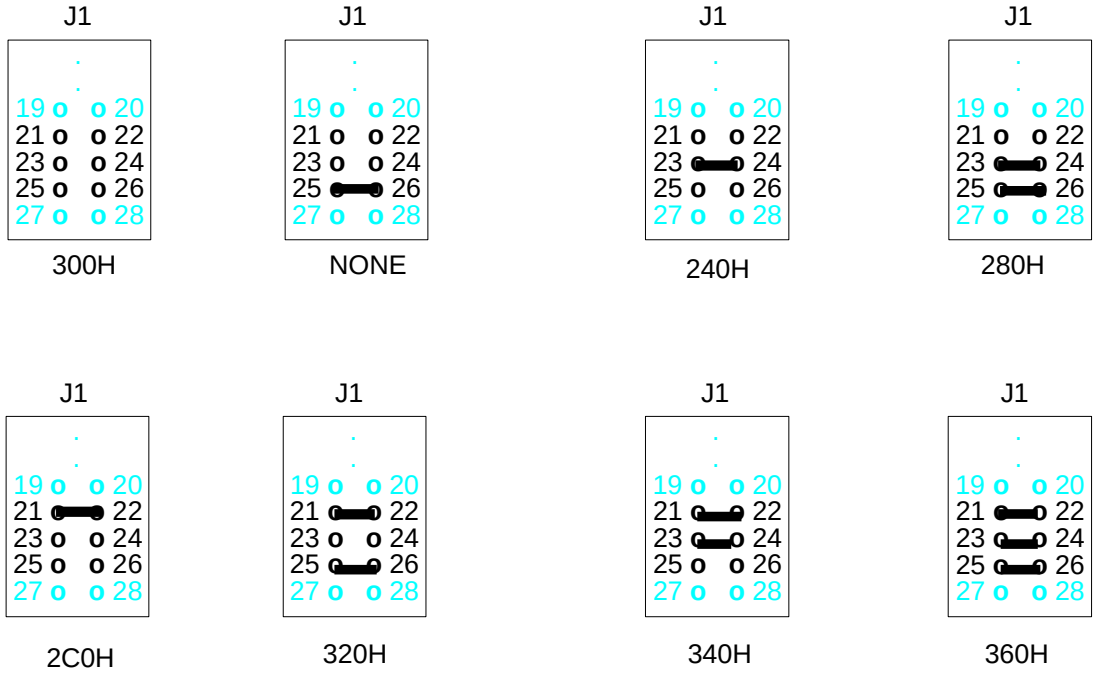
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.4 I/O Port Selection

The PCM-NE2000 uses 32 consecutive I/O address in the 80X86 I/O space. The base address is selected using three pins on the J1 configuration jumper. The choices available are :

240H
280H
2C0H
300H
320H
340H
360H

The proper jumpering for each of these choices is shown in the following illustrations.



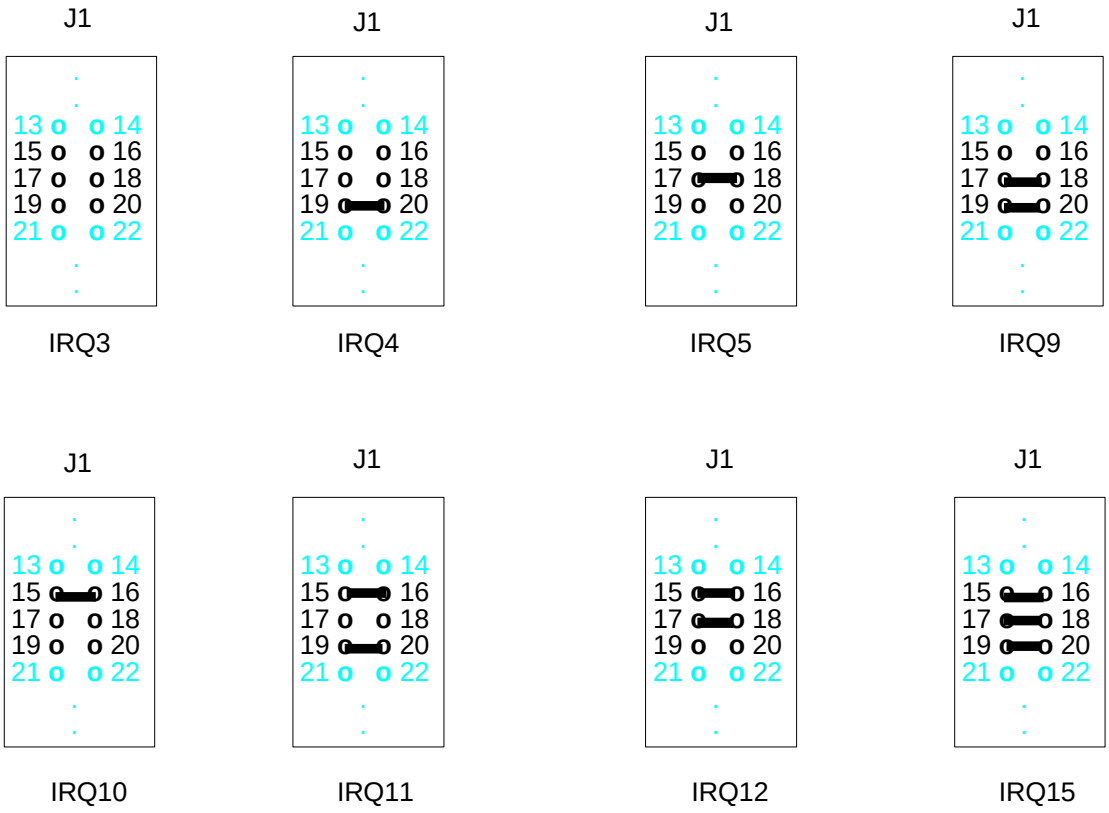
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.5 Interrupt Selection

The PCM-NE2000 needs an interrupt line for signaling various conditions to the software driver. There are 8 possible choices (4 on the 8-bit version) as shown here :

IRQ 3
IRQ 4
IRQ 5
IRQ 9
IRQ 10
IRQ 11
IRQ 12
IRQ 15

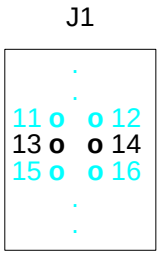
The proper jumpering for the three relevant jumper positions corresponding to the available interrupt choices are shown here :



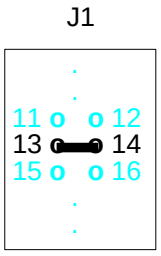
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.6 I/O vs. Shared Memory Mode

The buffer RAM within the PCM-NE2000 can be accessed in either of 2 ways. In the typical NE2000 compatible mode, the RAM is accessed through the NIC via I/O ports. An alternate access scheme is available using the shared memory mode. In this mode the board is software compatible with the WD8013EBT from Standard Microsystems (formerly Western Digital). In this mode a 32K window in the PC adapter space is used to access packet memory. The address of this window is controlled by the driver. For NE2000 compatibility the I/O mode is selected. The jumpering for each of the access modes is shown below :



I/O MODE



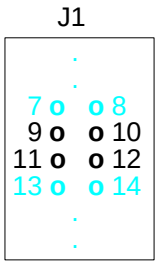
SHARED MEMORY MODE

2.7 Media Type Selection

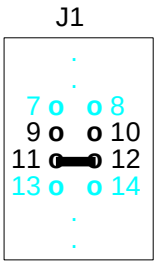
The media type is also jumper selectable via 2 pins on J1. The available choices are:

Twisted-Pair 10BASE-T
Thin Ethernet Coax[1]
AUI
Twisted-Pair 10BASE-T Reduced Squelch[2]

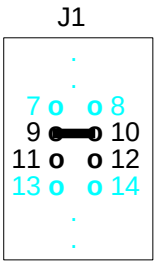
The J1 jumpering for each of the options is shown below.



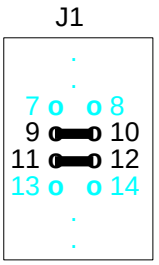
10 BASE-T



THIN ETHERNET[1]



AUI



Non-Spec 10BASE-T[2]

[1]The Thin Ethernet mode is not usable with the PCM-NE2000. If Thin Ethernet is required it is necessary to select the AUI mode and to use an external transceiver.

[2]The non-spec Twisted-pair mode with reduced squelch levels allows the use of longer cable lengths than specified in the twisted-pair specification, or the use of cable with higher losses.

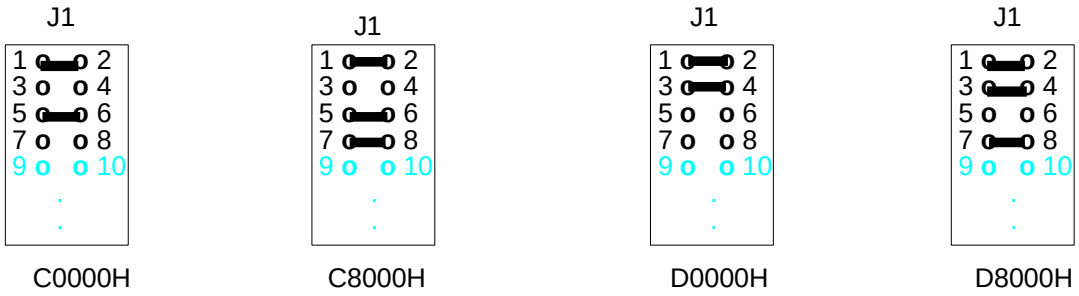
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.8 Boot ROM Selection

The PCM-NE2000 supports the use of the remote boot feature available with Novell and some other operating systems by providing a BIOS Extension boot ROM socket. A user supplied ROM may be installed into U3. The ROM should be a 32K X 8 device of 150nS or faster (type 27C256). The address of the ROM can be selected via a set of jumpers on J1. The addresses available are :

C0000H
C8000H
D0000H
D8000H

The correct jumpering for each of the supported addresses is shown here :



Note : Jumper combinations other than those shown will not result in proper recognition of the ROM. With no jumpers installed the ROM is disabled.

2.9 Compatible Vs Enhanced Mode

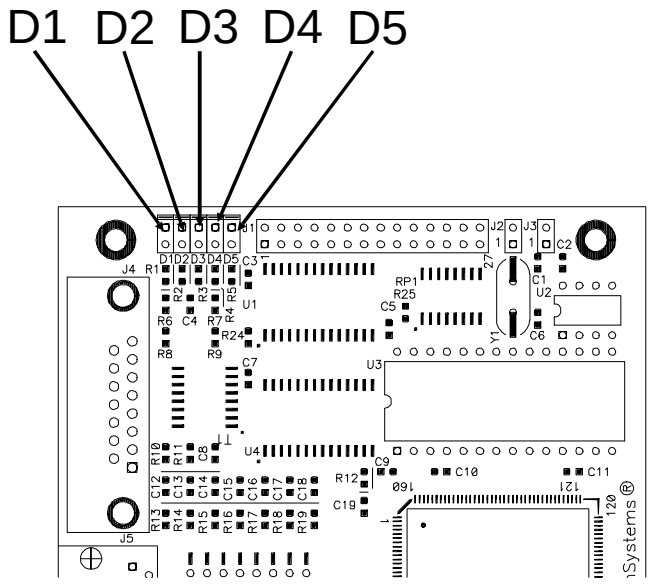
The PCM-NE2000 uses two 32K byte buffer RAMS on board. In compatible mode only 8K of each RAM (Total of 8K or 16K depending on 8-bit or 16-bit mode) is accessible to the driver. When the non-compatible mode is chosen the full 32K is available from each RAM. This Enhanced mode is generally supported by the supplied AT/LANTIC drivers but may not be usable with generic NE2000 software or drivers. When in doubt, choose the compatible mode.

The J1 jumpering for the compatible and enhanced modes are shown here :



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.10 Status LEDs



Status LEDs

There are four LEDs installed on the PCM-NE2000. These status LEDs give visual indication as to the status of the board. The color, location, and general description of each of the status LEDs follows :

D1 GREEN - Transmit activity
D2 GREEN - Receive activity (All packets on network)
D3 RED - Collision
D4 YELLOW - Link Integrity, or testing disabled
D5 YELLOW - Twisted-pair polarity reversed

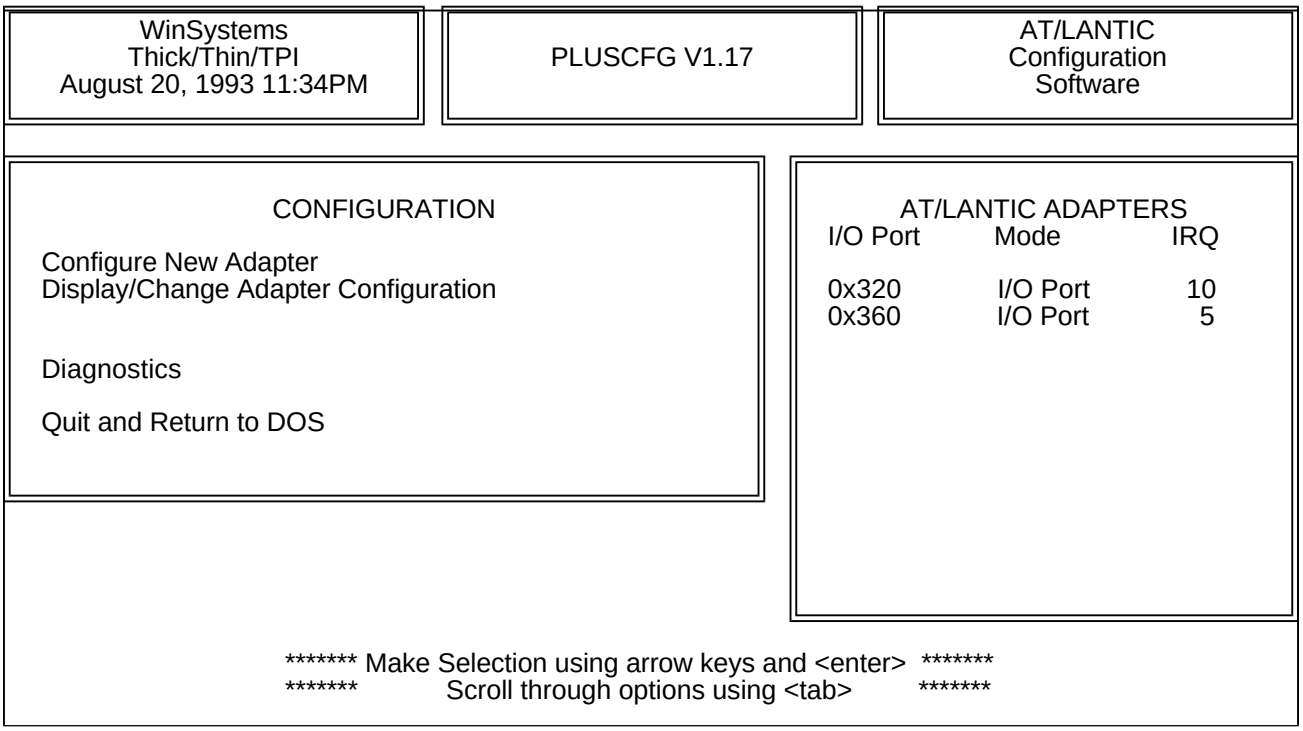
2.11 PlusCfg Configuration Utility

When the “jumperless mode is selected (See Section 2.3), the configuration is made via software which is then saved to the onboard EEPROM. PLUSCFG.EXE along with MESSAGE.MSG can be run from the provided floppy or can be copied to a hard disk. From the DOS command line PLUSCFG.EXE is executed by typing :

pluscfg [Enter]

The configuration program will load and display the basic menu and configuration screen. If any AT/LANTIC™, or NE2000 adapters are recognized they will be displayed in a window on the right side of the screen as shown on the following page:

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



From the main menu choose the desired function. Each of the main menu choices will be discussed in the following sections.

2.11.1 Configure New Adapter

This screen is used to configure an installed adapter that is not present in the window on the right side of the screen. Typically this would be a board that had it's I/O port set to “None”.

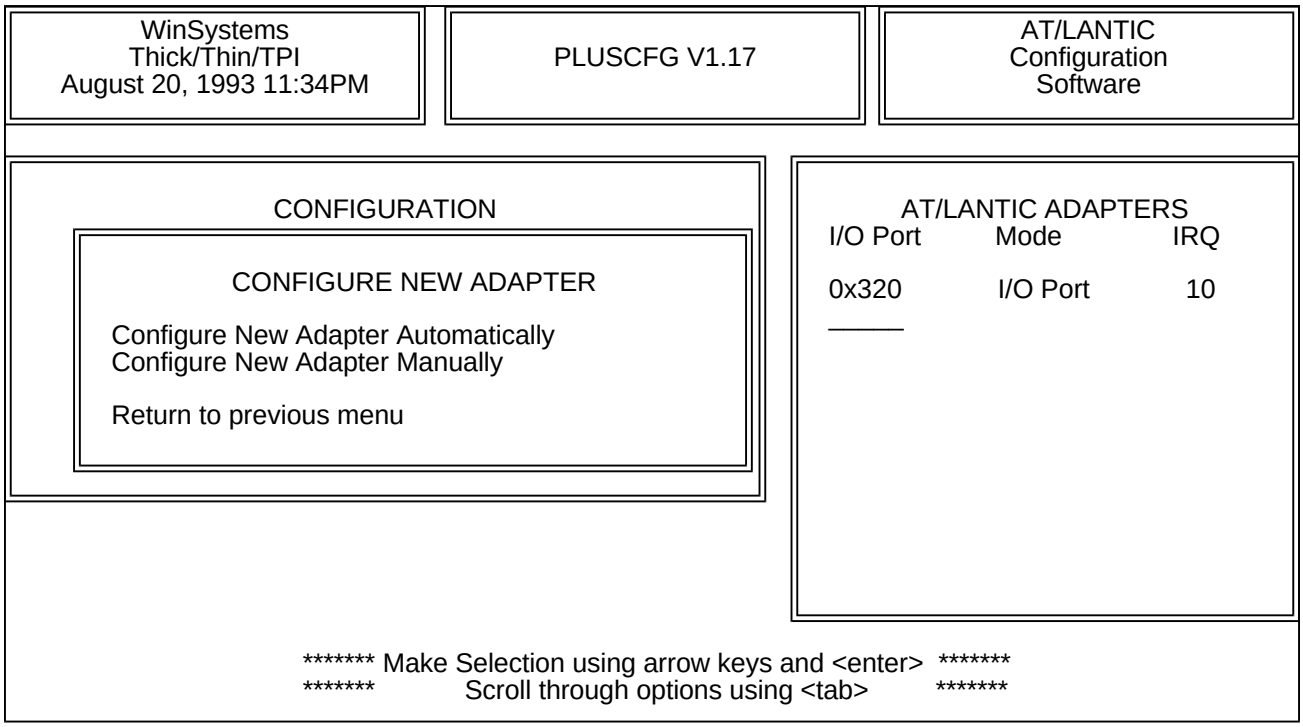
Two choices are provided to configure the new adapter.

The “Configure New Adapter Automatically” will search out an unconfigured adapter if present, survey the system, and make automatic choices for I/O address and interrupts for what it believes are free for use. The system will then display a series of configuration options to the user. These options include :

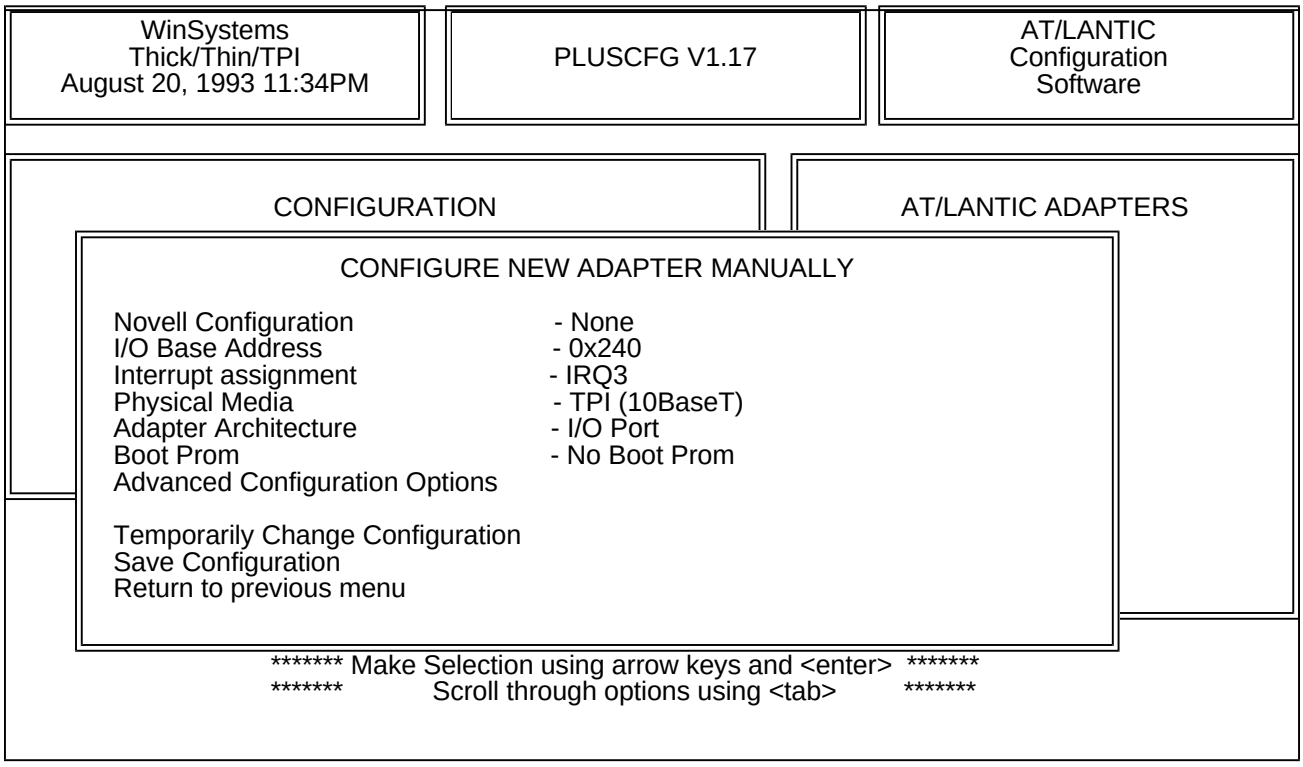
Adapter Architecture - I/O Port or Shared Memory
Select Cable Interface - Thin Ethernet or Thick Ethernet or 10BASE-T

The second prompt will only be presented if there is no active cable attached or the program is unable to determine the media type.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



The "Configure New Adapter Manually" presents a screen similar to the one shown below :



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Use the up and down arrow keys and the tab key to change the displayed configuration to what is desired and then select “Save Configuration” to program the EEPROM with the selected choices.

Note: PLUSCFG will not allow selection of I/O ports, interrupts, or memory addresses that it believes are being used by other hardware in the system. If PLUSCFG refuses to allow a desired selection for what you know are valid choices, it will be necessary to use the “jumpered” mode described earlier, for configuration.

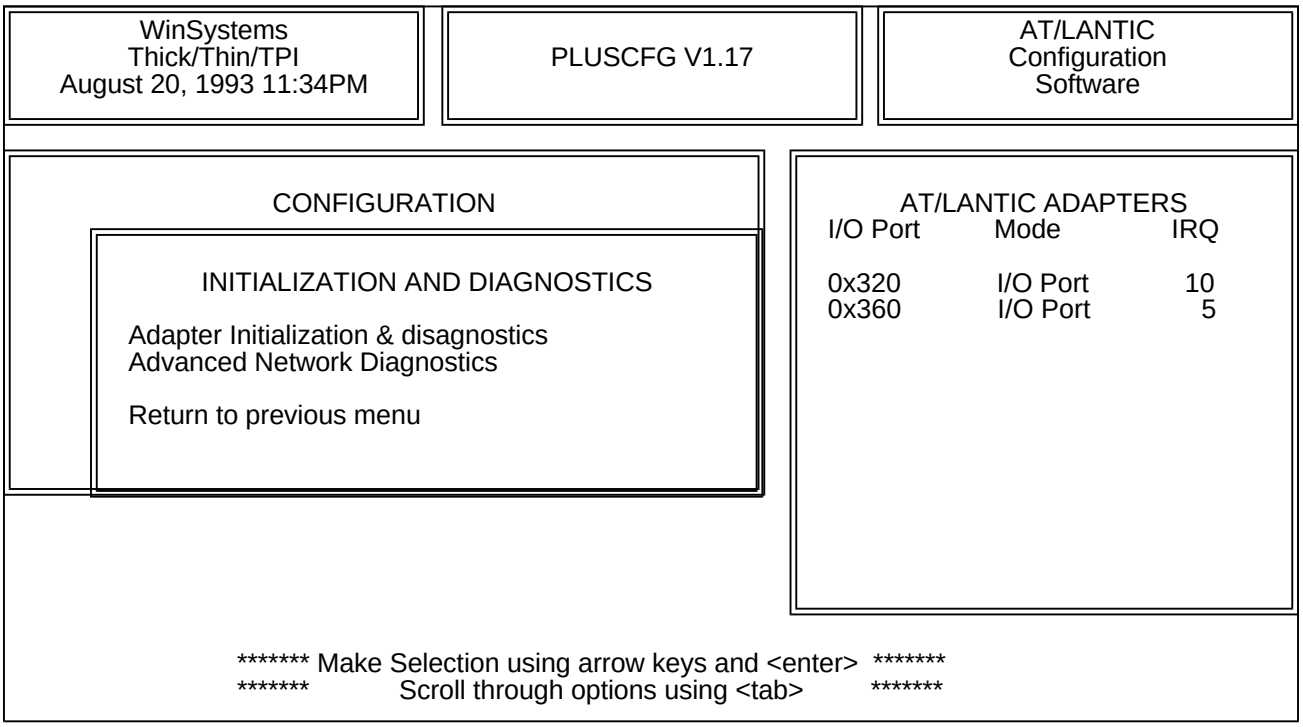
2.11.2 Display/Change Adapter Configuration

This option of the main menu presents the same screen as shown for the “Configure New Adapter Manually”. Use the up and down arrow keys and the tab key to alter the configuration as desired and then select “Save Configuration” to program the EEPROM with the new information.

Note: PLUSCFG will not allow selection of I/O ports, interrupts, or memory addresses that it believes are being used by other hardware in the system. If PLUSCFG refuses to allow a desired selection for what you know are valid choices, it will be necessary to use the “jumpered” mode described earlier, for configuration.

2.11.3 Diagnostics

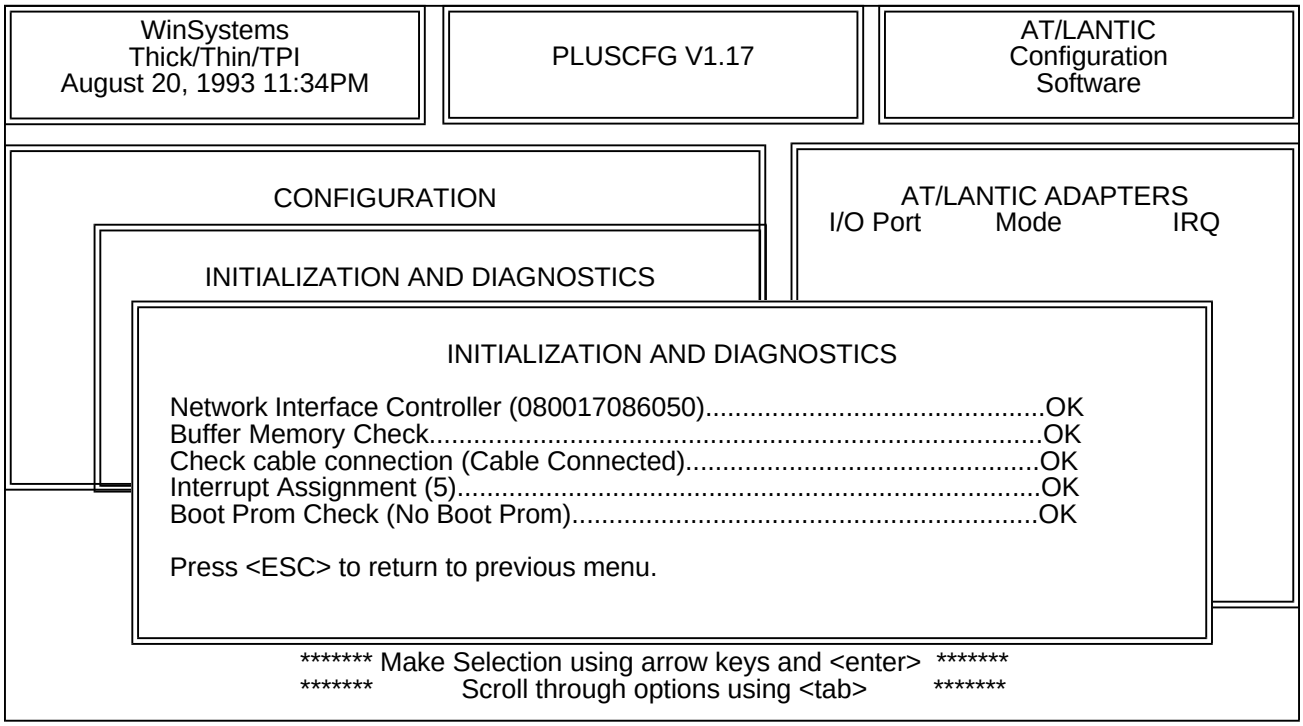
This third choice from the main menu allows the selection from the diagnostics sub menu as shown in this screen below :



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.11.4 Adapter Initialization & Diagnostics

This choice initializes the selected adapter and confirms I/O address, interrupt, media type, etc. The adapter should be connected to the network cable at this time. A sample screen is shown below :



NOTE : The Initialization & Diagnostics must be run and pass before any of the Advanced diagnostics can be executed.

2.11.5 Advanced Network Diagnostics

The Advanced Network Diagnostics menu is shown on the following page.

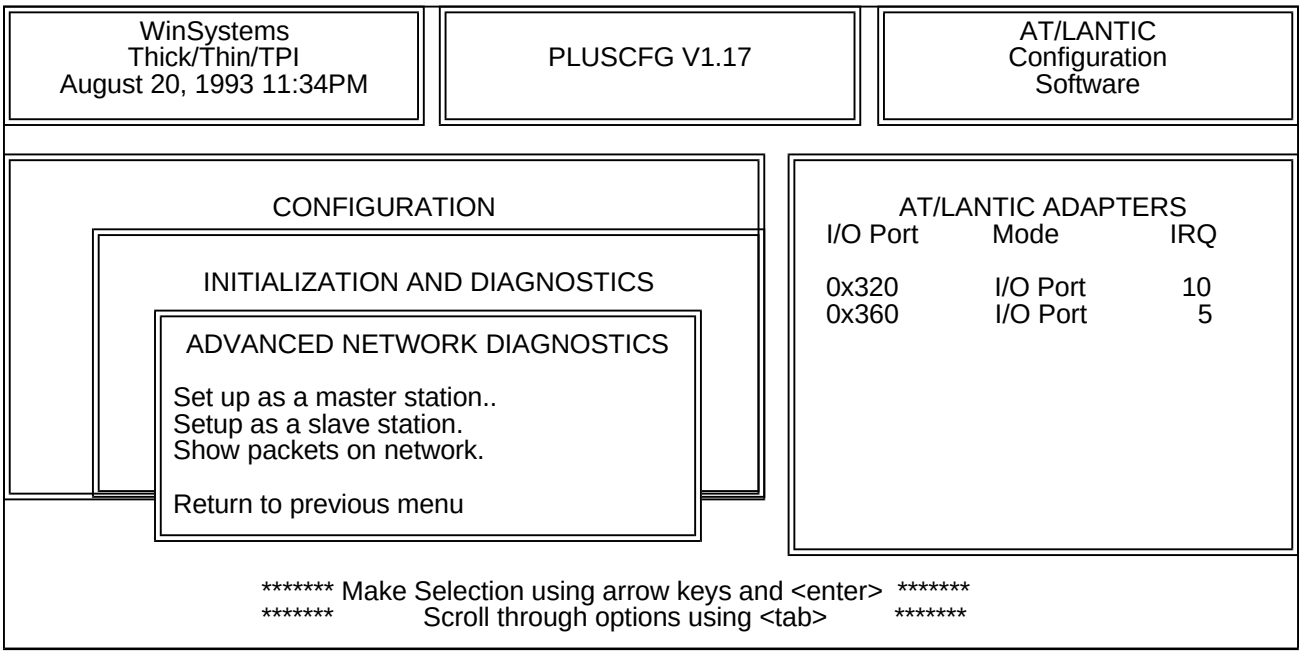
Three choices are provided for Advanced Network Diagnostics.

2.11.6 Setup as a Master Station.

This enables the board under test to be set up as the Master. The master will initiate testing. The Slave must be enabled prior to starting the Master.

The systemwill then request a packet repetition length and after entered will begin the test.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

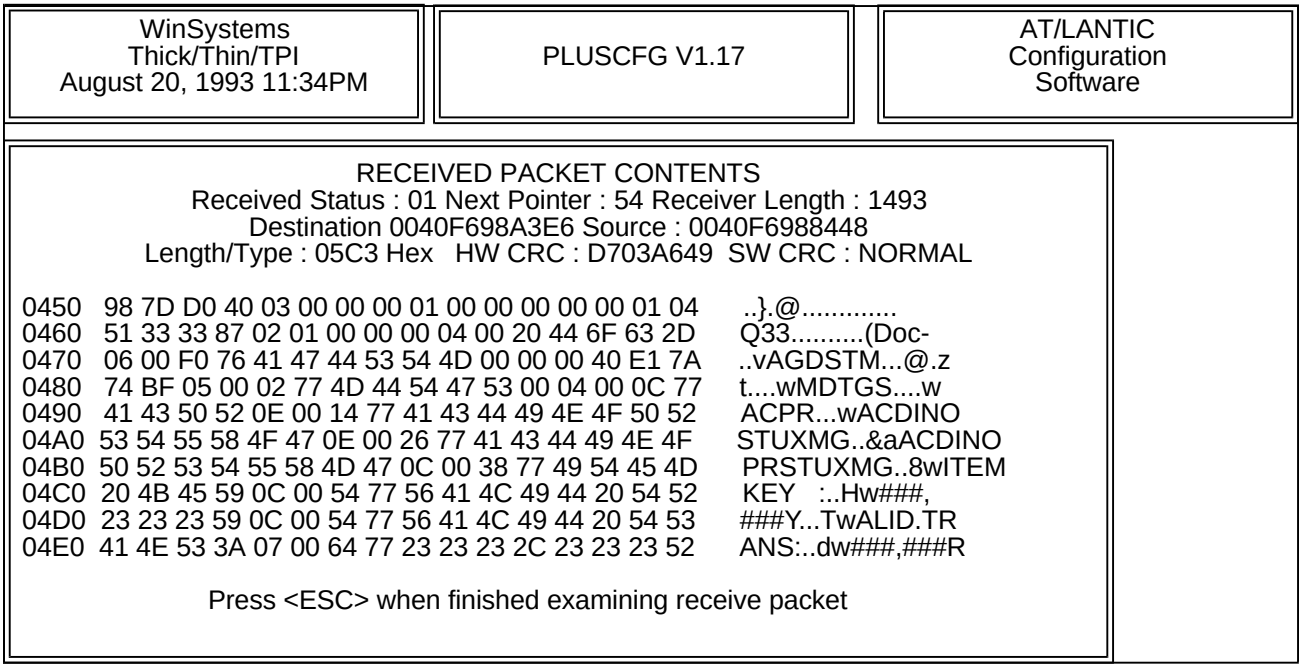


2.11.7 Set up as Slave Station

This choice should be made for a known good board. It will echo back across the network all packets initiated by the Master.

2.11.8 Show Packets On Network

This option displays in HEX and ASCII packets as they are received from the network. A sample screen is shown below :



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.11.9 Quit and return to DOS

This main menu option exits Pluscfg and returns you to the DOS prompt.

2.12 PC/104 Bus Pin Definitions

The J6 and J7 PC/104 bus connector pin definitions are shown here :

J6

GND	B1	A1		IOCHK
RESET	B2	A2		BD7
+5V	B3	A3		BD6
IRQ9	B4	A4		BD5
-5V	B5	A5		BD4
DRQ2	B6	A6		BD3
-12V	B7	A7		BD2
0WS	B8	A8		BD1
+12V	B9	A9		BD0
GND	B10	A10		IOCHRDY
MEMW	B11	A11		AEN
MEMR	B12	A12		SA19
IOW	B13	A13		SA18
IOR	B14	A14		SA17
DACK3	B15	A15		SA16
DRQ3	B16	A16		SA15
DACK1	B17	A17		SA14
DRQ1	B18	A18		SA13
REFRESH	B19	A19		SA12
SYSCLK	B20	A20		SA11
IRQ7	B21	A21		SA10
IRQ6	B22	A22		SA9
IRQ5	B23	A23		SA8
IRQ4	B24	A24		SA7
IRQ3	B25	A25		SA6
DACK2	B26	A26		SA5
TC	B27	A27		SA4
BALE	B28	A28		SA3
+5V	B29	A29		SA2
OSC	B30	A30		SA1
GND	B31	A31		SA0
GND	B32	A32		GND

J7

GND	C0	D0		GND
SBHE	C1	D1		MEMCS16
LA23	C2	D2		IOCS16
LA22	C3	D3		IRQ10
LA21	C4	D4		IRQ11
LA20	C5	D5		IRQ12
LA19	C6	D6		IRQ15
LA18	C7	D7		IRQ14
LA17	C8	D8		DACK0
MEMR	C9	D9		DRQ0
MEMW	C10	D10		DACK5
SD8	C11	D11		DRQ5
SD9	C12	D12		DACK6
SD10	C13	D13		DRQ6
SD11	C14	D14		DACK7
SD12	C15	D15		DRQ7
SD13	C16	D16		+5V
SD14	C17	D17		MASTER
SD15	C18	D18		GND
KEY	C19	D19		GND

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.13 Connector Jumper Summary

Connector/ Jumper	Description	Page Reference
J1	Configuration Options Jumper	2-3
J2	Bus Size Selection Jumper	2-2
J3	Jumpered vs Jumperless select jumper	2-3
J4	AUI Connector	N/A
J5	RJ-45 10BASE-T connector	N/A
J6	PC/104-8 Bus Connector	2-14
J7	PC/104-16 Bus Connector	2-14

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

APPENDIX

DP83905 AT/LANTIC™ Controller Datasheet Reprint

Printable datasheet in PDF format	DP83905_ ATLANTIC .pdf

Cable Drawings

Part Number	Description
CBL-147-1	16-pin ribbon to 15-pin D-Sub AUI adapter cable

Software

Drivers for NE2000 Ethernet Controller	NE2000.ZIP

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Telephone: 817-274-7553 . . Fax: 817-548-1358
http://www.winsystems.com . . E-mail: info@winsystems.com

WARRANTY

WinSystems warrants that for a period of two (2) years from the date of shipment any Products and Software purchased or licensed hereunder which have been developed or manufactured by WinSystems shall be free of any material defects and shall perform substantially in accordance with WinSystems' specifications therefore. With respect to any Products or Software purchased or licensed hereunder which have been developed or manufactured by others, WinSystems shall transfer and assign to Customer any warranty of such manufacturer or developer held by WinSystems, provided that the warranty, if any, may be assigned. The sole obligation of WinSystems for any breach of warranty contained herein shall be, at its option, either (i) to repair or replace at its expense any materially defective Products or Software, or (ii) to take back such Products and Software and refund the Customer the purchase price and any license fees paid for the same. Customer shall pay all freight, duty, broker's fees, insurance changes and other fees and charges for the return of any Products or Software to WinSystems under this warranty. WinSystems shall pay freight and insurance charges for any repaired or replaced Products or Software thereafter delivered to Customer within the United States. All fees and costs for shipment outside of the United States shall be paid by Customer. The foregoing warranty shall not apply to any Products or Software which have been subject to abuse, misuse, vandalism, accidents, alteration, neglect, unauthorized repair or improper installations.

THERE ARE NO WARRANTIES BY WINSYSTEMS EXCEPT AS STATED HEREIN. THERE ARE NO OTHER WARRANTIES EXPRESS OR IMPLIED INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN NO EVENT SHALL WINSYSTEMS BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, OR SPECIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF DATA, PROFITS OR GOODWILL. WINSYSTEMS' MAXIMUM LIABILITY FOR ANY BREACH OF THIS AGREEMENT OR OTHER CLAIM RELATED TO ANY PRODUCTS, SOFTWARE, OR THE SUBJECT MATTER HEREOF, SHALL NOT EXCEED THE PURCHASE PRICE OR LICENSE FEE PAID BY CUSTOMER TO WINSYSTEMS FOR THE PRODUCTS OR SOFTWARE OR PORTION THEREOF TO WHICH SUCH BREACH OR CLAIM PERTAINS.

WARRANTY SERVICE

All products returned to WinSystems must be assigned a Return Material Authorization (RMA) number. To obtain this number, please call or FAX WinSystems' factory in Arlington, Texas and provide the following information:

1. Description and quantity of the product(s) to be returned including its serial number.
2. Reason for the return.
3. Invoice number and date of purchase (if available), and original purchase order number.
4. Name, address, telephone and FAX number of the person making the request.
5. Do not debit WinSystems for the repair. WinSystems does not authorize debits.

After the RMA number is issued, please return the products promptly. Make sure the RMA number is visible on the outside of the shipping package.

The customer must send the product freight prepaid and insured. The product must be enclosed in an anti-static bag to protect it from damage caused by static electricity. Each bag must be completely sealed. Packing material must separate each unit returned and placed as a cushion between the unit(s) and the sides and top of the shipping container. WinSystems is not responsible for any damage to the product due to inadequate packaging or static electricity.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP