

AlphaLAN-2000

User's Guide

Wireless LAN Adapter (IEEE 802.11 Complaint)
for Mobile System PCMCIA Type II

Revision 1.0
May 1998



Leichu Enterprise Co., Ltd.
Advanced Technology B.U.

Important

FCC Information to User

Safety and Care Instructions

- (1) No matter what your level of experience with computers, please make sure you read the safety and care instructions. This information can help protect you, your computer and your Wireless LAN from possible harm.
- (2) Do not use this device in or near water.
- (3) Do not drop, puncture, disassemble, or mutilate this device.
- (4) Keep this device from extreme temperatures. Only operate this device between +0 °C ~ +40 °C. Store this device between +0 °C ~ +50 °C.

If something goes wrong

Unplug this device from the wall outlet and take it for servicing to your dealer if

- The card connector is damaged or frayed.
- Rain or any other liquid has fallen on or into this device.
- This device has been dropped or the case has been damaged.

FCC Warning

This equipment has been tested and found to comply with the limit for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does not cause harmful 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 or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your computer dealer or an experienced radio / television technician for help.

You may find helpful the following booklet, prepared by the federal Communication Commission: Interference Handbook (Stock number 004-000-00345-4). This booklet is available from the U.S. Government Printing Office, Washington, DC20402

Warning: The User must not modify or change any operation environment without approval. Modification could void authority to this equipment.

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1. Introduction

1.1 AlphaLAN family.

Specification & Application of AlphaLAN 2000:

- **AlphaLAN 2000 P :**
 - a. IEEE802.11 compliant
 - b. Modulation: Direct sequence Spread Spectrum.
 - c. Frequency Band: 2.412 Ghz ~ 2.484 Ghz.
 - d. Output Power: 50 mW ~ 100 mW.
 - e. Antenna: Patch. (For Client option)
- **AlphaLAN 2000 D :**
 - f. IEEE802.11 compliant
 - g. Modulation: Direct sequence Spread Spectrum.
 - h. Frequency Band: 2.412 Ghz ~ 2.484 Ghz.
 - i. Output Power: 50 mW ~ 100 mW.
 - j. Antenna: Dipole. (For Access Point option)

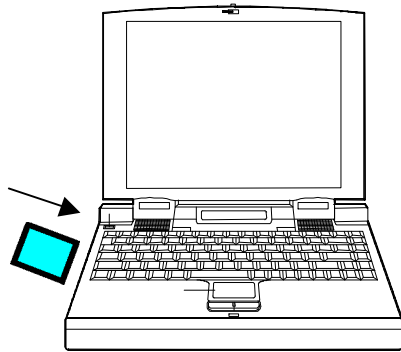
Access Point Specification & Application:

- IEEE 802.11 authentication and association.
- Support for IEEE802.11 PS-poll operation .
- Automatic Authentication and Association
- Frame forwarding between wireless environment and Ethernet environment
- Frame filtering to avoid unnecessary transmission on air
- Support for station initiated roaming
- Inter Access Point Protocol to ensure seamless roaming
- Support for AP initiated roaming
- Configurable ESSID and Radio channel
- User Per Access Point: 32 persons.
- Support Web Browser Management Reporting. (For OEM customer option only)
- Support Command Line Management (For OEM customer option only)
- Trivial File Transfer Protocol
- Support Ping function
- CPU: SC400, 16 MB DRAM, Serial Port, RJ-45 Ethernet connector, Flash ROM, 32 MB flash ROM optional, PCMCIA Slot X 2.

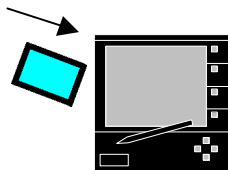
1.2 Product configuration.

Red LED signal for Power On
Yellow LED signal for Link On
Green LED signal for TX/RX On

Dipole Antenna option for Access Point
Embedded Patch Antenna for Client option.



Support Notebook Computer PCMCIA Slot.



Support PDA / Hand Held PC PCMCIA slot.

1.3 AlphaLAN LED Signal.

Red LED : Power On
Yellow LED : Link
Green LED : Active

1.4 Environment Requirements.

Typical indoor environment
Temperature : 0 ~ 55 C.
Humidity : 25 % ~ 80 %

Operation System:

- . Windows 95 / 98
- . Windows NT 3.X
- . Windows CE (for OEM customer option only)
- . MS-DOS 6.X (for OEM customer option only)

2. Installing the NDIS 2.0.1 Driver

The Network Driver Interface Specification (NDIS) 2.0.1 is a driver specification developed by Microsoft offer a standard driver interface for adapter cards. AlphaLAN NDIS 2.0.1 driver supports the following environment:

- Microsoft Windows for Workgroups 3.x

2.1 Microsoft Windows for Workgroups 3.1

Support is provided for the Microsoft Windows for Workgroups (Version 3.1) environment.

NotNote: 1) *The format and procedure to install the NDIS drivers for Windows for Workgroups 3.1 is different from that of Windows for Workgroups 3.11. Refer to Section 4.2 for the procedure for Windows for Workgroups 3.11.*

2) *The directory structure provided on the AlphaLAN NDIS 2.0.1 driver diskette has been set up for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the Microsoft Windows for Workgroups 3.1 User's Guide.*

Follow the steps listed below:

- 1.Insert Disk 1 of the "**AlphaLAN Drivers & Network Management**" disk set into the floppy drive.
- 2.From the Main menu in Windows, select the "**Control Panel**" icon.
- 3.In the Network Setting dialog box, select the "**Adapters**" button. The Network Adapters dialog box should appear.
- 4.Choose the "**Add**" button to install the AlphaLAN driver from the drivers diskette.
- 5.In the list of network adapters, select the " Unlisted or Updated Network Adapter." Then enter the path to load the NDIS 2.0.1 driver (e.g., "**A:\WFW31X**").
- 6.Select the "**AMD PcnnetMobile 802.11 Adapter**" and choose "**OK**."
- 7.In the Network Adapters dialog box, choose the "**Close**" button. Then choose the "**OK**" button in the Network Settings dialog box.
- 8.Follow the remaining Window instructions. Restart the computer to have the driver take effect.

The installation of the NDIS 2.0.1 driver for Windows for Workgroups is now complete.

2.2 Microsoft Windows for Workgroups 3.11

AlphaLAN provides NDIS 2.0.1 support for the Microsoft Windows for Workgroups 3.11 operating system.

- Notes:** 1) *The format and procedure to install the NDIS drivers for Windows for Workgroups 3.11 is different from that of Windows for Workgroups 3.1. Refer to Section 4.1 for the procedure for Windows for Workgroups 3.1.*
- 2) *The directory structure provided on the AlphaLAN NDIS 2.0.1 driver diskette has been setup for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the Microsoft Windows for Workgroups 3.11 User's Guide.*

Follow the steps listed below:

1. Insert Disk 1 of the "**AlphaLAN Drivers & Network Management**" diskette into the floppy drive.
2. In the Windows for Workgroups 3.11 Program Manager, double click on the Windows Setup icon.
3. From the Options Menu, select "**Change Network Settings.**"
4. From the Network Setup dialog box, select the "**Drivers...**" button to install the AlphaLAN NDIS 2.0.1 driver.
5. In the Network Drivers dialog box, select the "**Add Adapter**" button to install the AlphaLAN device drivers.
6. In the Add Network Adapter window, choose the "**Unlisted or Updated Network Adapter**" from the menu and then select "**OK**".
7. The Install Driver dialog box will appear. Enter the floppy drive containing the AlphaLAN NDIS 2.0.1 driver diskette and specify the Windows for Workgroups 3.11 path to install the AlphaLAN drivers. For example, enter:

 \ **WFW311**

 Then select "OK."
8. The AlphaLAN PC card Family selection will appear under the Network Adapters list. Select "**OK**" to continue.
9. Answer the series of questions for the correct **Base I/O Port** and **Interrupt (IRQ)**. In the Network Drivers dialog box, select "**Setup...**". Note that for many cases the default values will be acceptable.
10. Select "**OK**" to exit. Windows for Workgroups 3.11 will ask the user to reboot the machine once the installation is completed.

The installation of the NDIS 2.0.1 driver for Windows for Workgroups 3.11 is now complete.

Note: *All of the keywords available to the NDIS 2.0.1 driver may be activated by configuring the PROTOCOL.INI file in some operating system environments or by selecting the options through a dialog box in other operating systems.*

3. Installing The NDIS 3.x Miniport Driver

The Network Driver Interface Specification (NDIS) 3.x is a driver specification developed by Microsoft to offer a standard driver interface for adapter cards. AlphaLAN NDIS 3.x driver supports the following environments:

- Microsoft Windows NT 3.51, 4.0
- Microsoft Windows 95

Installation of AlphaLAN NDIS 3.1 driver for the environments listed above is described below.

3.1 Microsoft Windows NT

Support is provided for the Microsoft Windows NT (Versions 3.51 and 4.0) environment.

Notes: 1) *The directory structure provided on the NDIS 3.x driver diskette has been set up for automatic OEM installation. Also, more information can be found in the Microsoft Windows NT User's Guide.*

2) *Only x86-based Windows NT platforms are supported.*

Follow the steps listed below:

1. Insert the AlphaLAN NDIS 3.x driver diskette into the floppy drive.
2. From the Control Panel in the Windows NT Main window, double click on the "Network" icon to install the AlphaLAN adapter card. (Please see the Fig.-1)

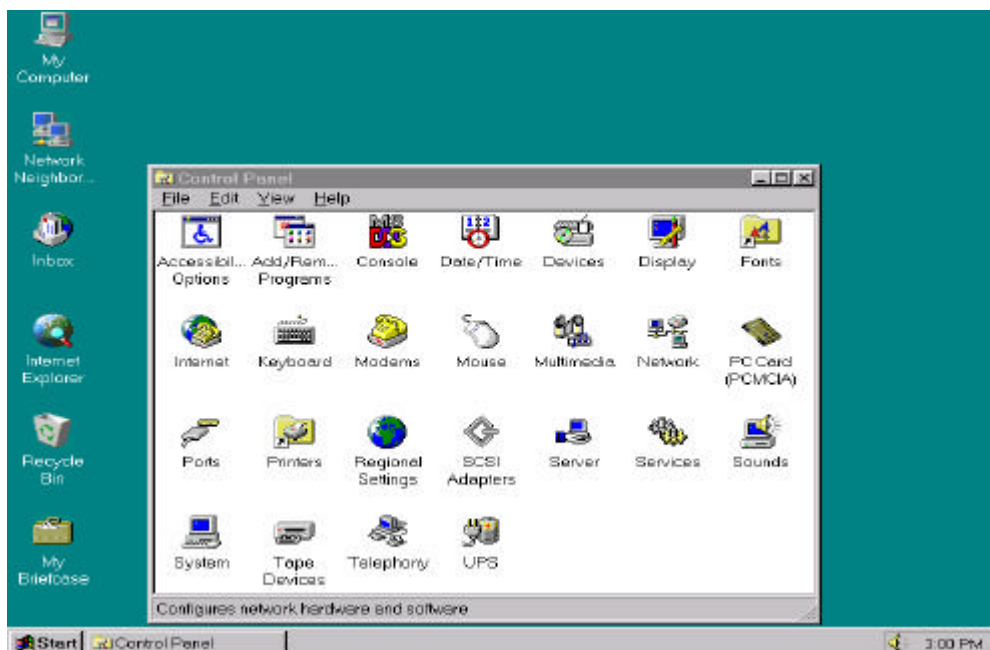


Fig.-1

3. In the Network Settings dialog box, choose "**Add Adapter.**" (Please see the Fig.-2)

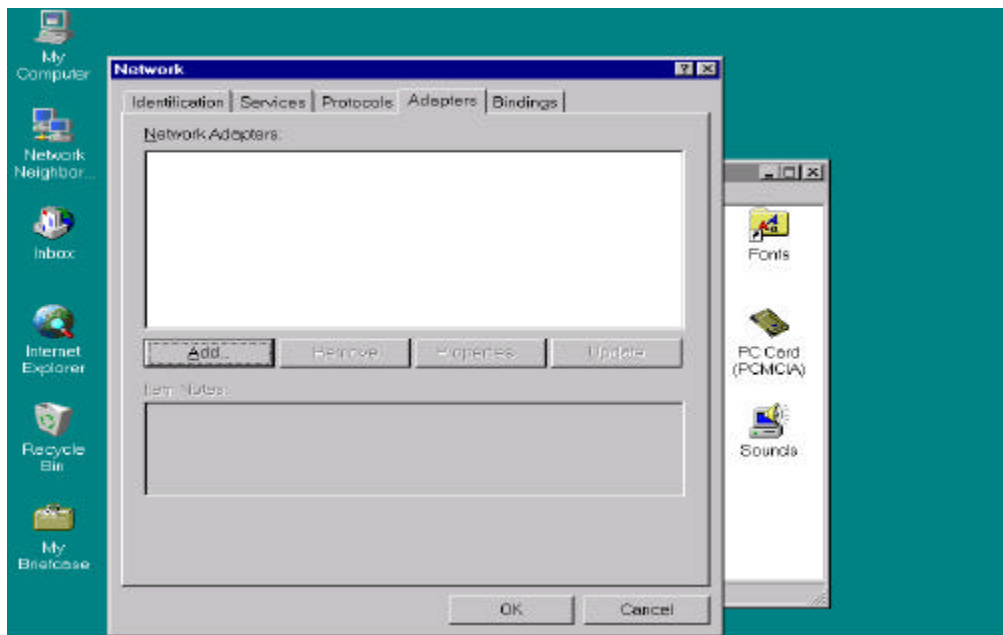


Fig.-2

4. In the Add Network Adapter dialog box, pull down the adapter card list menu and select "**Have Disk**" from the list and continue. (Please see the Fig.-3)

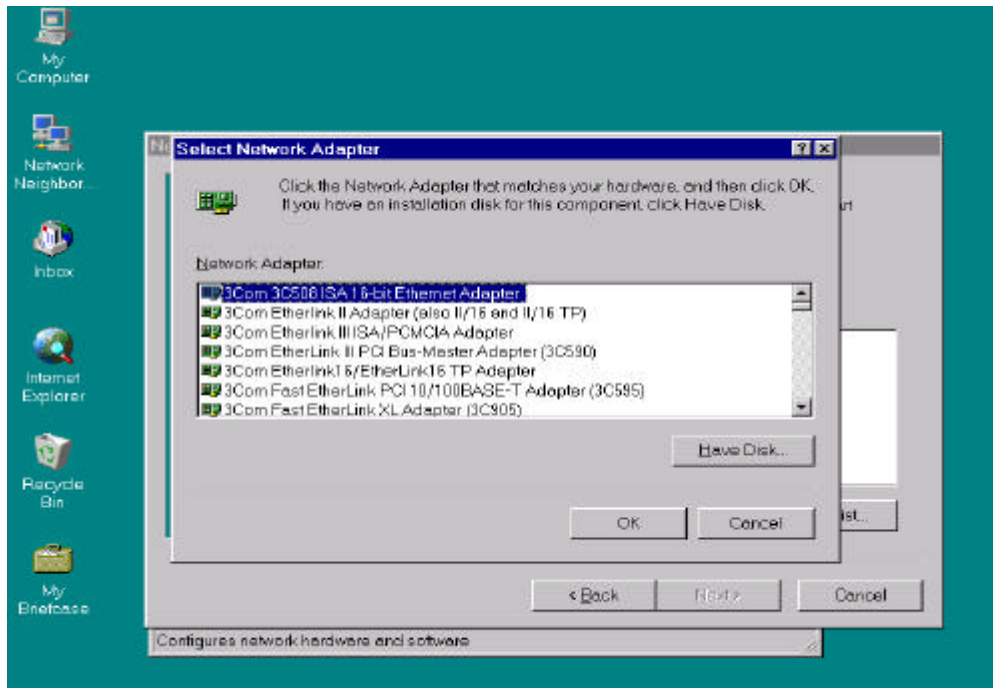


Fig.-3

5. In the next window, enter:

A:\WINNT (Please see the Fig.-4)

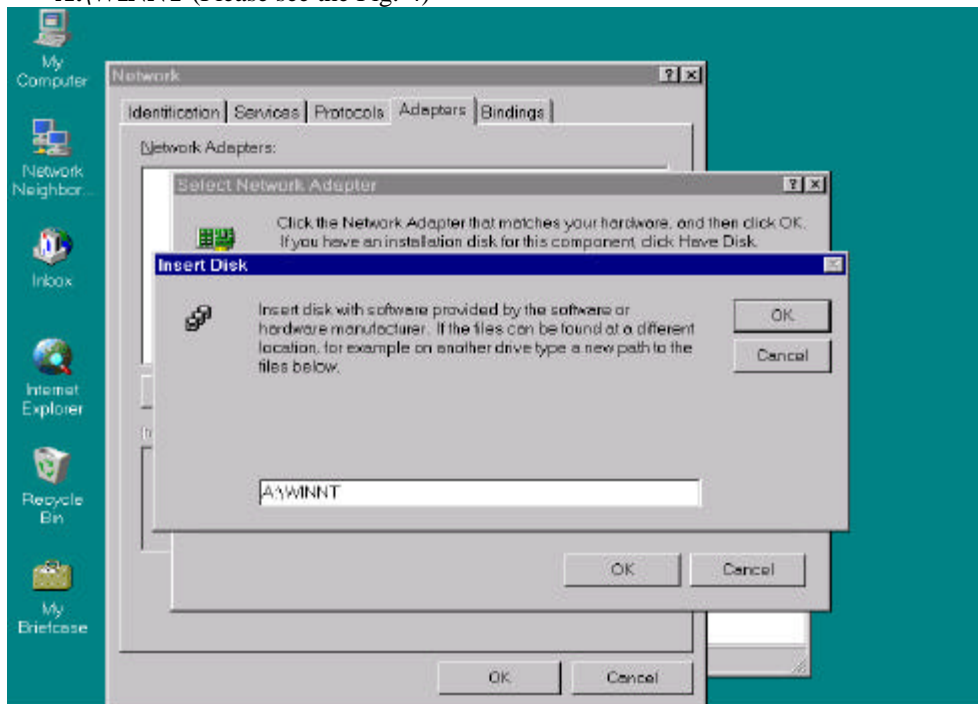


Fig.-4

6. Then, select "AMD PCnetMobile 802.11 PC Card Setup " from the dialog box to install the AlphaLAN adapter card. (Please see the Fig.-5)

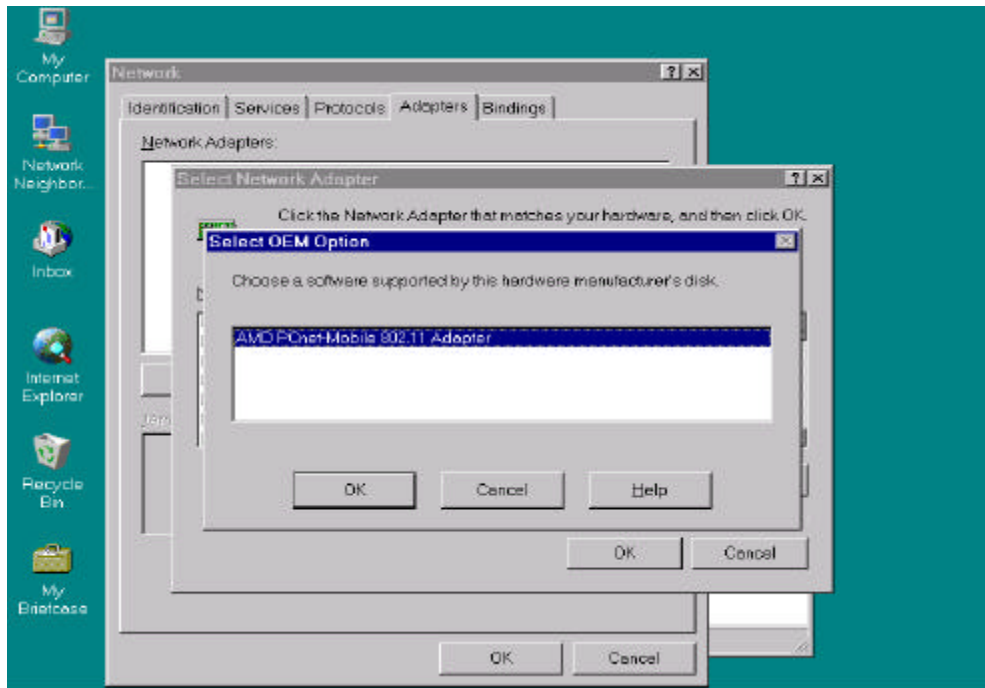


Fig.-5

7. In the window labeled " **AMD PCnetMobile 802.11 PC Card Setup** ", you will be asked to select values for the driver parameters I/O Base, IRQ Level, and Shared Memory Base. I/O Base is the first I/O port address (in hex) of an I/O window 32 I/O ports wide. IRQ Level is the IRQ level (in decimal) of the edge-triggered IRQ output from the card. Shared Memory Base is the first memory address (in hex) of a 24K memory window. (Please see the Fig.-6)

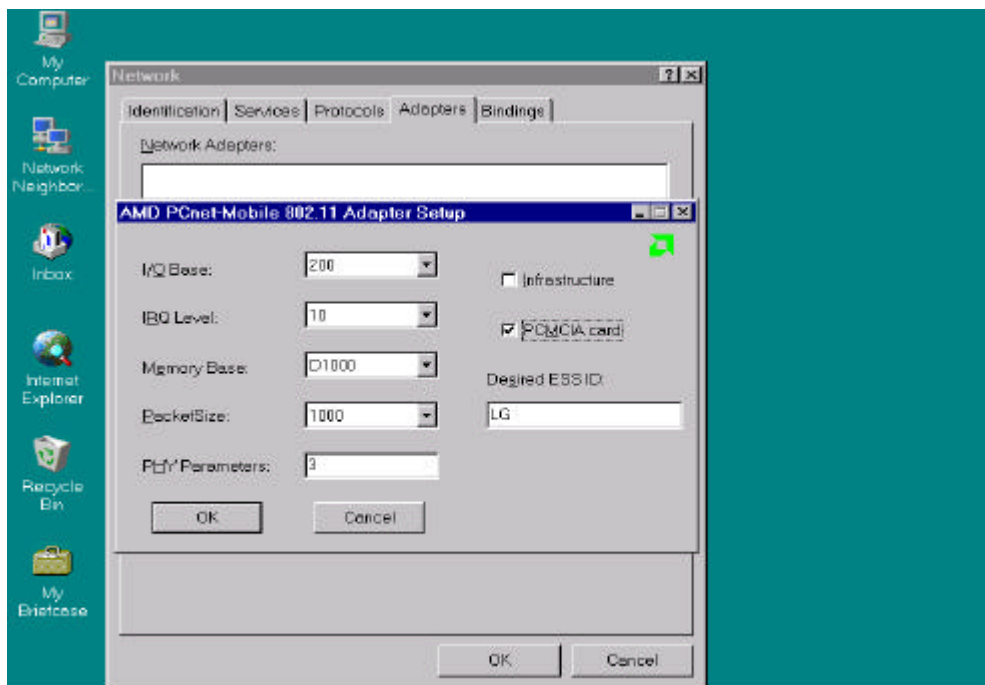


Fig.-6

You must select conflict-free values for the driver parameters. The default values were chosen carefully, but are not guaranteed to be conflict-free.

You can use the Windows NT Diagnostics in the Administrative Tools group to see what I/O ports, IRQ, and memory windows are being used. Do not select values that conflict with these [in use](#).

For ISA PnP card, please make sure that "**PCMCIA card**" checkbox is cleared. Also, make sure that your system has PnP BIOS support. PnP adapters will not operate properly under NT if the BIOS doesn't provide configuration for the adapter.

You will also find in the Setup window several other parameters for the AlphaLAN Adapter to configure. Please refer to "**NDIS 3 driver keywords**" section for the description of these parameters.

For Windows NT 3.51, during network installation, you will get an error to the effect that "the network was prevented from starting". This is because the Windows NT installation program has overlooked the fact that the Windows NT PCMCIA components have not activated the AlphaLAN at this point. Acknowledge the related message screens and continue with the installation.

After completing network adapter installation, you must boot with the AlphaLAN inserted in a PCMCIA slot in order to access the network. Current versions of Windows NT do not support the insertion or ejection of PC Cards while Windows NT is running.

Windows NT versions earlier than 3.51 did not support PCMCIA and are therefore incompatible with the AlphaLAN.

9.Reboot your system to complete the driver installation process.

Use the Event Viewer to check the System Log for information on which Windows NT component or OEM component failed to load and for what reason.
[Please refer to "NDIS 3 driver error messages" section for the description of these failures and how to correct them.](#)

Make sure that you selected conflict-free values for the driver parameters. Note that you can still change these values even after completing driver installation. Follow the standard Windows NT procedures for doing this. For example, in Windows NT 3.51, double-click the Control Panel icon, double-click the Network icon, double-click the AlphaLAN entry in the adapter list.

For additional information, refer to your Microsoft Windows NT OS documentation. In addition, the user may review the README.TXT on AlphaLAN NDIS 3.x driver diskette.

3.2 Installation of the NDIS 3.x Windows 95 Driver

Follow the standard Windows 95 OEM network adapter installation. Refer to your Windows 95 manual for details on how to do this.

In short, follow steps below:

1. Insert AlphaLAN based card in the PCMCIA slot. If PCMCIA support on your Win95 system is not installed, install it via "**Control Panel -> PC Card**" (Please see the Fig.-7 and Fig.-8).

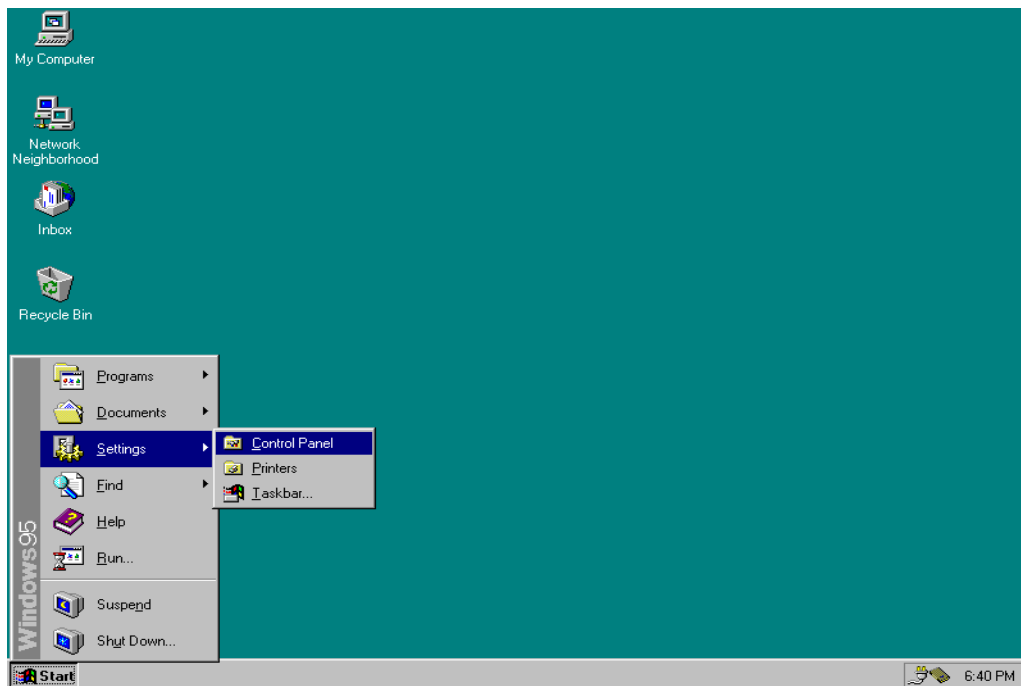


Fig.-7

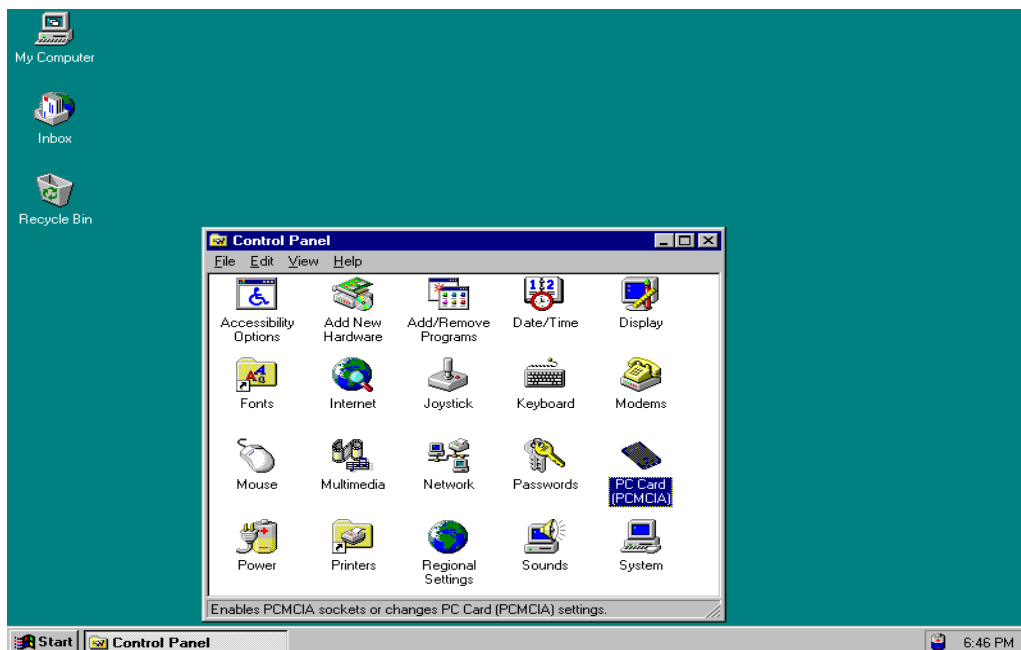


Fig.-8

2. You will get " **New hardware found, AMD-Am79C930** " message when the system loads. If the message doesn't appear, don't continue. Most likely your adapter is bad or PCMCIA support on your Windows 95 system is not installed properly. Correct the problem and try installation again. (Please see the Fig.-9).

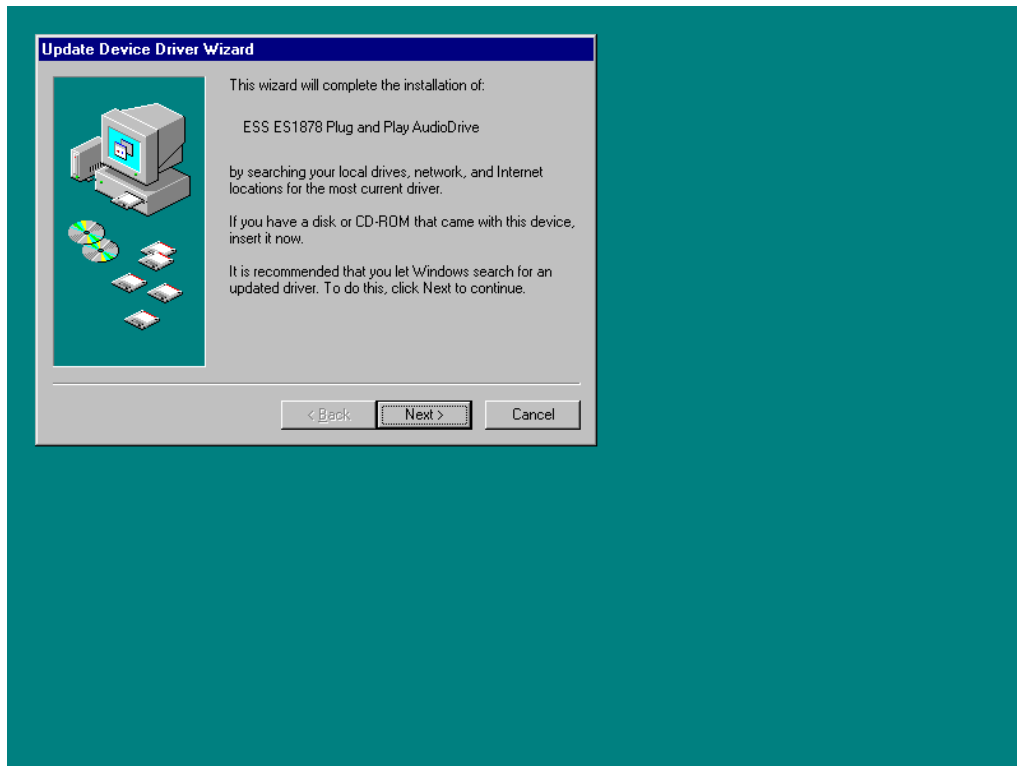


Fig.-9

3. Choose **"Driver from disk provided by hardware manufacturer"** option (default).
4. Specify **a:\win95** as a path for the AlphaLAN driver files and click **OK**. (Please see the Fig.-10)

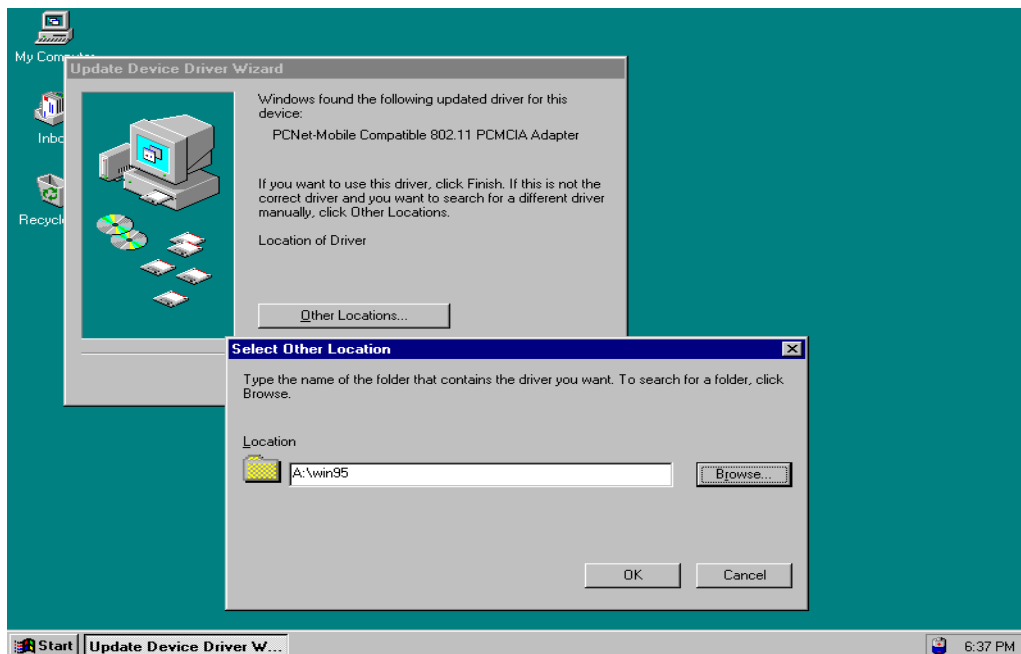


Fig.-10

5. Continue installation for your network protocol and options. You will find several Advanced Properties for the AlphaLAN Adapter to configure. Please refer to "**NDIS 3 driver keywords**" section for the keywords description.
6. Reboot the machine. When the Windows 95 system comes up, you should get standard network login window. If the window appears, you should be able to network with other AlphaLAN based systems. If the window doesn't appear, try to take out and re-insert the card or reboot the machine. On Windows 95, Card and Socket services sometimes fail to initialize the card on the very first load. When the card is taken out and re-inserted, the driver is reloaded.

Once the driver is loaded properly, it should work. If the network is still not working, you can use GUI for Windows 95 to see the reason for the failure. Please refer to the "**GUI for the Windows 95**" section for the direction on how to install and start the GUI. Once the GUI is started, click on the "**AMD PCnetMobile 802.11 Component**" to expand the component. Then click on the "**Local MIB**". The group will expand and you will see the table with the element 18 being "**Hardware configuration and resource allocation for the AlphaLAN device**". Click on the element to get to the next screen with the configuration status and information about failures, if any. For additional help, please see "**NDIS 3 driver error messages**" section.

Hardware configuration and resource allocation errors are passed to the GUI by the NDIS3 driver, which is not unloaded upon a failure but rather stays in memory and keeps error codes available to the GUI. If you do not wish to keep failed driver loaded in system memory, please change "**Diagnostics**" keyword to "**Disable**".

7. To upgrade the driver, you should delete the installed AlphaLAN card via "**Control Panel -> System -> Device Manager -> Network Adapters**" and re-install it with the procedure outlined above. Please refer to Microsoft Windows 95 documentation for more details on the standard upgrade procedure for the network drivers.

3.3 NDIS 3.x Driver Keywords

Please be advised that all NDIS 3 keywords are optional. Your adapter will work with default values and you should use the keywords at your discretion. For the list of keywords, default values, range and description please see Appendix A.

Note: All of the keywords available to the NDIS 3.x driver may be activated by selecting the options through a "**Network setup**" dialog in the appropriate operating system.

3.4 GUI for the Windows 95

The GUI interface, provided in this release, is based on the DMI (Desktop Management Interface) implementation and it does not currently work on the NT. Microsoft committed to support DMI on the NT platform in a future. More information on DMI can be found at www.dmtf.org WEB site. Please note that the GUI package is optional. It is provided mainly for test purposes and is not required for the driver to operate. Many end users may choose not to install it.

1. Put the AlphaLAN "**DISK2**" into the floppy drive.
2. Run "**Start->Settings->Control Panel->Add/Remove Programs->Windows Setup-> Have Disk**" on your Windows 95 system and type in "**a:\dmi\win95**" for the path. You will see "**Desktop Management**" for the Components list. Check the box and hit "**Install**".
3. Put "**DISK 1**" into the floppy drive.

4. Copy all files from the a:\browser directory into your windows directory and make a shortcut to the "Dmiwin32.exe" file.
5. Click on the shortcut. It will take a long time for the browser to come for the first time after the new installation since it does a lot of parsing on this very first load. When it comes up, you will see "AMD PCnetMobile 802.11 Component". You can expand the component and groups, read and write information from and to the driver via the GUI interface.

You can refer to the Desktop Management Task Force documentation at the www.dmtf.org if you need more details on the browser or the interface to it.

4. APPENDIX A: Software Keywords (For All Drivers)

This section describes software keywords that may be needed while configuring PCnet-Mobile adapter cards. Also, a table is provided to show the valid combinations of keywords with the various PCnet-Mobile adapter cards.

Table 1. Keywords

Bus type designation BUS_TO_SCAN BUSTYPE NDIS 2.0.1 Specifies the bus type to use when attempting to locate the PC-net Mobile device. No value will cause the PCMCIA bus to be scanned first, and if no PC-net Mobile device is found the PNP bus is scanned. DESIRED_ESS_ID NDIS 2.0.1 NDIS 3.x This keyword allows the user to specify the Desired ESS ID other than the default. Please refer to 802.11 documentation for more information on the ESS ID parameter. In short, it is a string 2 to 32 characters long which represents the name of your ad-hoc network. It has to be identical for all systems on the network. If you change the default value to separate your network from other systems, please be sure it is changed on all computers you would like to be on your network. Any ASCII character string from 2 to 32 characters.

Physical Parameters PHY_PARAMETERS DSCHANNEL NDIS 2.0.1 NDIS 3.x This keyword allows the user to specify the channel number for Direct Sequence adapters, other than the default. Please note that with the Mac Mgmt enabled (default) the system will hop to the channel of the computer it is joining. For instance, if you set the channel to 7 and the driver finds another system with the same ESS_ID on channel 11 (at load time), it will switch to channel 11. The default for the keyword is 3. Please refer to 802.11 spec for the list of channels valid for your domain. For the FCC (USA) valid channels are from 1 to 11. FCC - from 1 to 113.

Interrupt, INTERRUPT IRQ NDIS 2.0.1 Specifies the Interrupt (IRQ) to use for the PC-net Mobile device. For PCMCIA PC-net Mobile solutions, the specified IRQ will be requested from the PCMCIA Card & Socket services. If the request fails, another IRQ will be provided by Card & Socket services. 3, 4, 5, 9, 10, 11, 12, 15.

I/O Address IOADDRESS PORT IOBASE NDIS 2.0.1 See above. Used to specify the preferred I/O ports to use. For PCMCIA PC-net Mobile solutions, the specified I/O ports will be requested from the PCMCIA Card & Socket services. If the request fails, another I/O port address range will be provided by Card & Socket services.

Mac Mgmt MACMGMT NDIS 2.0.1 NDIS 3.x. This keyword enables or disables the Mac Management module of the AMD 802.11 software. The default for the keyword is "1" (enabled) Please do not change the default except for test purposes.

Diagnostics NDIS 3.x, Windows95 only. This keyword is used to enable or disable diagnostics mode for the driver on Windows95 platform. If enabled (default), driver stays resident in memory in case of a failure so it is able to pass an error code to the GUI. Please see "Installation of the Ndis3 driver on Windows 95" section for more details on diagnostics mode operation.

Network Mode NMODE NDIS 2.0.1 NDIS 3.x The NMODE keyword determines the type of wireless network the computer will use. ADHOC allows two or more wireless PC's to communicate directly with each other without the use of an Access Point (AP). INFRASTRUCTURE requires the PC to communicate through the network via an AP. This method allows the PC to communicate over a wired LAN if present and to other wireless PC's. ADHOC INFRASTRUCTURE ADHOC

Packet Size PKTSIZE NDIS 2.0.1 NDIS 3.x This keyword is used to limit the transmit packet size for the driver. The default value for the keyword is 1000 bytes. Unless your network performs badly, leave this value set to the default. Altering this value could affect the ability of the system to communicate over the network. Any valid packet size allowable by the protocol. 1000 bytes (base 10)

Plug and Play Vendor ID VENDOR_ID NDIS 2.0.1 The vendor_id is required by the NDIS 2 device driver to identify the wireless PnP ISA card. If no keyword is provided the driver will assume the default id. A valid Plug and Play vendor id. The value must match the card. ADV30C9

5. APPENDIX B: Driver Error Messages

5.1 NDIS 3.x Driver Error Messages

As described in the "Installation of the NDIS 3.x Windows 95 Driver" section above, NDIS 3.x driver messages are viewed differently on Windows 95 and NT. On Windows 95, NDIS 3.x driver messages are viewed under Windows 95 GUI interface.

On Windows 95, NDIS 3.x driver messages are viewed under Programs->Administrative tools->Event Viewer. Messages for similar problems will be somewhat different for the two environments although they will have similar meaning and actions. Since on NT one can use only predefined text for error messages, Windows 95 error message is more accurate.

Message	Windows 95: No configuration problems detected. Windows NT: No error messages in the Event Viewer from PCMBN31.
Meaning	PCnet-Mobile is configured correctly and the network is not operational for the reason unrelated to the PCnet-Mobile software or hardware.
Action	Check and correct if necessary your network configuration, i.e. TCP/IP confederation, ESS ID, etc.
Message	Windows 95: Error: I/O Base is not 0x40 aligned. Windows NT: PCMBN31: The I/O base address supplied does not match jumpers on the adapter.
Meaning	PCnet-Mobile valid I/O addresses are 0x240, 0x280, 0x2a0, 0x300, 0x340, 0x380, 0x3a0, i.e. I/O address has to be aligned on 0x40 boundary. Due to the Windows 95 design, AMD software can't enforce this limitation automatically.
Action	Windows 95: Run Start->Settings->Control Panel->System->Device Manager->Network Adapters->PCNet->Mobile ... Adapter->Resources->Change Settings And change I/O Range to one of the valid values above. Windows NT: Run Network Setup and change I/O Range to one of the valid values above.
Message	Windows 95: Error: Error: I/O Base has a conflict. Windows NT: PCMBN31: The adapter has returned an invalid value to the driver.
Meaning	The driver was configured at the I/O address, which has a conflict with a different device.
Action	Windows 95: Run Start->Settings->Control Panel->System->Device Manager->Network Adapters->PCNet->Mobile ... Adapter->Resources->Change Settings. Change I/O Range to re-configure PCnet-Mobile. Windows NT: Run Network Setup and change I/O Range to re-configure PCnet-Mobile.
Message	Windows 95: Error: Memory window has a conflict. Windows NT: PCMBN31: Has encountered a conflict in resources and could not load.
Meaning	The driver was configured at the Memory address, which has a conflict with a different device.
Action	Windows 95: Run Start->Settings->Control Panel->System->Device Manager->Network Adapters->PCNet->Mobile .. Adapter->Resources->Memory Range->Change Settings. Change Memory Range to re-configure PCnet-Mobile. Windows NT: Run Network Setup and change Memory Range to re-configure PCnet-Mobile.
Message	Windows 95: Error: 24k Memory Window not allocated. Windows NT: PCMBN31: A required parameter is missing from the registry.
Meaning	On a rare occasion, PCMCIA BIOS reserves all available memory in the system for "future use" and Windows 95 fails to allocate memory for the PCnet-Mobile.
Action	You can change BIOS configuration by going to Start->Settings->Control Panel->System->Device Manager-> System Devices->System Board extension for PnP BIOS->Resources. Un-check 'Use automatic settings' checkbox and hit 'Change Settings' button. That will free some memory in 640k-1M range and the driver will be able to load.
Message	Windows 95: Error: Can't map the I/O device. Windows NT: PCMBN31: Has encountered an internal error and has failed.
Meaning	Internal NDIS wrapper error.
Action	Re-boot the machine.
Message	Windows 95: Error: Firmware failure. Windows NT: PCMBN31: Has determined that the adapter is not functioning properly
Meaning	PCnet-Mobile firmware failed self-test.

Action	Re-boot the machine to be sure the failure is consistent. Check the card with low-level utilities and/or reload the firmware.
Message	Windows 95: Error: IRQ registration failure. Windows NT: PCMBN31: Could not connect to the interrupt number supplied.
Meaning	Internal NDIS wrapper error.
Action	Re-boot the machine.

5.2 NDIS 2.0.1 Driver Error Messages

Message	PCMBND\$-DOS-1: Unable to open Protocol Manager.
Meaning	The NDIS stack is not configured correctly.
Action	Check and correct your configuration.
Message	PCMBND\$-DOS-2: Unable to allocate stack.
Meaning	The device driver was unable to find enough memory to create its own stack.
Action	Try minimizing the number of device drivers being loaded in the config.sys.
Message	PCMBND\$-DOS-5: Error resetting Wireless LAN Adapter (Am79C930)
Meaning	The device driver was unable to reset the PCnet-Mobile Wireless LAN Controller.
Action	Power off the system and re-seat the PC-net Mobile Controller card. If this does not work try a different PCMCIA slot if available or a different ISA slot if using an ISA Controller card. If the same error message is still occurring, try selecting different I/O ports. This is done by editing the PROTOCOL.INI file which is usually in the WINDOWS directory for Windows installations. Change the value which is on the right side of the IOADDRESS line in the MS\$PCMBND section to a different value.
Message	PCMBND\$-DOS-6: Out of memory while allocating buffers
Meaning	The device driver was unable to find enough memory while creating its own data structures.
Action	Try minimizing the number of device drivers being loaded in the config.sys. -
Message	PCMBND\$-DOS-7: Protocol Manager device error
Meaning	The NDIS stack is not configured correctly.
Action	Check and correct your configuration.
Message	PCMBND\$-DOS-8: Bad status for Protocol Manager
Meaning	The NDIS stack is not configured correctly.
Action	Check and correct your configuration.
Message	PCMBND\$-DOS-9: Can not find Protocol.ini entry
Meaning	The NDIS stack is not configured correctly.
Action	Check and correct your configuration.
Message	PCMBND\$-DOS-10: Protocol Manager ioctl failed
Meaning	The NDIS stack is not configured correctly.
Action	Check and correct your configuration.
Message	PCMBND\$-DOS-11: Protocol Manager registration failed
Meaning	The NDIS stack is not configured correctly.
Action	Check and correct your configuration.
Message	PCMBND\$-DOS-12: Error enabling the Wireless LAN Adapter (Am79C930)
Meaning	The device driver is having difficulty communicating with the PCnet-Mobile Wireless LAN Adapter Controller.

Action	Power off the system and re-seat the PC-net Mobile Controller card. If this does not work try a different PCMCIA slot if available or a different ISA slot if using an ISA Controller card. If the same error message is still occurring, try selecting different I/O ports. This is done by editing the PROTOCOL.INI file which is usually in the WINDOWS directory for Windows installations. Change the value which is on the right side of the IOADDRESS line in the MS\$PCMBND section to a different value.
Message	PCMBND\$-DOS-13: No AMD Wireless LAN Adapter (Am79C930) found.
Meaning	The device driver can't find the PC-net Mobile Wireless LAN Adapter.
Action	This message is most commonly caused when the driver is having difficulty obtaining a memory Window from PCMCIA Card and Socket Services. Re-check the PCMCIA configuration and verify that there is at least one 32k byte memory Window available for use by this adapter.
Message	PCMBND\$-DOS-14: Outdated firmware found in the PCnet Mobile Wireless LAN Adapter.
Meaning	The firmware programmed into the wireless LAN adapter is too old for this version of the NDIS 2 device driver.
Action	The firmware should be upgraded. The manufacturer of your wireless LAN card should be able to provide you with the necessary utilities and files. If this is not possible, re-install the driver (PCMBND.DOS) back to the version being used before the error message appeared.
Message	PCMBND\$-DOS-15: Device not found, driver loaded anyway.
Meaning	PCMCIA Card and Socket Services support was found, and the PCnet-Mobile Wireless LAN device driver was able to load, but the actual device was not found.
Action	Re-install the PCnet-Mobile Wireless LAN Controller (with power off). Try a different PCMCIA socket or ISA slot if possible.
Message	PCMBND\$-DOS-33: PCnet-Mobile device with specified IOBASE is already in use
Meaning	Specifically, in PCMCIA implementations, this message means that Card and Socket Services returned an I/O port address of zero for the PCnet-Mobile Wireless LAN Controller.
Action	Verify that only one PCnet-Mobile device is installed in the system and that Card and Socket Services is configured correctly.
Message	PCMBND\$-DOS-34: Bad Argument error calling Card Services (GetCardServices)
Meaning	The PC-net Mobile device driver encountered an error while communicating with PCMCIA Card and Socket Services.
Action	Make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1.
Message	PCMBND\$-DOS-35: Bad Argument error calling Card Services (RegisterClient)
Meaning	The PC-net Mobile device driver encountered an error while communicating with PCMCIA Card and Socket Services. -
Action	Make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1.-
Message	PCMBND\$-DOS-36: Bad Attribute error calling Card Services (RegisterClient)
Meaning	The PC-net Mobile device driver encountered an error while communicating with PCMCIA Card and Socket Services. -
Action	Make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1. -
Message	PCMBND\$-DOS-37: Card Services cannot support this version

	client
Meaning	Either PCMCIA Card and Socket Services returned a "Bad Version" error or it has been detected that this version of Card and Socket Services is prior to version 2.1.
Action	Make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1. -
Message	PCMBND\$-DOS-38: PCMCIA Card Services not found
Meaning	A call to PCMCIA Card Services failed or Card Services was not found.
Action	Verify that the PCMCIA Card and Socket Services device drivers are properly installed and that there are no errors when they are loaded.
Message	PCMBND\$-DOS-39: Error accessing PCMCIA Card Services
Meaning	The PC-net Mobile device driver encountered an error while communicating with PCMCIA Card and Socket Services.
Action	Make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1.
Message	PCMBND\$-DOS-40: No space in Card Services to register client
Meaning	PCMCIA Card Services was unable to register the PCnet-Mobile NDIS 2.0.1 device driver as a client because it (Card Services) is out of resources.
Action	Remove other PCMCIA client drivers (modem, networking, SCSI, etc.) to see if this corrects the error. If not, make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1.
Message	PCMBND\$-DOS-41: Error occurred while allocating PCMCIA resources
Meaning	The PCnet-Mobile NDIS 2.0.1 device driver was unable to complete its registering with the PCMCIA Card Services driver. Make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1. Re-check the PCMCIA configuration and verify that there is at least one 32k byte memory Window and 64 contiguous I/O port addresses available for use by this adapter. -
Message	PCMBND\$-DOS-42: Error occurred while Deregistering Client
Meaning	The PCnet-Mobile NDIS 2.0.1 device driver was unable to satisfactorily complete its registering with the PCMCIA Card Services driver. While attempting to un-register, it encountered an error message from Card Services. -
Action	Make sure that the PCMCIA Card and Socket Services device drivers are current. The PCnet-Mobile NDIS 2.0.1 device driver requires that Card and Socket Services be compliant with at least PCMCIA Standard 2.1. Re-check the PCMCIA configuration and verify that there is at least one 32k byte memory Window and 64 contiguous I/O port addresses available for use by this adapter. -
Message	PCMBND\$-DOS-43: AMD BANNER not found
Meaning	The appropriate identifier was not found within the PCnet-Mobile LAN Controller's firmware.
Action	Verify that the controller is a compatible with the PCnet-Mobile Wireless LAN Controller family. If possible, re-flash the controller's firmware image.

6. APPENDIX C: GLOSSARY

Access Protocol	The set of traffic rules that network workstations obey to avoid data collisions when sending messages and packets over shared network media (sometimes referred to as the media access control (MAC) protocol).
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Common examples include Carrier Sense Multiple Access (CSMA) and Token Passing.

Adapter	Generally refers to a network adapter card. These boards are expansion cards which are inserted inside each workstation or server on a network. The adapter card allows each device on the network to listen and communicate with other nodes on the network.
Address	A unique location in memory.
Administrator	A network user who is responsible for setting up, configuring, maintaining, and managing the network.
AppleTalk	A proprietary Apple LAN capable of transmitting data at a rate of 230-Kbs over shielded twisted pair wire. AppleTalk is based on a bus topology and is built into all Apple Macintosh computers and laser printers. The most common cabling scheme used with AppleTalk is known as LocalTalk.
AUI	Attachment Unit Interface. An IEEE specification for a node or repeater connection interface to an external medium attachment unit (MAU).
AUI Cable	A cable used to connect an external transceiver to a computing device. The AUI cable is also sometimes known as the transceiver cable.
Backbone	Generally, a coax or fiber optic cable used as the main transmission medium for connecting network areas called workgroups.
Base Address	The first address in a series of addresses in memory, i.e., the beginning location of a section of code or data. It is often used to describe the start of a network interface card's (NIC) I/O space (i.e., I/O base address).
Baseband	A network that transmits signals as a pulse rather than as variations in a carrier wave (signal).
Bit	Binary digit. A bit is the smallest unit of information represented on a computer. A bit can contain either a zero (0) or a one (1).
BIOS	Basic Input Output System. BIOS is built-in software typically contained in a ROM (Read Only Memory) chip that determines what a computer can do without accessing programs from disk. On IBM PC, BIOS contains code required to control the keyboard, display screen, disk drives, serial communications, etc. A Plug and Play BIOS supplements the BIOS functions with routines that support Plug and Play operations.
Boot PROM	Boot Programmable Read Only Memory. A memory chip that allows the network workstation to communicate with the network file server and to read a DOS boot program from the server. These diskless workstations are then capable of operating on the network without having a disk drive.
Broadband	A network that transmits signals as variations of carrier waves rather than directly as pulses. Broadband networks provide greater network bandwidth capacity, but are also more complex.
Broadcast	To send a message to all workstations connected on the network.
Buffer	A temporary storage space. Data may be stored in a buffer before, during, or after a data transmission. Buffers are often used to compensate for the

	difference between the speed of data packet transmission and the speed of data packet processing.
Bus (Topology)	A network topology where all devices are connected to a central cable called the bus or backbone. Bus networks are relatively inexpensive and easy to install. Ethernet, a very popular LAN, uses a bus topology.
Byte	A group of eight consecutive bits which are treated as one unit.
Channel	A path between a sender and receiver that carries one stream of information. A two-way path is called a circuit.
Client/Server (Architecture)	A networking architecture in which each computer or process on the network is either a client or server. A server is a powerful computer or process dedicated to managing disk drives (file servers), printers (printer server), or network traffic (network server). Clients are less powerful PCs or workstations on which users run applications and issue requests to servers for resources.
Coax Cable	A type of network media. Coaxial cable contains a copper inner conductor surrounded by plastic insulation and then a woven copper or foil shield. It is commonly used in cable television and Ethernet networks.
Command	An instruction to a computer or device to perform a specific task.
Configuration Manager	The component of the Plug and Play system responsible for managing the software configuration associated with a system's current hardware configuration.
CSMA	Carrier Sense Multiple Access. CSMA is a media-sharing scheme in which network workstations listen on the network media and transmit only if the cable is not in use. CSMA is often combined with a collision detection scheme for a more efficient data transmission.
CSMA/CD	Carrier Sense Multiple Access with Collision Detection. An enhancement to CSMA in which a network station stops transmitting if it detects a collision on the network cable.
CRC	Cyclic Redundancy Check. A CRC is calculated by the media access control (MAC) transmit process and checked by the MAC receive process of a workstation to ensure integrity of the frame contents.
Diagnostic Test	A test used to detect and/or isolate hardware or software problems.
DLL	Dynamic Link Library. A library of shared functions that applications can link in at runtime as opposed to compile time.
Domain	A collection of network servers and resources in a logical grouping.
Driver	A software program that controls the underlying network hardware (such as adapters and controllers) or implements the protocol stacks through which higher-level applications can communicate with the network hardware.

EEPROM	Electrically Erasable Programmable Read Only Memory. An EEPROM is a special type of PROM that can be erased by exposure to an electrical charge.
EISA	Extended Industry Standard Architecture. A PC system bus that is an alternative to IBM's Micro Channel Architecture (MCA). EISA is a bus architecture designed for IBM PCs and compatibles using an Intel 386 or 486 microprocessor. An EISA bus is 32 bits wide and supports multiprocessing. The main difference between EISA and MCA is that EISA is backwards compatible to the ISA bus (also known as the AT bus), while MCA is not.
Ethernet	A LAN protocol originally developed by Xerox in cooperation with DEC (Digital Equipment Corporation) and Intel. Ethernet uses a bus topology and supports data transmission rates of 10-Mbs. It has also been standardized by the IEEE 802.3 group.
Ethernet Address	Also known as the IEEE address, this is a unique numeric identifier of a node on a LAN.
Fiber Optic	A data transmission method that uses light pulses sent over glass (or plastic) threads (fibers). Message transmission is close to the speed of light.
Flash Memory	A special type of EEPROM that can be erased and reprogrammed inside a computer. Conventional EEPROMs require a special device called a PROM reader. Flash memory is non-volatile and does not lose its contents when power is turned off.
Frame	A group of bits that include data plus one or more addresses. A frame generally refers to a link layer (OSI Model layer 2) protocol.
Hub	A general term frequently used instead of repeater.
IEEE	Institute of Electrical and Electronics Engineers. Founded in 1963, the IEEE is an organization composed of scientists, engineers, and students. The IEEE is best known for its work in establishing standards for the computer and electronics industry.
IEEE 802	A committee of the Institute of Electrical and Electronics Engineers (IEEE). IEEE 802 was organized to establish standards for the physical and electrical connections for LANs.
IEEE 802.11	A committee of the Institute of Electrical and Electronics Engineers (IEEE). IEEE 802.11 was organized to establish standards for the physical and electrical connections for wireless LANs. At this point, the standard is not finalized.
Interrupt	A signal that suspends a program temporarily while transferring control to the operating system when input or output is required. Interrupts are given priority levels such that higher priority interrupts are processed first.
I/O	Input/Output.
I/O Port	An addressable location on the Intel 386 microprocessor to and from which hardware control information can be read and written.
IPX	Internet Packet Exchange. IPX is Novell NetWare's native transport protocol. It is used to transfer data between a server and/or client programs

running on different network nodes. IPX packets are not related to packets used in other systems such as Ethernet or token ring.

IRQ	Interrupt Request. An IRQ is a computer instruction used to interrupt a program for an I/O task. Each hardware device raises interrupts on a predetermined IRQ (numbered 0 through 15). The microprocessor associates specific interrupts with different interrupt service routines (ISR).
ISA	Industry Standard Architecture. The ISA bus is the system bus used on the IBM PC/XT and IBM PC/AT computers. The version of the bus used on the AT is often referred to as the AT bus. The XT bus is 8 bits wide and the AT bus is 16 bits wide. The AT bus has become a de facto industry standard.
ISR	Interrupt Service Routine. A sequence of software instructions which are executed as a result of a hardware interrupt.
Jumper	A plastic and metal shorting bar that slides over two or more electrical contacts to set certain conditions. Older (legacy) ISA network adapter cards require the user to set the DMA channel and IRQ via jumpers on the card itself. Newer network cards no longer require the user to set jumpers. The DMA channel, IRQ, etc., can be set via software or are done automatically via Plug and Play.
Keyword	A word reserved for special use by a program.
Kilobyte	K. A unit of information consisting of 1,024 bytes.
LAN	Local Area Network. A computer network that spans a relatively small area (typically within a single building or group of buildings).
Legacy	Term used to refer to older hardware and software still in use. In the Plug and Play context, legacy means the installed base of adapter cards that do not conform to the Plug and Play standard.
Local	Programs, files, peripherals, and computation power accessed directly in the user's own system rather than through the network.
LocalTalk	The cabling scheme supported by the AppleTalk network protocol for Apple Macintosh computers. LocalTalk is a 230-Kbs media access method which is relatively slow, but popular because it is inexpensive and easy to install and maintain.
Loopback Test	A diagnostic test in which a transmitted signal is returned to the sending device after passing through all, or a part of, a network. Loopback provides a way of comparing the transmitted signal with the returned signal for integrity.
MAC	Media Access Control. The MAC sublayer defines the medium independent capability for frame transmission and reception using the CSMA/CD access method.
MAC Driver	Media Access Control driver. A driver responsible for the lowest level of network device control. A MAC device driver deals directly with the network adapter.

MAU	Medium Attachment Unit. The physical and electrical interface between a workstation or repeater and the actual medium. The MAU is connected to the station by an attachment unit interface (AUI). A different MAU is required to support each different type of medium (cable type).
MCA	Micro Channel Architecture. MCA is the architectural basis for IBM's Micro Channel bus which is used in high-end models of IBM's PS/2 series of computers.
Media	The cabling or wiring used to carry network signals. Common media types include coax, fiber optic, and twisted pair. Plural of medium.
NDIS	Network Driver Interface Specification. NDIS is a software specification that defines the interaction between a network transport and an underlying network device driver. NDIS is vendor independent, and like ODI, supports multiple protocols and adapters.
NetBIOS	Network Basic Input Output System. NetBIOS was originally developed by IBM and Sytek to link a network operating system with a specific hardware. Today, many vendors either provide a version of NetBIOS to interface with their hardware or emulate its session layer communications in their network products.
NetBEUI Transport	NetBIOS Extended User Interface transport. A network transport commonly used in Microsoft networks.
NetWare	A series of network operating systems and related products developed and sold by Novell, Inc.
Network	A group of two or more computers that are connected together that facilitates sharing of files and resources.
Network Transport	The lowest layer in the network subsystem, network transport is responsible for transmitting and receiving data packets via the underlying network device driver.
NIC	Network Interface Card. An expansion card that can be inserted into a computer so that the computer can be part of a network. Most NICs are designed for a particular type of network, protocol, and media, although some can be used in multiple network environments.
NLM	NetWare Loadable Module. NLMs are applications and drivers that run in the NetWare server that can be loaded and unloaded on the fly.
\Node	In a network, a node can be a computer or some other device such as a printer.
ODI	Open Data-Link Interface. ODI supports multiple protocols and adapters and is Novell's network device driver interface standard.
OSI Model	Open Systems Interconnection Reference Model. OSI is a network model developed by the International Standards Organization (ISO) which divides network functions into seven connected layers (physical, data link, network, transport, session, presentation, application). Each layer builds on the services provided by those below.
Packet	A unit of information that is transmitted over the network. A packet consists of a preamble, a destination address, a source address, data being

transmitted, and a code (e.g., CRC) for testing correct transmission of the packet.

PCI	Peripheral Connect Interface. The PCI local bus is a high performance, 32-bit or 64-bit bus with multiplexed address and data lines. It is intended for use as an interconnect mechanism between highly integrated peripheral controller components, peripheral add-in boards, and processor/memory systems.
PCMCIA	Personal Computer Memory Card International Association. A standard bus for credit card sized peripherals.
PCnet	A product family of single-chip, Ethernet controllers for the ISA, VL, and PCI system buses made by Advanced Micro Devices, Inc.
PCnet-Mobile	A single-chip, 802.11 controller for the ISA, and PCMCIA system buses made by Advanced Micro Devices, Inc.
Peer-To-Peer (Architecture)	A network architecture in which each node on the network has equal responsibility, i.e., any station can contribute resources to the network while still running local application programs.
Plug and Play	Referred to as PNP, a specification originated by Microsoft for hardware and software architecture that allows for automatic device identification and configuration.
PROM	Programmable Read Only Memory. A memory chip which can be written to only once. The difference between a PROM and a ROM is that a PROM is manufactured blank, whereas a ROM is programmed during manufacturing. To write data to a PROM a special device called a PROM programmer (or burner) is needed. Programming a PROM is often referred to as burning a PROM.
Protocol	A formalized set of rules that describes how data should be exchanged between two entities. Protocols are typically divided into modular layers where each layer performs a specific function for the layer above. Protocols allows products from different vendors to communicate on the same network. One of the most popular LAN protocols is Ethernet. Another common LAN protocol is IBM's token-ring network.
Protocol Stack	The collection of software modules that implements a particular network protocol (such as TCP/IP).
RAM	Random Access Memory. Any type of computer memory that can be accessed randomly. RAM is the most common type of memory found in computers. RAM comes in two basic types: SRAM (Static RAM) and DRAM (Dynamic RAM). SRAM and DRAM differ in the technologies used to store their data. SRAM is faster, and hence, more expensive than DRAM. RAM is volatile in nature and will not retain its contents when power is turned off. In common usage, RAM is often referred to as main memory which is used to store programs and data.
Redirector	A software module that is loaded into every network station. It captures application program requests for file and peripheral services and routes them through the network, i.e., the redirector transforms client-side requests into network requests.

Registry	A database maintained by Microsoft Windows 95 for storing hardware and software configuration information. The registry is used heavily in Plug and Play systems.
Repeater	A repeater is used to extend the physical topology of the network allowing two or more cable segments to be coupled together. No more than four repeaters are permitted between the path of any two stations.
Ring (Topology)	A network topology where all devices are connected together in the shape of a closed loop. Ring networks are relatively expensive and difficult to install. However, they are robust (one failed device will not cause the entire network to fail). Most ring networks use a token-passing protocol which allows a device on the ring to send messages out when it receives a special bit pattern called a token.
ROM	Read Only Memory. Computer memory on which data has been pre-written. Once data is written to a ROM it cannot be changed and can only be read. Unlike main memory (RAM), ROM maintains its contents when power is turned off. ROM is referred to as being non-volatile, whereas RAM is volatile.
Server	Any computer on a network that makes file, print, or communication services available to other network stations.
SPX	Sequenced Packet Exchange. SPX is an enhanced set of commands implemented on top of IPX that provides for more functions (such as guaranteed packet delivery).
Star (Topology)	A network topology where all devices are connected to a central hub. Star networks are relatively easy to install and manage, but network bottlenecks can occur since all data must pass through the hub.
10BASE2	10-Mbs Baseband 200 m. A low-cost version of 10BASE5. Commonly known as Cheapernet. Maximum of 30 nodes on cable segment, 185 m per segment.
10BASE5	10-Mbs Baseband 500 m. Commonly known as Ethernet. Maximum of 100 nodes on cable segment.
10BASE-FB	10-Mbs Baseband Fiber Optic Backbone. Covered by Section 17(Draft) of IEEE 802.3. Uses IEEE 802.3 protocol, dual fiber point-to-point cabling with synchronous signaling to provide an inter-repeater "backbone" link. No defined maximum node count, maximum fiber distance 2 km, depending on system configuration.
10BASE-FL	10-Mbs Baseband Fiber Optic Link. Covered by Section 18 (Draft) of IEEE 802.3. Uses IEEE 802.3 protocol, dual fiber point-to-point cabling and repeaters to provide the network architecture. No defined maximum node count, maximum fiber distance 1-2 km, depending on system configuration.
10BASE-FP	10-Mbs Baseband Fiber Optic Passive. Covered by Section 16 (Draft) of IEEE 802.3. Uses IEEE 802.3 protocol, dual fiber point-to-point cabling and passive optical star to provide network architecture. No defined maximum node count, maximum fiber distance 0.5 km, depending on system configuration.

10BASE-T	10-Mbs Baseband Twisted Pair. Covered by Section 14 of IEEE 802.3. Uses IEEE 802.3 protocol, point-to-point twisted pair cabling and repeaters to provide network services. No defined maximum node count, maximum cable distance is 100 m.
T-connector	A coax connector, shaped like a "T", that connects two thin Ethernet cables while supplying an additional connector for a network interface card (NIC).
TCP/IP	Transmission Control Protocol/Internet Protocol. The Internet protocol stack which defines a wide range of network services allowing heterogeneous network system operation. TCP/IP is the default wide area network protocol used by both Microsoft Windows 95 and Windows NT.
Thick Ethernet	A cabling system that uses large-diameter, relatively stiff cable to connect transceivers. The transceivers connect to the nodes through flexible multiwire cable.
Thin Ethernet	A cabling system that uses a thin and flexible coax cable to connect each node to the next node in the line.
Token Passing	An access protocol which uses a special message (called a token) comprised of a bit pattern which is circulated around the network nodes giving them permission to transmit.
Topology	The geometric map of a LAN. Common LAN topologies include the bus, ring, and star.
Transceiver	A hardware device that links a node to a baseband network cable and functions as both a transmitter and receiver.
Twisted Pair Wiring	Cable comprised of two wires twisted together at six turns per inch to provide electrical shielding. Some telephone wiring uses twisted pair wiring.
Unicode	A standard that defines an international character set encoding scheme.
VL	VESA Local Bus. A high performance, 32-bit system bus originating from the Video Electronics Standards Association (VESA).
VxD	Virtual Device Driver. A low-level software component that manages a single resource, such as a display screen or a serial port.

7. APPENDIX D.:Trouble shooting:

<u>Phenomenon</u>	<u>Solving</u>
* Can not access to Network.	■Close your O.S. then re-login into your system.
*Power LED on, No Link/TX/RX LED signal.	■ Plug out the adapter then re-plug in this adapter. If it still is out of order maybe caused I/O address or memory address is conflicted or driver

installing incompletely.

*No any LED signal active

■ Driver is not installed completely. Or inserted is incompletely.

*This adapter always can not be detected.

■ Driver is not installed. Or this adapter is defective and need to return to original seller for RMA service.