

a

Analog Devices Canada Ltd.

777 Bay Street, Suite 2303

Toronto, Ontario

CANADA M5G 2C8

Voice: (416) 59x-3200

Fax: (416) 59x-4004

ADSL PCI NIC User Manual

Document Number 20-23000-100

Revision 1.3

01-05-25

This document contains confidential information and is
proprietary to **Analog Devices Inc.**

No part of this document may be reproduced in any form or by any means
without the prior permission of **Analog Devices Inc.**

All specifications are subject to change without notice.

Federal Communications Commission (FCC) Requirements, Part 15

This equipment has been tested and found to comply with the limits 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 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 the dealer or an experienced radio/TV technician for help.**

CAUTION: Any changes of modifications not expressly approved by the grantee of this device could void the users authority to operate the equipment.
--

Table of Contents

WELCOME TO ADI ADSL PCI NIC !	3
DOCUMENT ANNOTATIONS	3
SYSTEM REQUIREMENTS	3
HARDWARE INSTALLATION	4
FAMILIARIZING YOURSELF WITH YOUR ADSL BOARD	4
INSTALLING THE ADSL BOARD	4
SOFTWARE INSTALLATION	5
PPPoE (RFC1483) DRIVER INSTALLATION FOR WINDOWS 9x	6
<i>Device Driver Installation</i>	6
<i>GUI Configuration</i>	10
<i>Verify the modem</i>	14
<i>Uninstall the device driver</i>	18
PPPoA (RFC2364) DRIVER INSTALLATION FOR WINDOWS 9x.....	19
<i>Device Driver Installation</i>	19
<i>GUI Configuration</i>	25
<i>Verify the modem</i>	29
<i>Uninstall the device driver</i>	32
<i>Setup a Connection</i>	33
<i>Make a Call</i>	35
CO BOARD.....	37
PPPoE (RFC1483) CO DRIVER INSTALLATION.....	37
PPPoA (RFC2364) CO DRIVER INSTALLATION FOR WINDOWS NT4.....	38
<i>Install the ADSL PCI NIC card, RAS and related services</i>	38
<i>Setting registry</i>	43
<i>Creating new user(s) for server side</i>	43
<i>Starting server</i>	44
<i>Create an entry in phone book on the client side</i>	46
UTILITY PROGRAMS	50
TROUBLESHOOTING.....	51
CHECKLIST	51
ORDERING INFORMATION	52
NEXT RELEASE	52

Welcome to ADI ADSL PCI NIC !

Introduce yourself to the new world of fast Internet. ADI provides a whole new fast and simple environment for Internet access.

The ADI ADSL board features the following:

- Plug and Play PCI 2.1 interface
- Rate Adaptive ADSL technology that adapts to your connection conditions
- Receive rates up to 10Mbps (downstream) and transmit rates up to 1Mbps (upstream)

Document Annotations



Important Instruction



Special Note

System Requirements

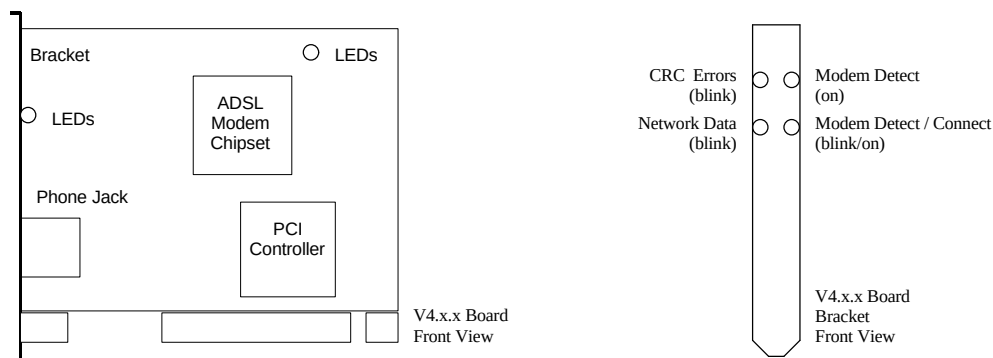
To use the PCI NIC, you PC must have:

- Pentium 133MHz CPU or faster
- Minimum 5MB free space on your hard drive
- 256 color VGA, or higher resolution
- Microsoft NT4 (with Service Pack 5 or later) or Windows 95 / 9x / 9x (2nd Edition) / Me / 2000
- Floppy drive
- CD-ROM drive

Hardware Installation

Familiarizing yourself with your ADSL Board

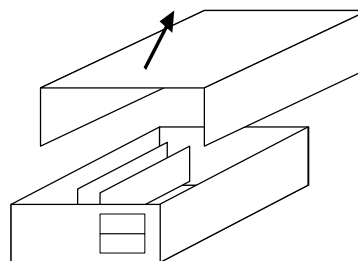
Your ADSL board only has one RJ-11 connector for data connection. POTS splitters or microfilters can be plugged outside from the board using multiple port phone jacks.



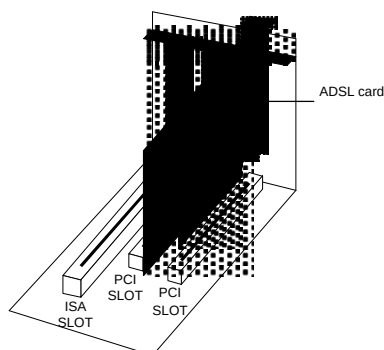
Installing the ADSL Board

To install the board:

1. Switch off your computer and all attached devices.
2. Touch a metal part of your computer to ground yourself.
3. Remove the computer cover.
4. Locate a free PCI slot on the computer motherboard, remove the metal plate from the slot and put the screw aside.
5. Align the ADSL Board with the PCI slot and insert the board as shown.
6. Secure the ADSL Board to the PCI slot with the screw which was removed from the metal plate.
7. Connect your ADSL Board to your wall's telephone jack which is connected to your ADSL service.
8. Replace the computer's cover.
9. Plug the power cord into the power outlet and switch on the computer.



Opening your PC



Installing the ADSL board

Software Installation

Install from CD-ROM

If you receive a zip file containing all the drivers, please unzip the files and burn them into a CD-ROM. The CD-ROM contains both PPPoEthernet (RFC1483) and PPPoATM (NDISWAN) Windows software drivers. Both drivers support Windows NT4/95/9x/2000/Me.



Install the latest service pack

It is important to remember to install/reinstall latest service pack for Windows whenever you are adding components to your system since older system files may be copied back to Windows during installation. After that you should reboot the machine again.

PPPoE (RFC1483) Driver Installation for Windows 9x

For some ADSL networks, they provide the PPP over Ethernet dial-up network services. The supplied RFC1483 drivers work with third party PPPoE client software such as WinPoet, NTS. Consult your service provider for the PPPoE client software and its installation guide. This manual only demonstrates the installation for the RFC1483 drivers which work with other networks.

Device Driver Installation

1. It is important to have a clean Windows 9x setup. It indicates there should not be any conflicted hardware. The user is encouraged to check:
Start -> Setting -> Control Panel -> System -> Device Manager.
2. There should not be any “yellow warning sign” that complains an improper hardware attached to the system.
3. Make sure the computer completely power down. Then insert the ADSL PCI NIC card into one of the PCI slots.
4. Put the Windows 9x original CD-ROM into the CD drive.
5. Power up the system, you should see the following window while system is searching for new hardware.
6. Windows 9x will open a window called “Add New Hardware Wizard” to indicate that it found a “PCI ATM Controller” (ADSL) board. Click “Next” to continue.



7. Click “Next” to search for the best driver for your device.



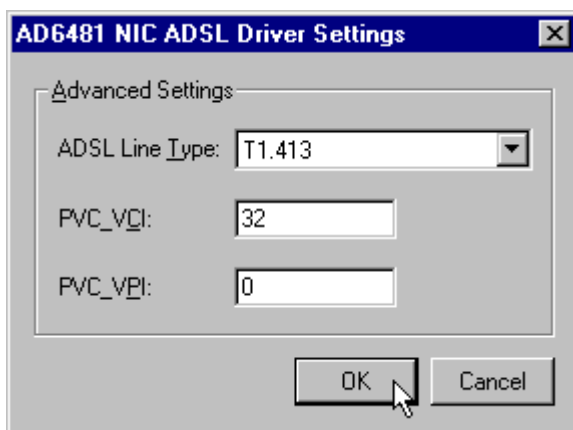
8. Select “Specify a location” and browse for the target network protocol and operating system. Then click “Next”.



9. Windows should find the selected ADSL device driver configuration file. Click “Next” to continue.



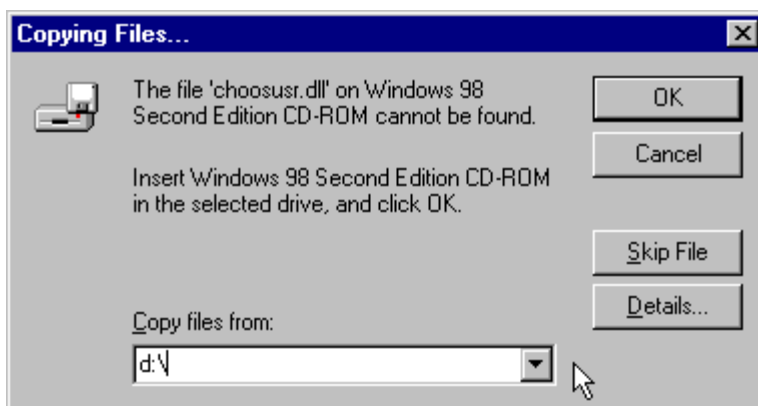
10. New window will let you select the ADSL network option. Consult your service provider or network administrator for details. Click “OK” when finished.



11. Windows will ask for your Windows CD-ROM to install the necessary files. Click “OK” to continue.



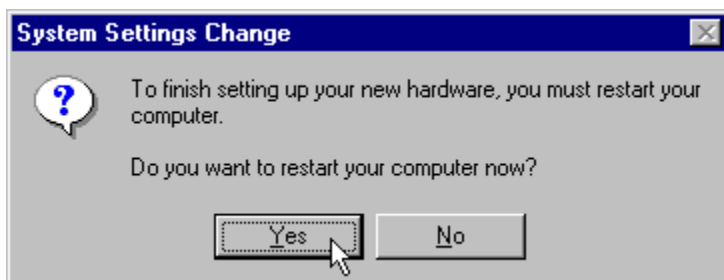
12. Select the location of the CD-ROM drive and click “OK” to continue.



13. Windows has finished the software driver installation, to continue click “Finish”.

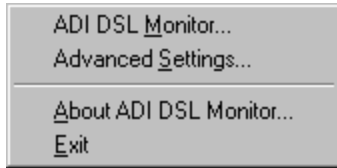


14. Click “Yes” to restart Windows.

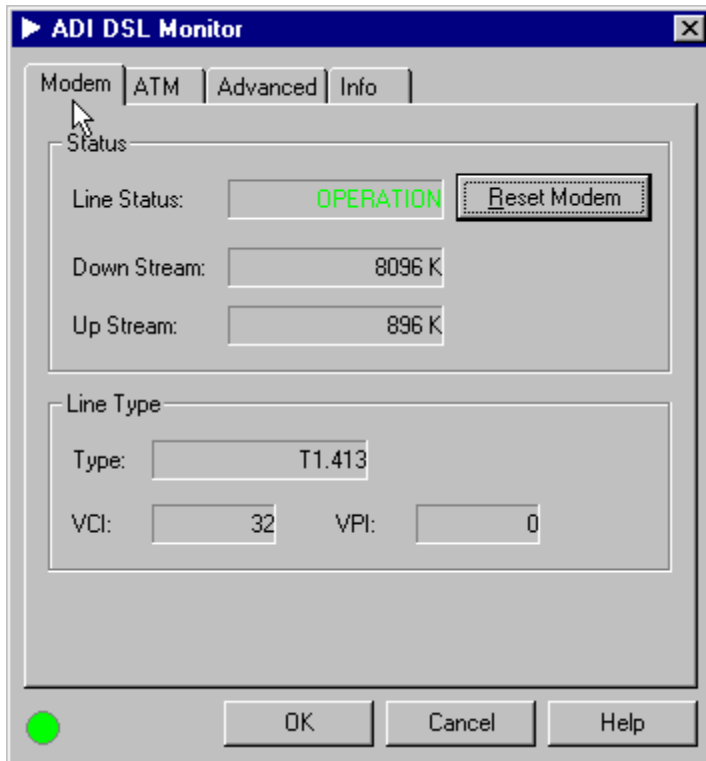


GUI Configuration

1. From the Windows system icon tray bar (bottom right of the screen), right click to view the ADI DSL Monitor menu. Click on “ADI DSL Monitor” to open the menu.

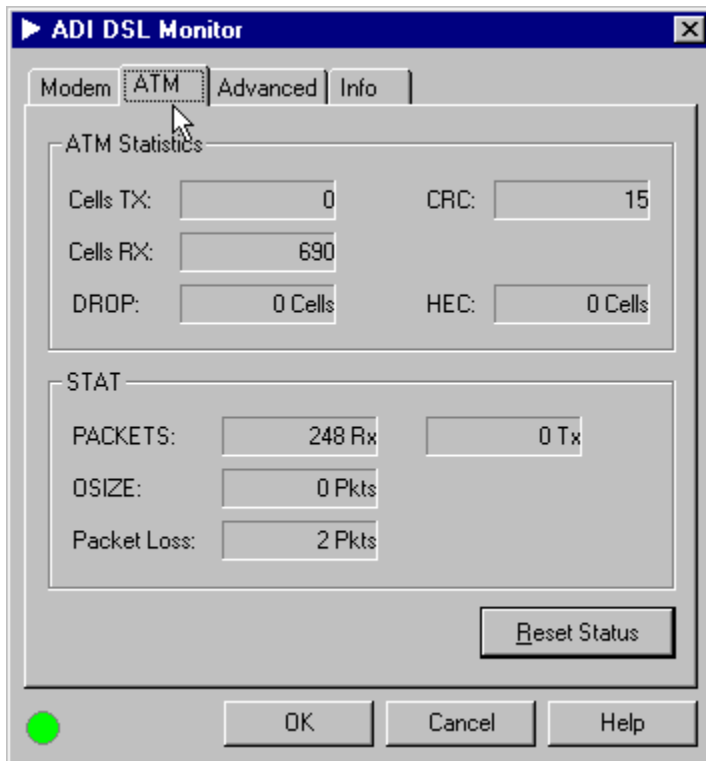


2. ADSL modem information are shown here. Modem can be reset by clicking on “Reset Modem” icon.



Modem Information Field	Description
Line Status	Status of the modem: (IDLE, OPERATIONAL, INITIALIZING, FAILED)
Down Stream	Downstream data rate negotiated by DSL link (Kbit/s)
Up Stream	Upstream data rate negotiated by DSL link (Kbit/s)
Type	Choices are ANSI T1.413, G.LITE, G.DMT and Multi-Standard
VCI	Virtual Channel Identifier field used in the ATM cell header
VPI	Virtual Path Identifier field used in the ATM cell header

3. ATM statistics are shown here.

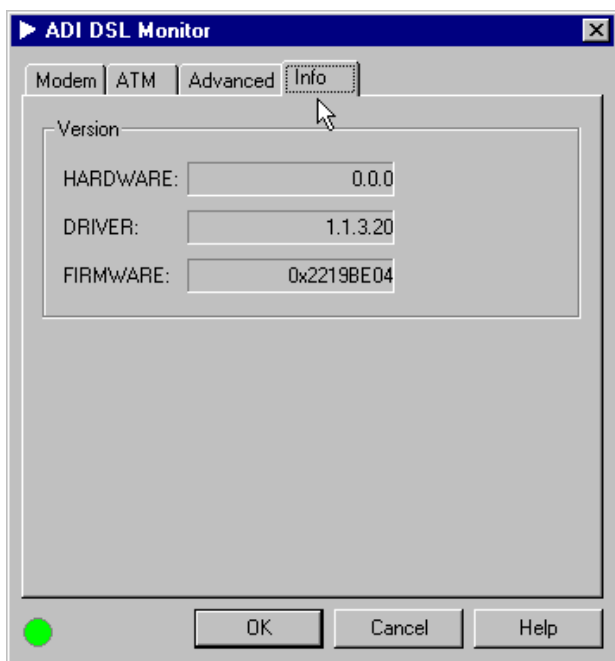


ATM Information Field	Description
Cells TX	Number of (non-IDLE) ATM cells transmitted since start of link
Cells RX	Number of (non-IDLE) ATM cells received since start of link
DROP	Number of dropped cells
CRC	Number of AAL5 packets with checksum errors
HEC	Number of received ATM cells with errors in the ATM cell header since start of link
Packets	Number of AAL5 packets received (Rx) and transmitted (Tx) since start of link
Oversized	Number of oversized packets received
Packet Loss	Number of AAL5 packets received that are discarded (due to CRC errors and oversize)

- Advanced tab is used by advanced users who are familiar with the ADI ADSL modem CMV (configuration and management variable) command set.

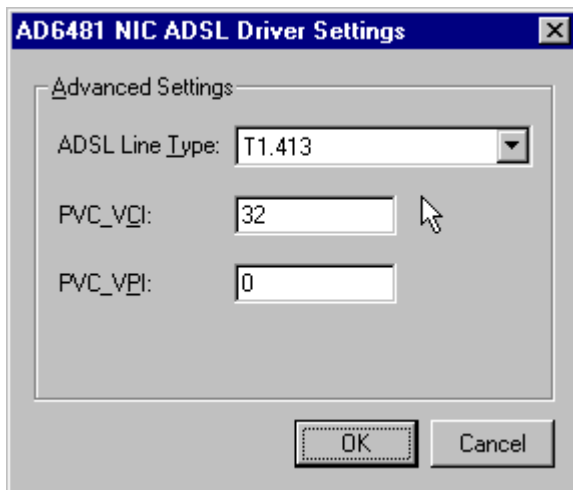
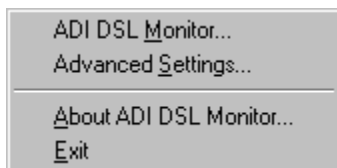


- Info tab shows the product information.

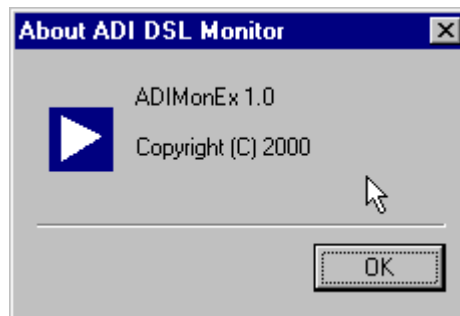
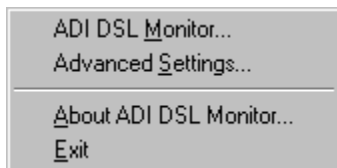


Info Information Field	Description
HARDWARE	Board version
DRIVER	Windows device driver version
FIRMWARE	ADSL modem firmware version

6. Return to the tray icon and click “Advanced Settings”. ADSL Line Type and PVC settings can be changed from here.

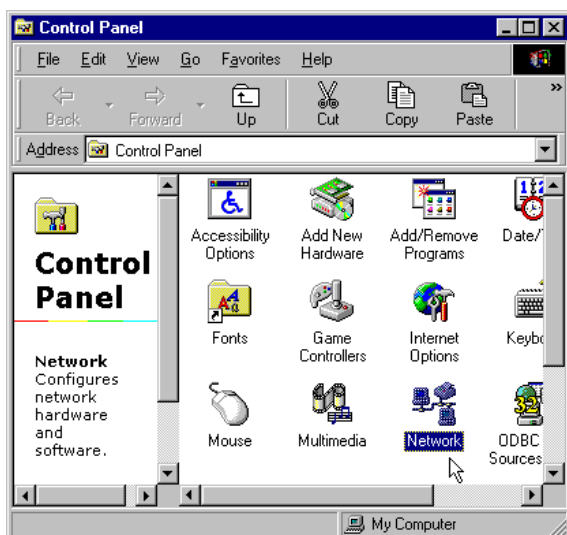


7. ADI DSL Monitor version and copyright information can be shown by clicking “About ADI DSL Monitor”.

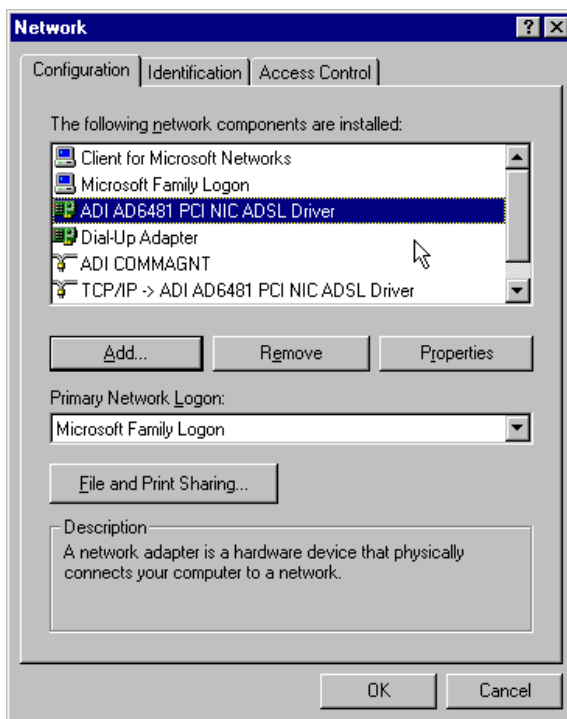


Verify the modem

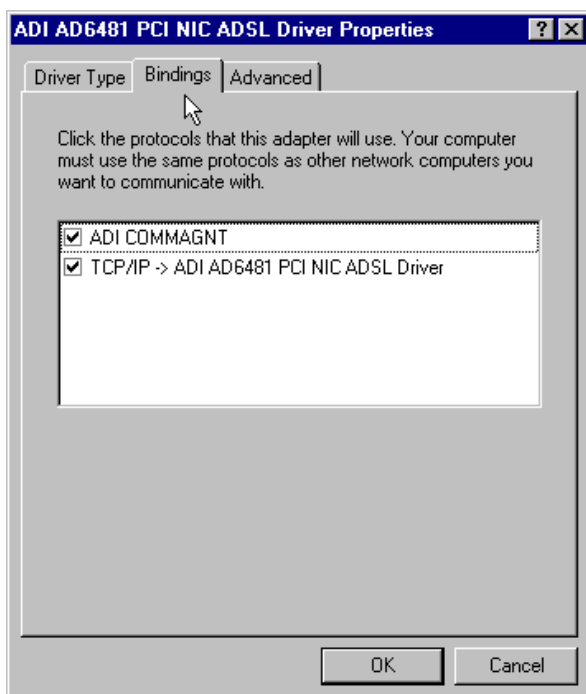
You may want to check the following screens to ensure proper installation of the modem.



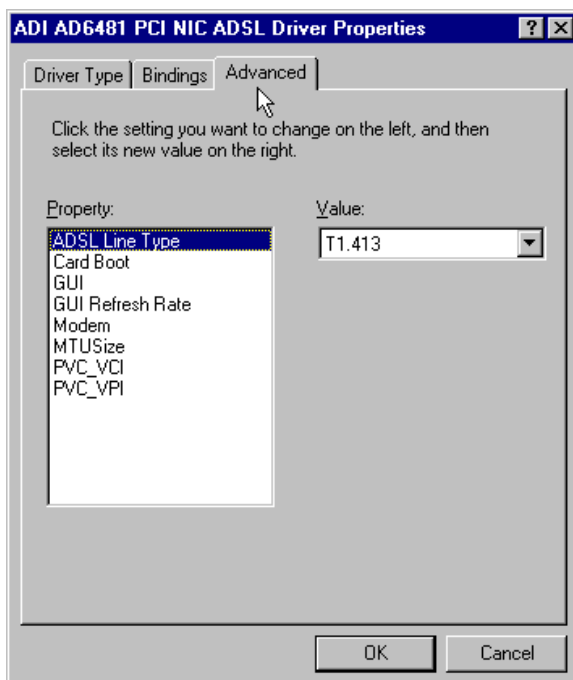
Click on the “Network” icon, ADI PCI NIC ADSL Driver can then be shown.



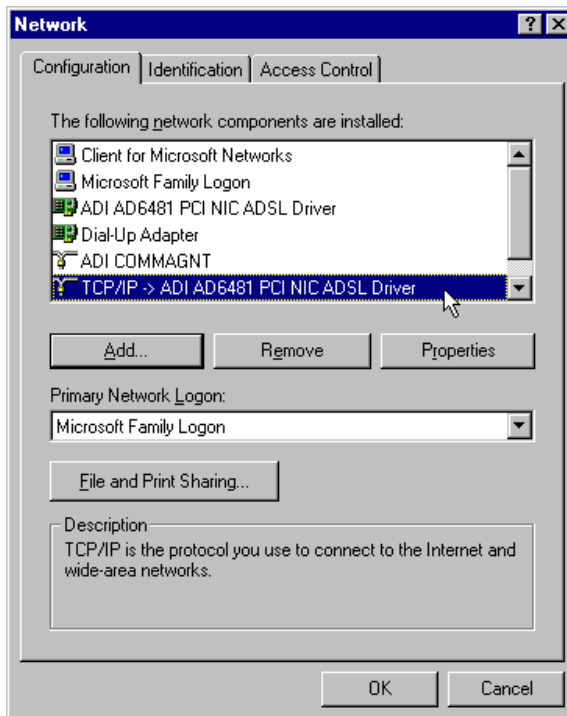
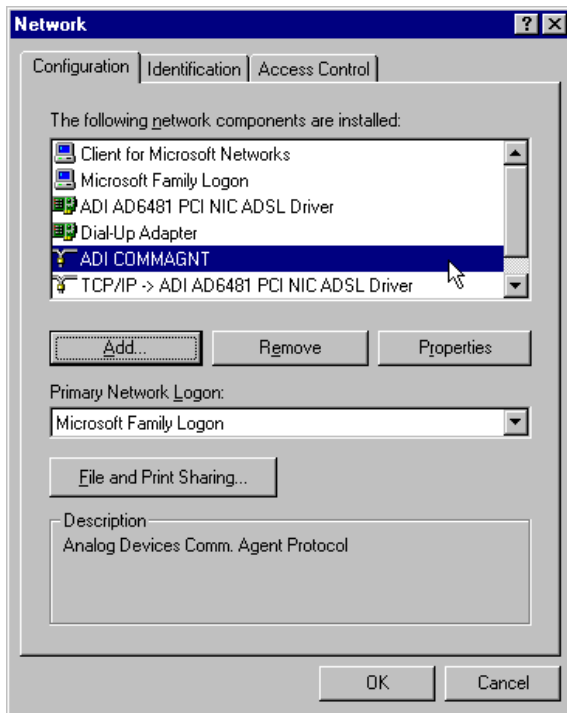
Click on Driver “Properties” and its “Binding” tab.



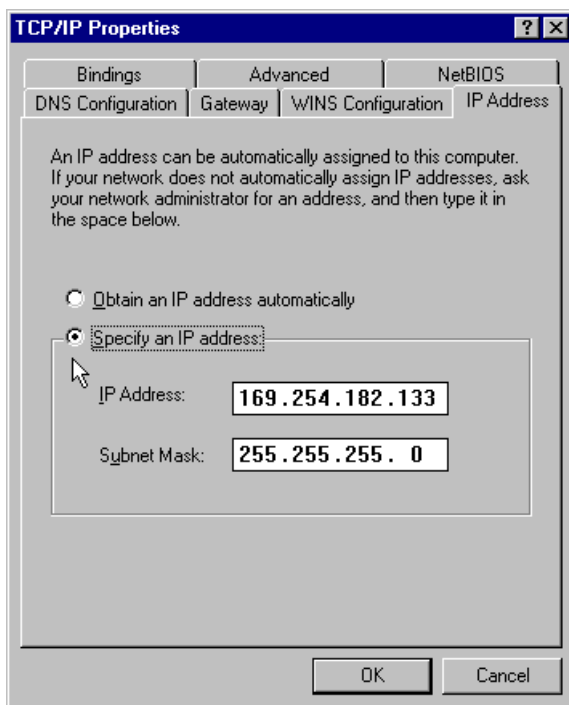
Modem parameters can also be changed from “Advanced” tab. It is recommended to change these parameters from the ADI DSL Monitor GUI.



Back to the “Network” panel, ADI Commagent and TCP/IP for the ADI ADSL Driver should also be shown.



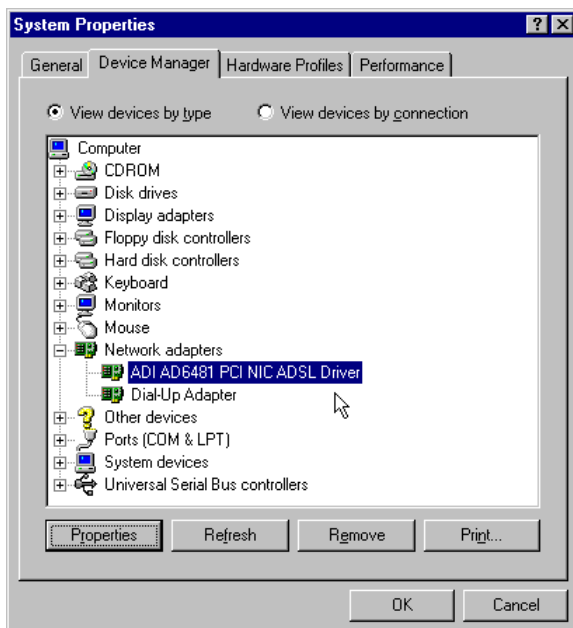
Change IP address of the PC, consult your service provider or network administrator for the proper IP address.



Return to Control Panel and click on "System" icon.

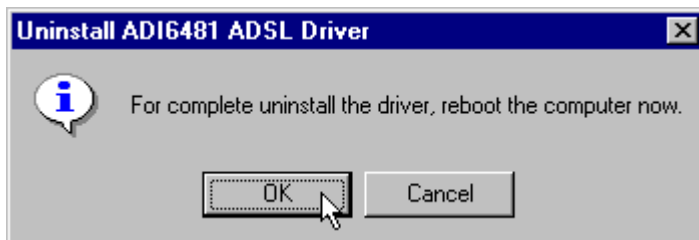
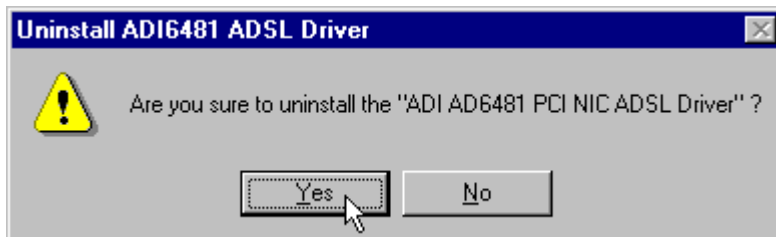


ADI AD6481 PCI NIC ADSL Driver should be shown under the “Network adapters” device class.



Uninstall the device driver

Click on Start -> Programs -> ADI AD6481 PCI NIC ADSL Driver to uninstall the device driver.



PPPoA (RFC2364) Driver Installation for Windows 9x

Device Driver Installation

1. It is important to have a clean Windows 9x setup. It indicates there should not be any conflicted hardware. The user is encouraged to check:
Start -> Setting -> Control Panel -> System -> Device Manager.
2. There should not be any “yellow warning sign” that complains an improper hardware attached to the system.
3. Make sure the computer completely power down. Then insert the ADSL PCI NIC card into one of the PCI slots.
4. Put the Windows 9x original CD-ROM into the CD drive.
5. Power up the system, you should see the following window while system is searching for new hardware.
6. Windows 9x will open a window called “Add New Hardware Wizard” to indicate that it found a “PCI ATM Controller” (ADSL) board. Click “Next” to continue.



7. Click “Next” to search for the best driver for your device.



8. Select “Specify a location” and browse for the target network protocol and operating system. Then click “Next”.



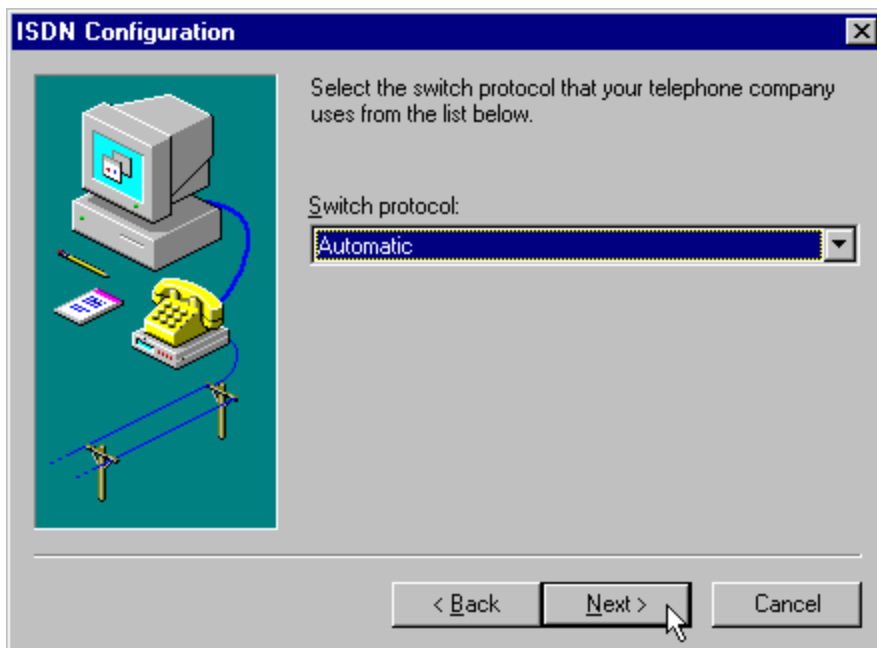
9. Windows should find the selected ADSL device driver configuration file. Click “Next” to continue.



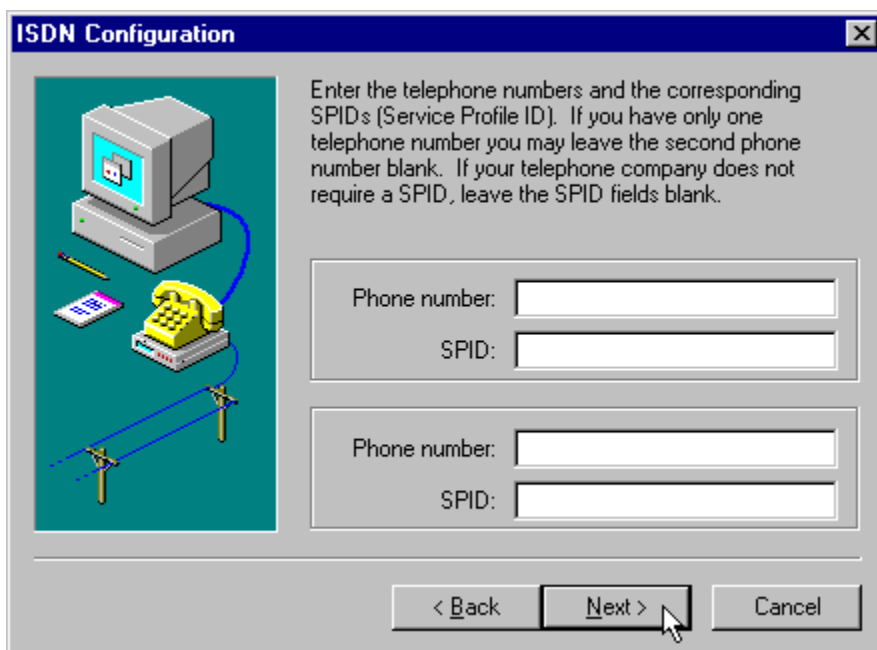
10. The ADSL PCI NIC card is introduced as an ISDN card with PPP driver. It enables users to use this NIC card through the Dial-Up Network.



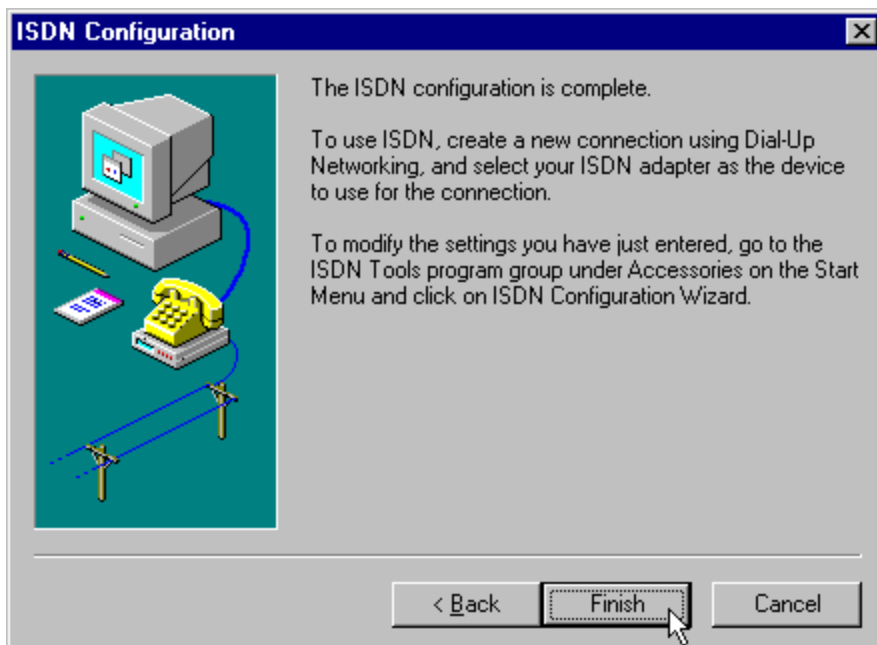
11. Default protocol is “Automatic”, click “Next” to continue.



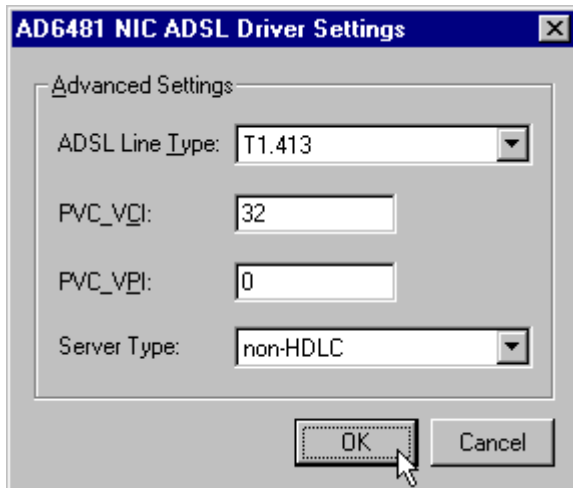
12. It is not required to enter phone number because the ADSL PCI NIC card is permanently connected to the Central Office. Click “Next” to continue.



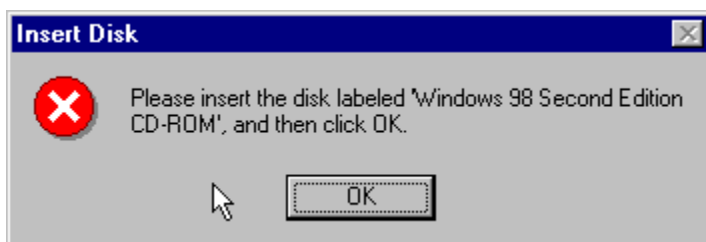
13. This window confirms the driver being properly configured, Windows 9x still requires to install its network components. Click “Finish” to continue.



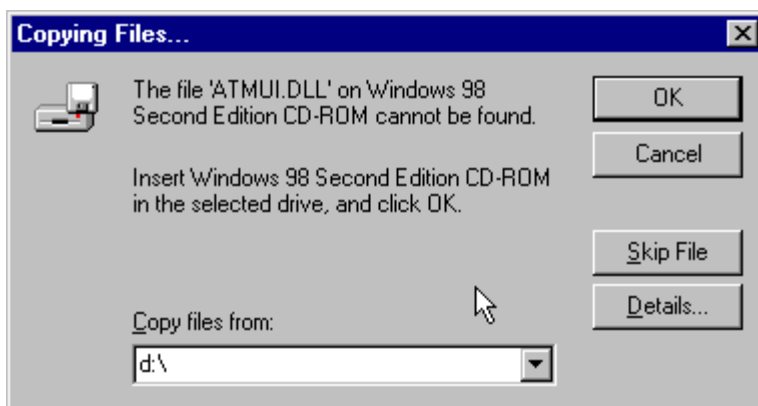
14. New window will let you select the ADSL network option. Consult your service provider or network administrator for details. Click “OK” when finished.



15. Windows will ask for your Windows CD-ROM to install the necessary files. Click “OK” to continue.



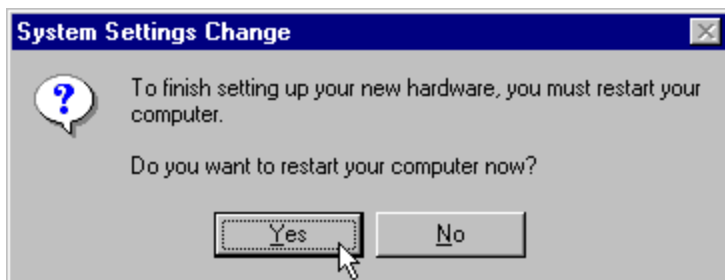
16. Select the location of the CD-ROM drive and click “OK” to continue.



17. Windows has finished the software driver installation, to continue click “Finish”.

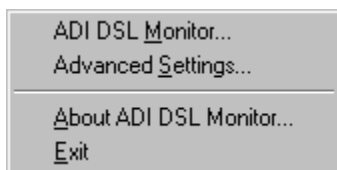


18. Windows 9x has finished the installation. It requires system reboot to run the driver the first time.

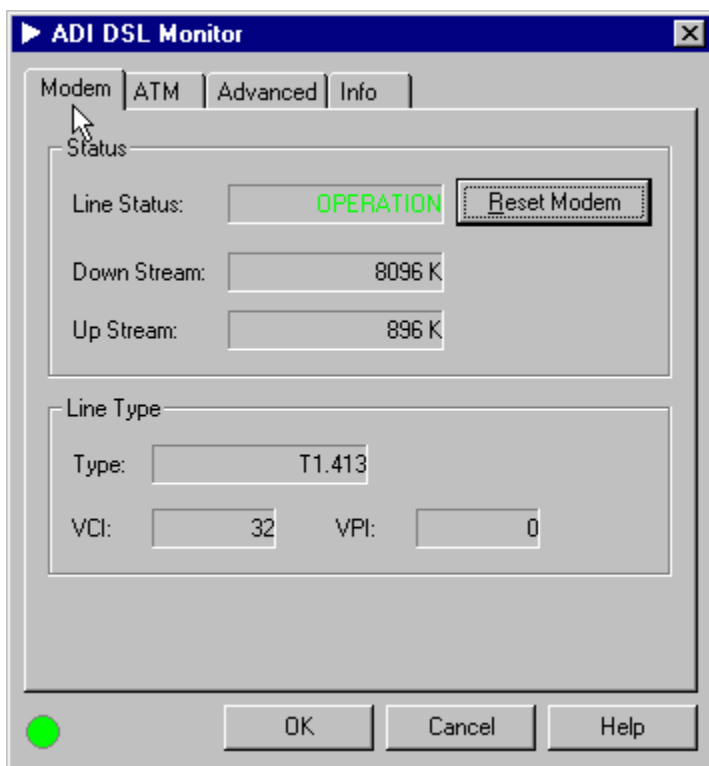


GUI Configuration

1. From the Windows system icon tray bar (bottom right of the screen), right click to view the ADI DSL Monitor menu. Click on "ADI DSL Monitor" to open the menu.



2. ADSL modem information are shown here. Modem can be reset by clicking on "Reset Modem" icon.



Modem Information Field	Description
Line Status	Status of the modem: (IDLE, OPERATIONAL, INITIALIZING, FAILED)
Down Stream	Downstream data rate negotiated by DSL link (Kbit/s)
Up Stream	Upstream data rate negotiated by DSL link (Kbit/s)
Type	Choices are ANSI T1.413, G.LITE, G.DMT and Multi-Standard
VCI	Virtual Channel Identifier field used in the ATM cell header
VPI	Virtual Path Identifier field used in the ATM cell header

3. ATM statistics are shown here.

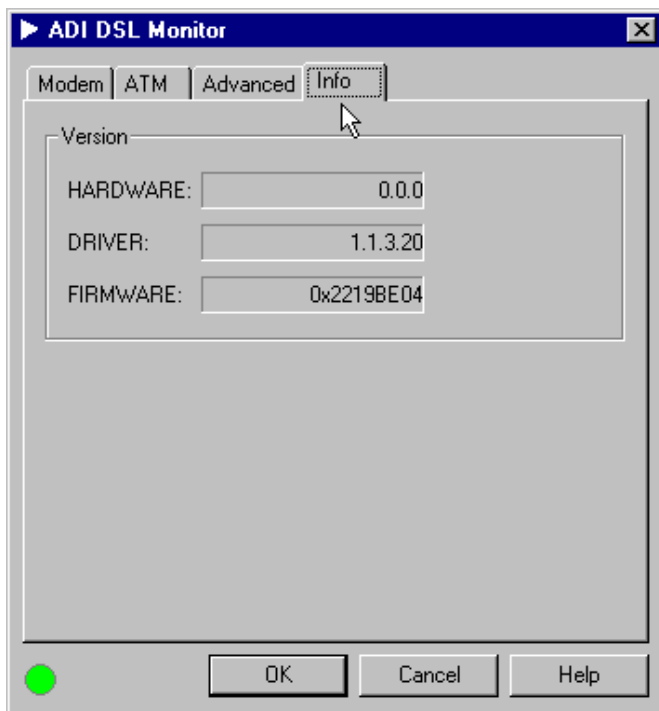


ATM Information Field	Description
Cells TX	Number of (non-IDLE) ATM cells transmitted since start of link
Cells RX	Number of (non-IDLE) ATM cells received since start of link
DROP	Number of dropped cells
CRC	Number of AAL5 packets with checksum errors
HEC	Number of received ATM cells with errors in the ATM cell header since start of link
Packets	Number of AAL5 packets received (Rx) and transmitted (Tx) since start of link
Oversized	Number of oversized packets received
Packet Loss	Number of AAL5 packets received that are discarded (due to CRC errors and oversize)

- Advanced tab is used by advanced users who are familiar with the ADI ADSL modem CMV (configuration and management variable) command set.

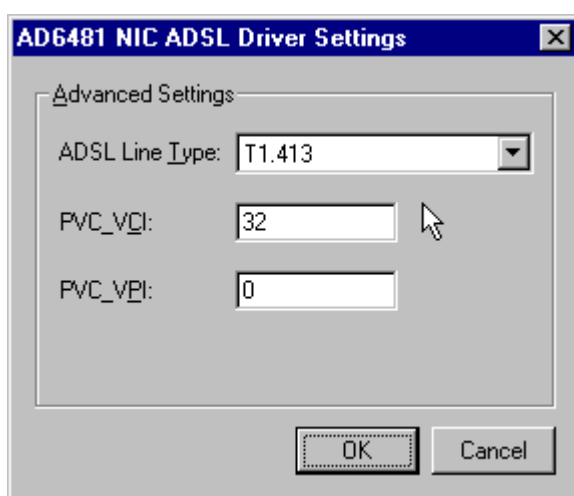
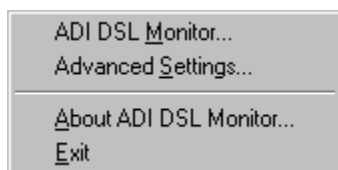


- Info tab shows the product information.

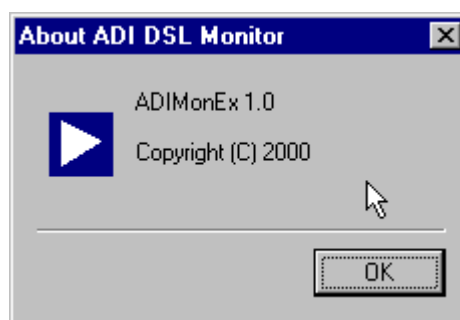
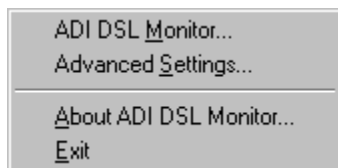


Info Information Field	Description
HARDWARE	Board version
DRIVER	Windows device driver version
FIRMWARE	ADSL modem firmware version

6. Return to the tray icon and click “Advanced Settings”. ADSL Line Type and PVC settings can be changed from here.

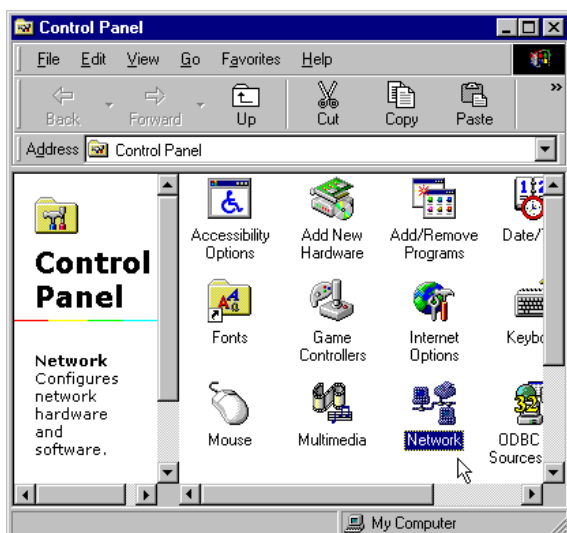


7. ADI DSL Monitor version and copyright information can be shown by clicking “About ADI DSL Monitor”.

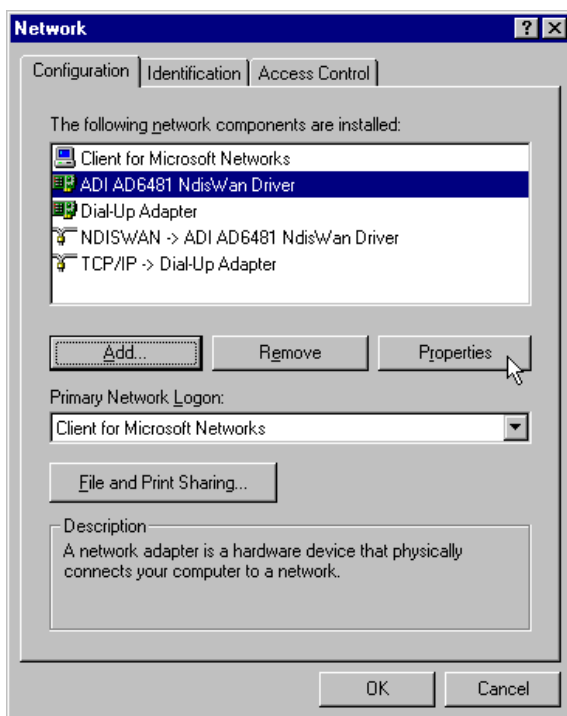


Verify the modem

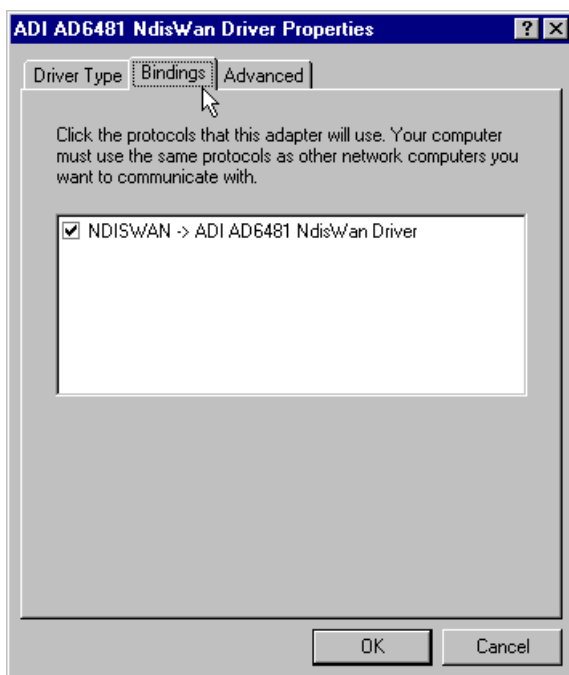
You may want to check the following screens to ensure proper installation of the modem.



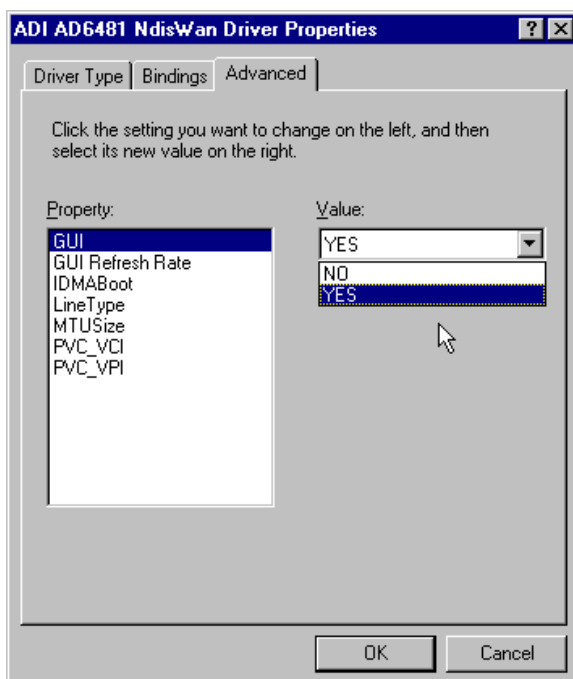
Click on the “Network” icon, ADI PCI NIC ADSL Driver can then be shown.



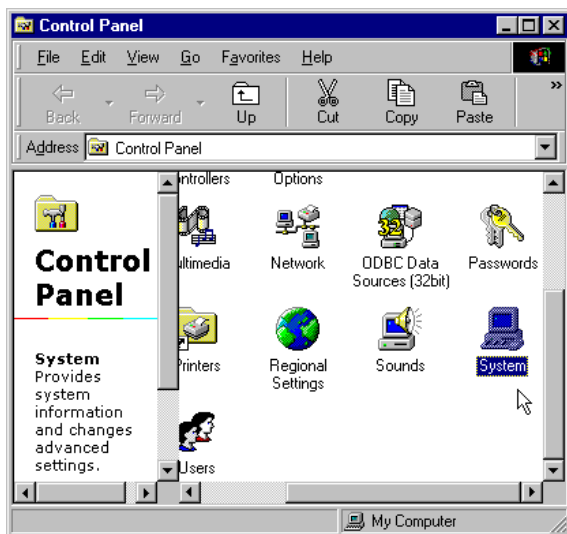
Click on Driver “Properties” and its “Binding” tab.



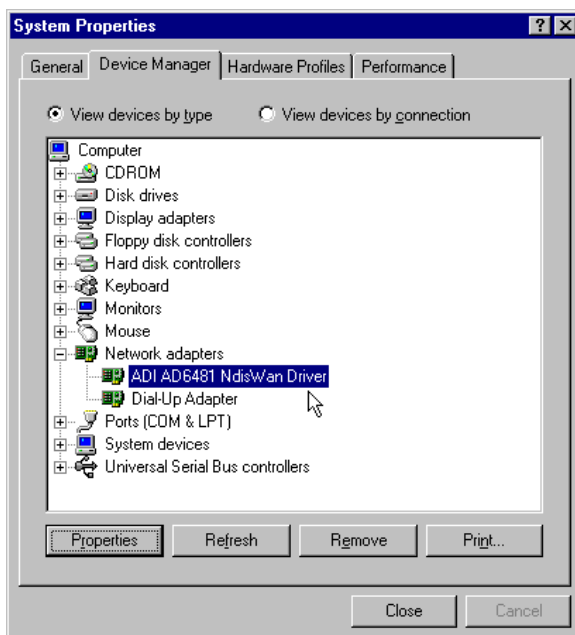
Modem parameters can also be changed from “Advanced” tab. It is recommended to change these parameters from the ADI DSL Monitor GUI.



Return to the Control Panel and click on “System” icon.

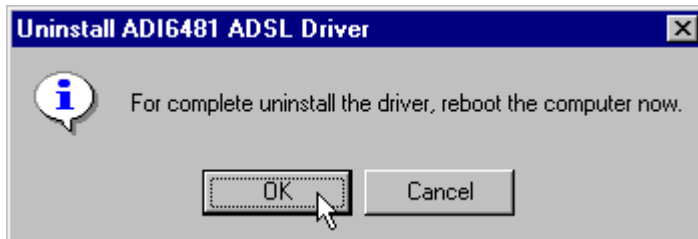
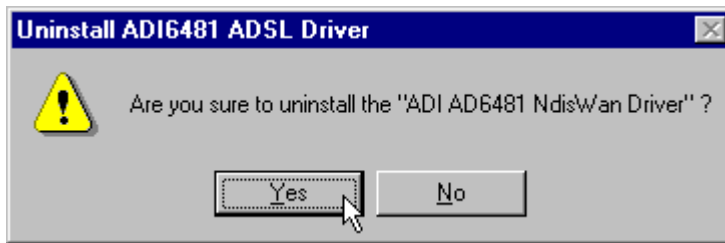


The “ADI AD6481 NdisWan Driver” should be shown under the “Network adapters” device class.



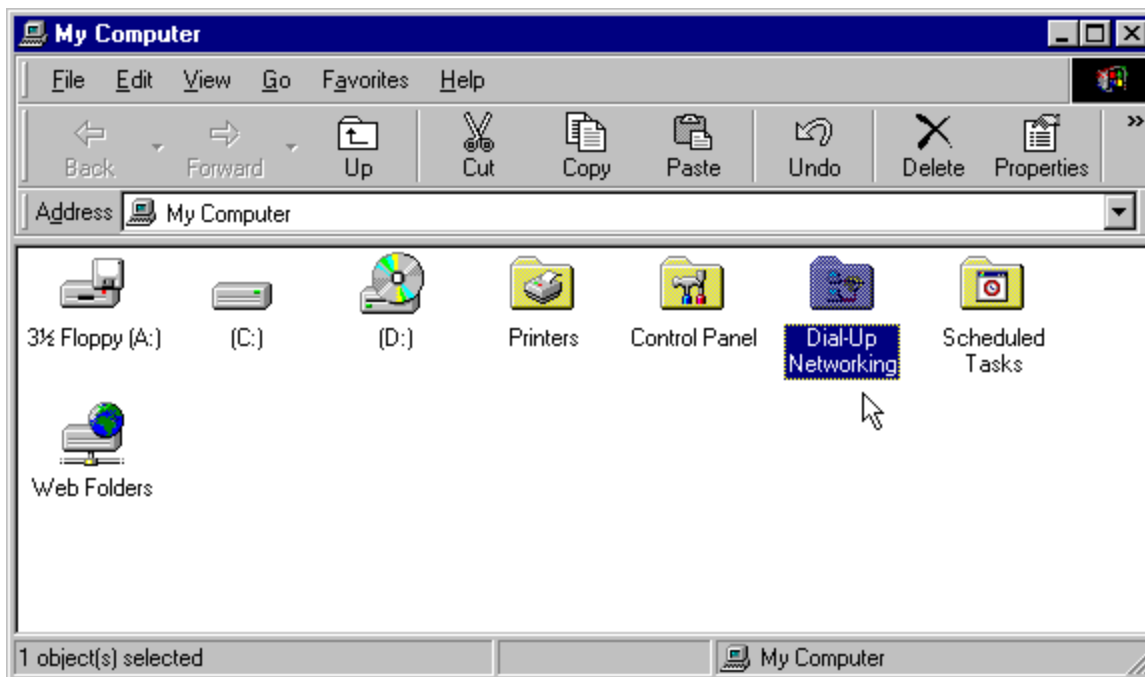
Uninstall the device driver

Click on Start -> Programs -> ADI AD6481 PCI NIC ADSL Driver to uninstall the device driver.

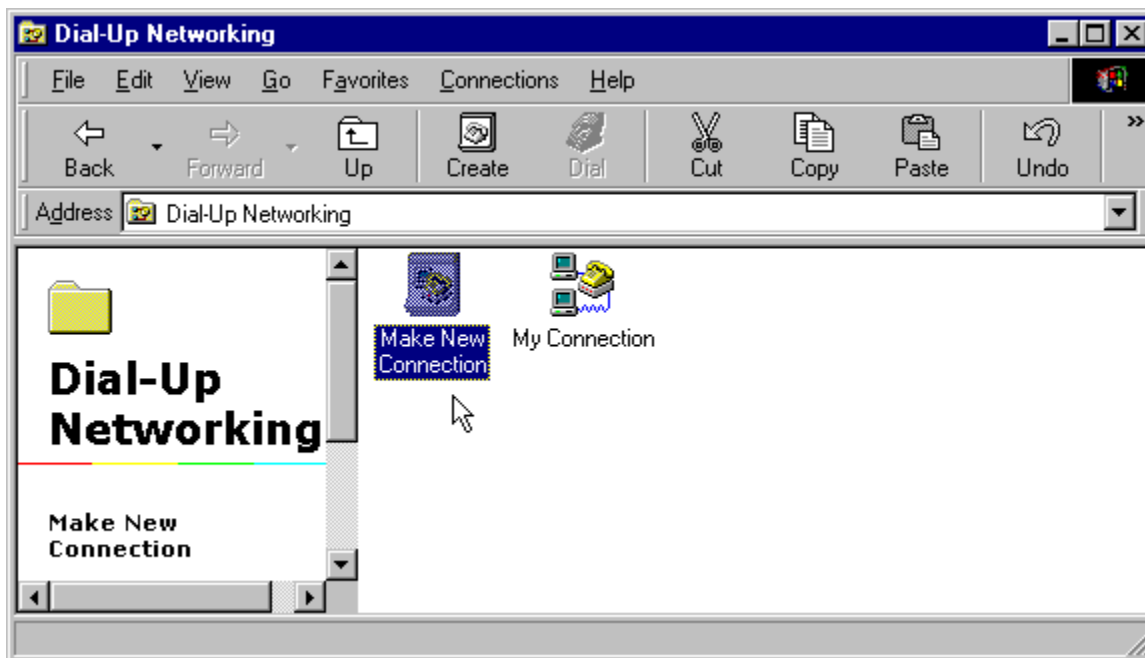


Setup a Connection

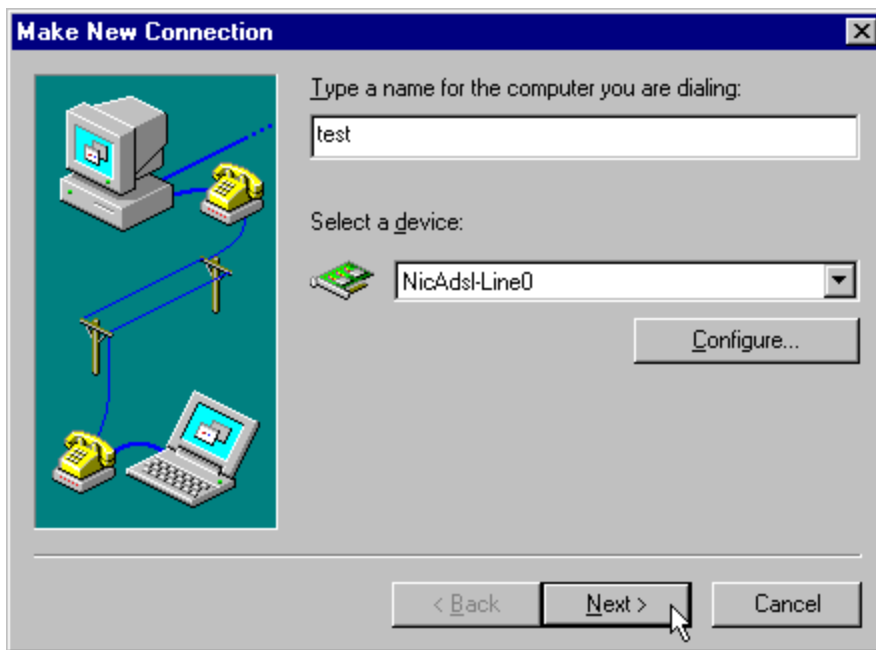
1. User is required to set up a dial-up connection before attempting to dial into the server. “Dial-Up Networking” can be found under “My Computer” on the desktop screen. It can also be opened from Start -> Program -> Accessories -> Communications.



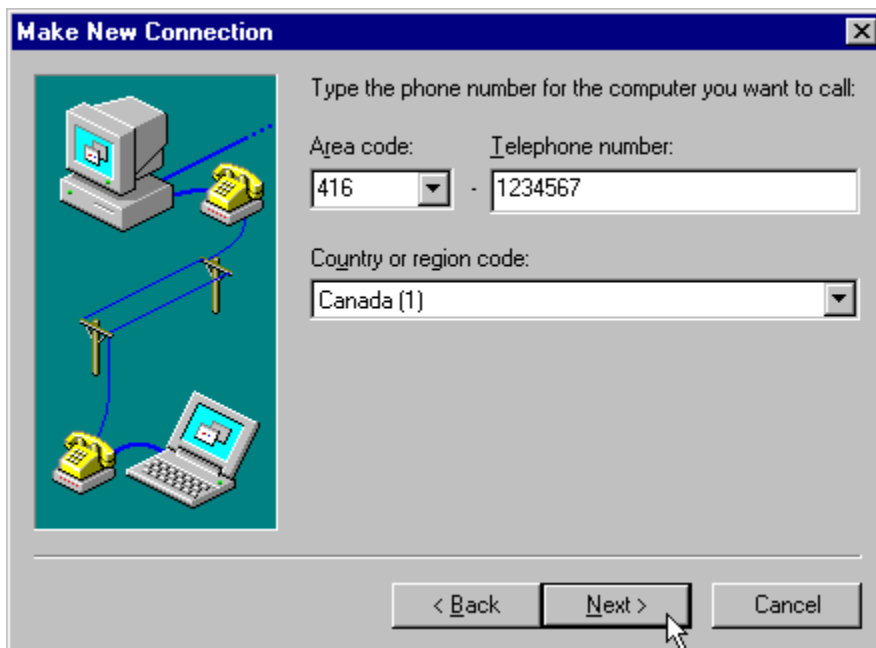
2. New user is required to make new connection.



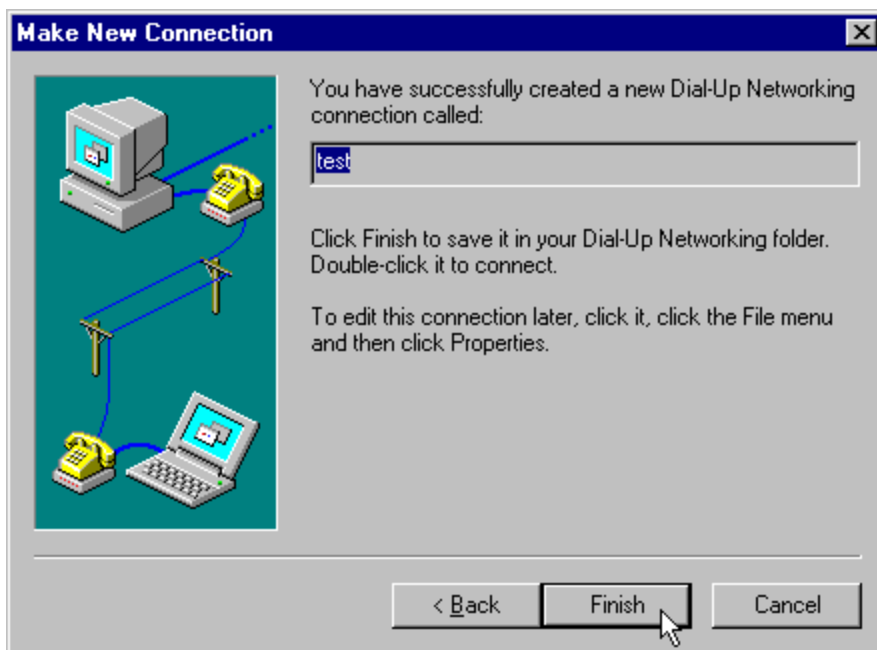
3. Name the connection, and make sure “NicAdsl-Line0” has been chosen for device selection.



4. Phone entries can be entered with dummy numbers.

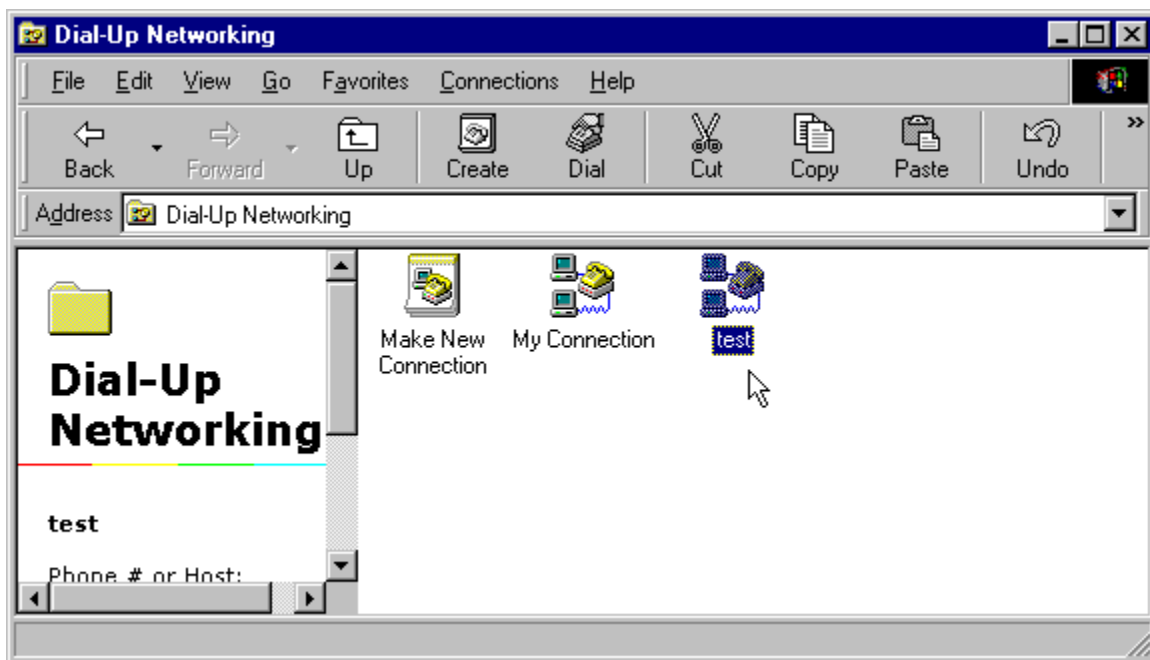


- Windows 9x will verify whether the connection has successfully been installed. Click “Finish” to continue. If this is the first time to setup a connection on current Windows 9x, it will install Dial-Up Networking components. Make sure Windows 9x CD-ROM is inserted in the CD-ROM drive.

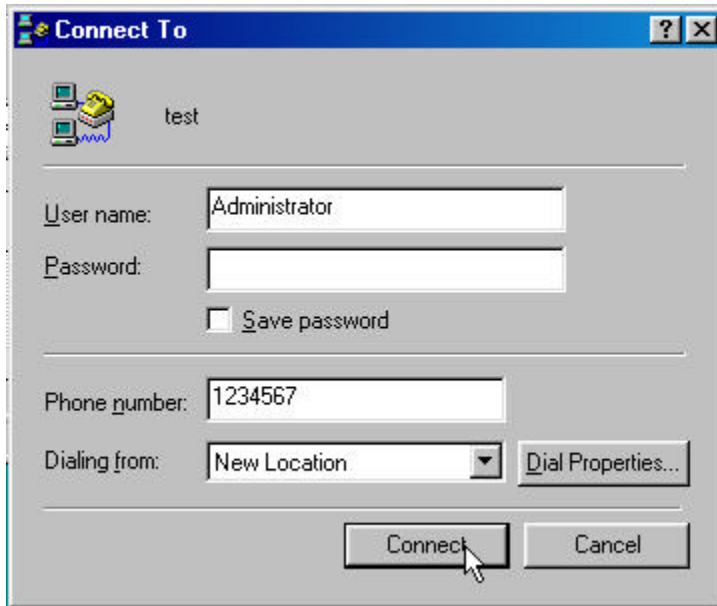


Make a Call

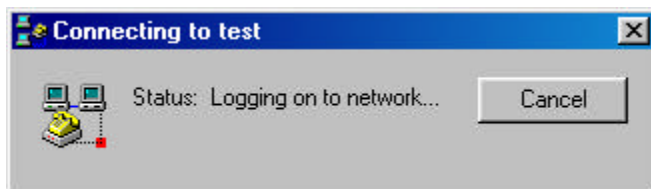
- After installed the device driver and setup the connection, user can now dial-in to the server. Double click on the dialing-in computer.



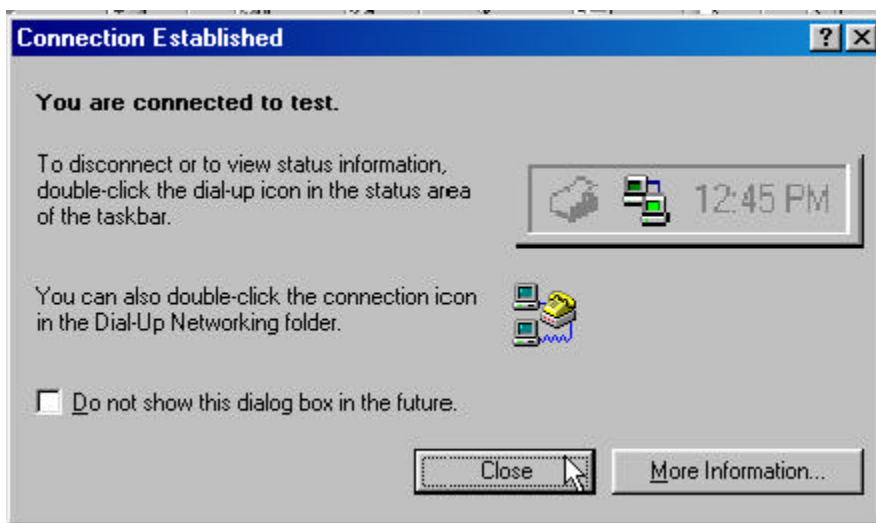
- Correct user name and password should be entered for server authorization. Then click “Connect”.



- User should see the following window showing the PPP dial-up status.



- The following window displays a successful connection. IP address has been assigned from the server.



CO Board

For full product evaluation purpose, emulated single channel ADSL CO (central office) PCI NIC card is available. To install the driver, we recommend to use Windows NT4 Server which provides built-in server dial-up services and higher file transfer performance.

CO Driver Installation

The procedures apply to both PPPoE (RFC1483) and PPPoA (RFC2364) drivers.

Same driver installation procedures are used like the RT (remote terminal) card.

Change the following parameters from Windows registry:



Modem = 0
IDMABoot = 0

For NT4, run “regedit” from Windows Start bar, the registry entry for the ADSL PCI NIC is located in

HKEY_LOCAL_MACHINE -> System -> CurrentControlSet -> Services -> Nicadsl_? -> Parameters

For Win9x, the registry entry for the ADSL PCI NIC is located in

HKEY_LOCAL_MACHINE -> System -> CurrentControlSet -> Services -> Class -> Net -> ????

Where ??? are numbers assigned by Windows registry.

PPPoA (RFC2364) CO Driver Installation for Windows NT4

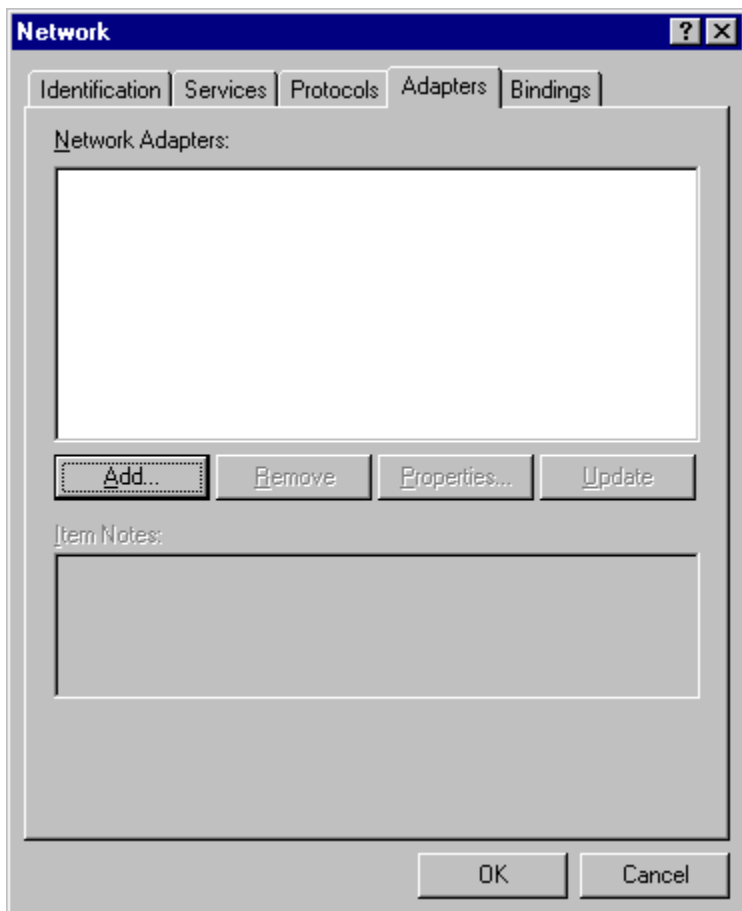
Install the ADSL PCI NIC card, RAS and related services

The following steps show how to install PPPoA driver under Windows NT4 for server (CO board).

1. Open the Control Panel via the Start -> Settings -> Control Panel. Double click on "Network".



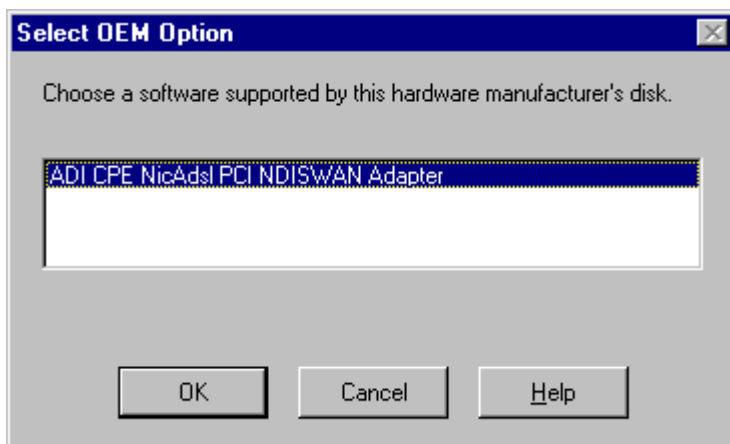
2. Select "Adapters" tab. Click "Add" then "Have Disk" to locate the driver directory.



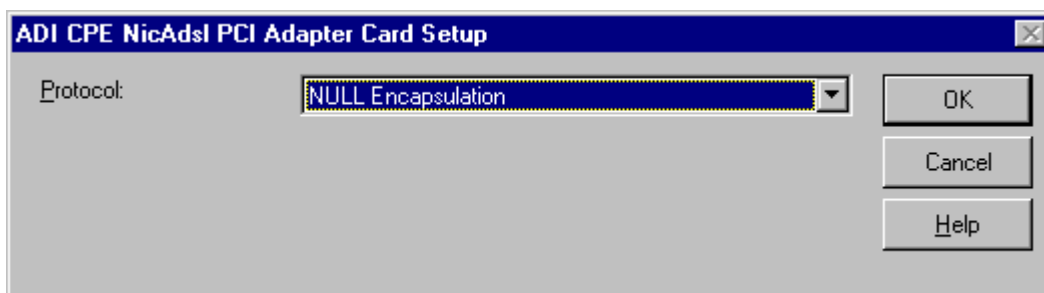
3. Type the driver directory which is located from the CD-ROM. Then click “OK” to continue.



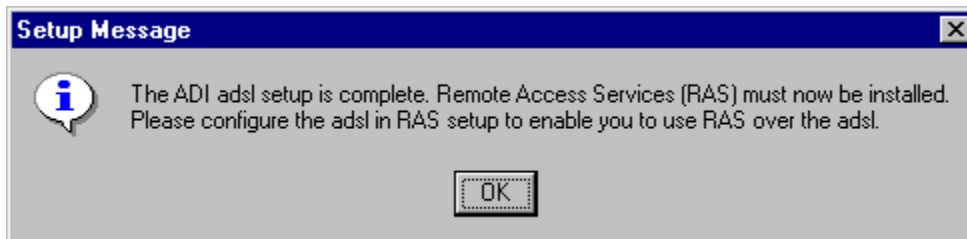
4. Driver name will appear on the following, click “OK” to continue.



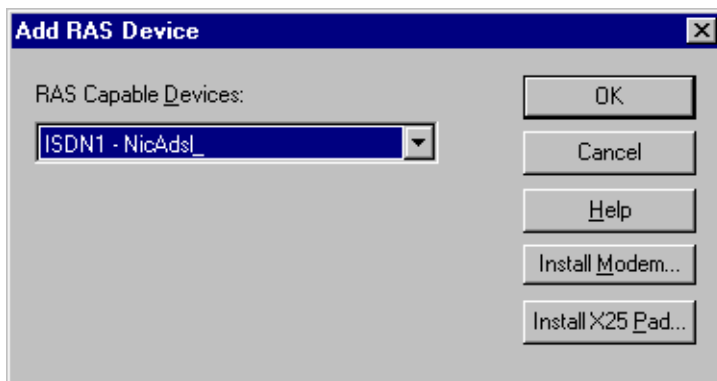
5. Choose the appropriate encapsulation scheme and click “OK”.



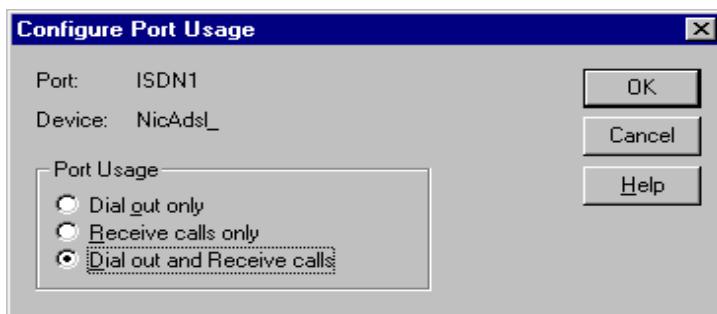
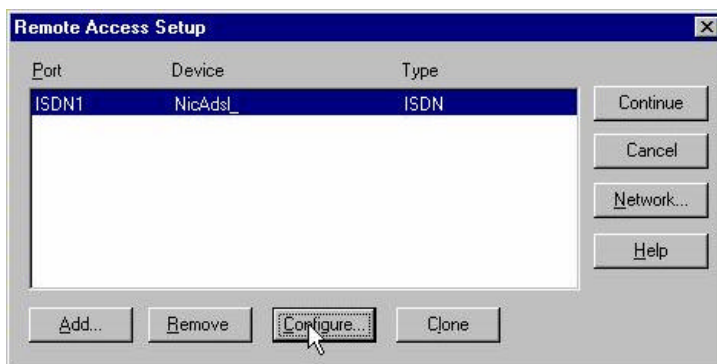
6. Driver installation complete message is shown. Windows will continue to install Remote Access Service (RAS) automatically by click “OK”.



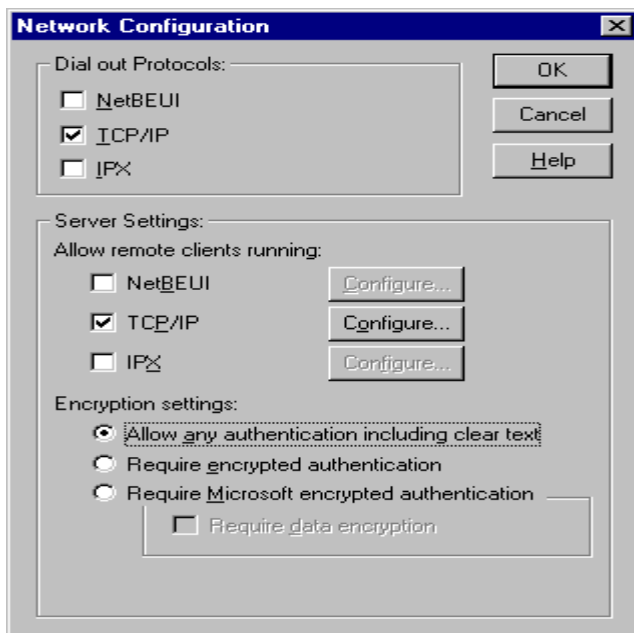
7. Make sure you see correct name of the device in main page of RAS. Then click “OK”.



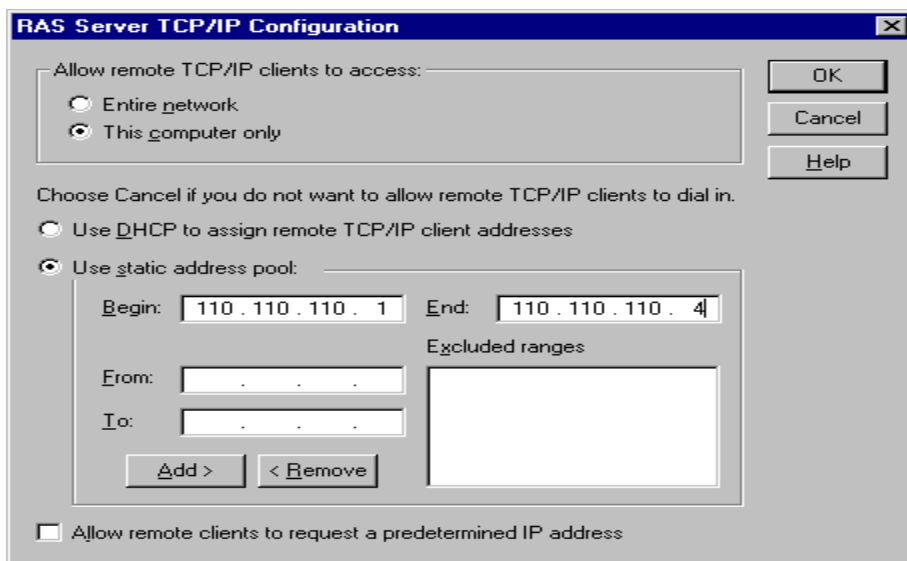
8. Click “Configure” to setup RAS for dialing out (client), receiving calls or both together (server). Click “OK” after finished selection.



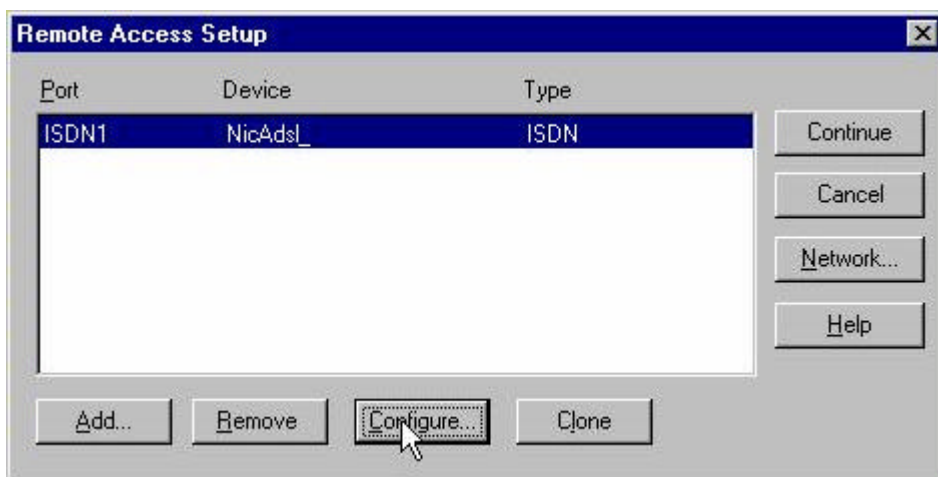
9. Click “Network” icon from “Remote Access Setup” window to configure network for RAS. Click “Configure” to choose your desired TCP/IP configuration for RAS server.



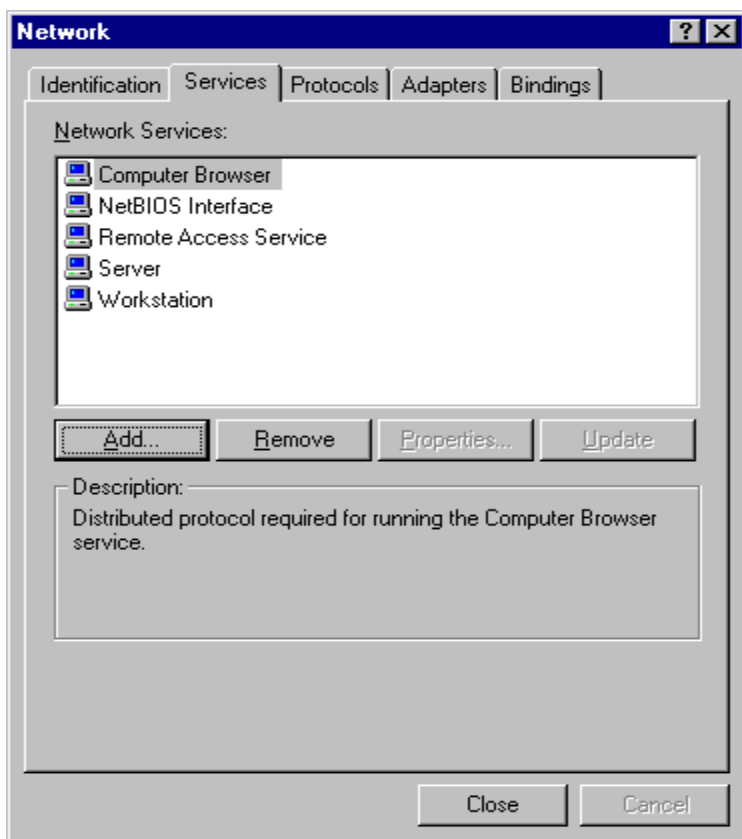
10. Enter the TCP/IP addresses, click “OK” to continue.



11. After installing RAS, return to the “Remote Access Setup” windows, then click “Continue”.



12. Network panel will be displayed again. Select “Services” tab to install Server, Workstation and NetBIOS interface. These services are necessary for PPP driver.



13. After installed the ADSL PCI NIC card, RAS and related services, just “Close” the “Network” panel and reboot the machine.



14. It is important to install/reinstall the latest service pack (SP6 or higher) for Windows NT4 whenever you are adding components to your system since older system files may be copied back to Windows during installation. After that you should reboot machine again.

Setting registry

After installed the ADSL PCI NIC card, you can set up the desired VPI and VCI in the registry by adding as DWORD, one for VPI which is **PVC_VPI** and one for VCI which is **PVC_VCI** in the following path. To edit registry, click “Start” then “Run” and “Open” with “regedt32”.

HKEY_LOCAL_MACHINE -> System -> CurrentControlSet -> Services -> Nicadsl_? -> Parameters



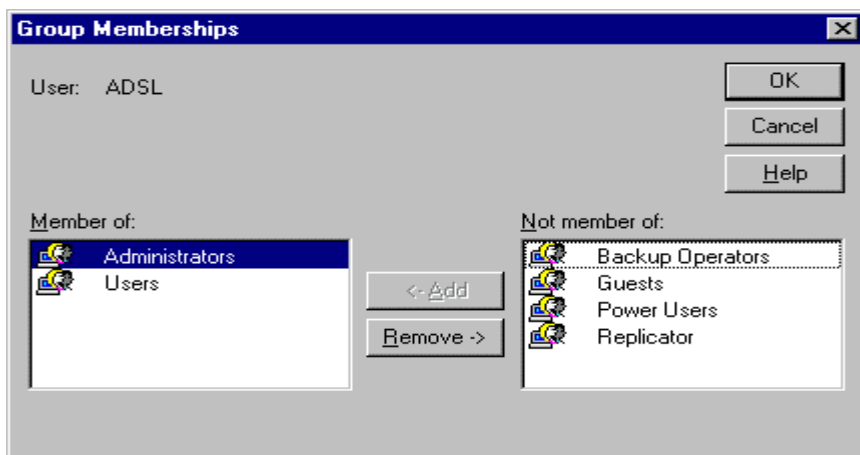
Be careful about the other items in the registry and do not try to change any of them. VPI and VCI for both CO and RT cards should be the same.

Creating new user(s) for server side

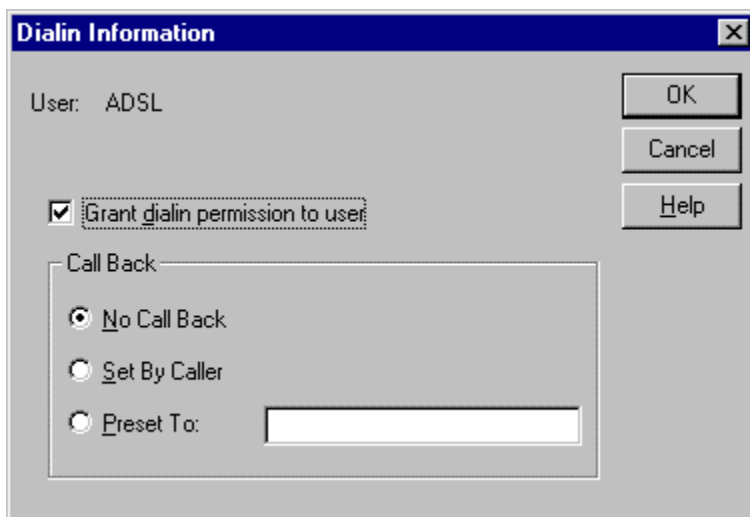
After the service pack is installed, you can create your desired user to be able to dial-in to the server. Do the following steps:

1. Open “User Manager” via Start -> Programs -> Administrative Tools.
2. Create new user from pull down menu.

3. Give Administrator permission to new user.



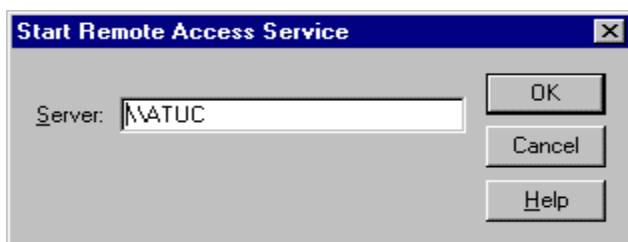
4. Grant dial-in permission to new user.

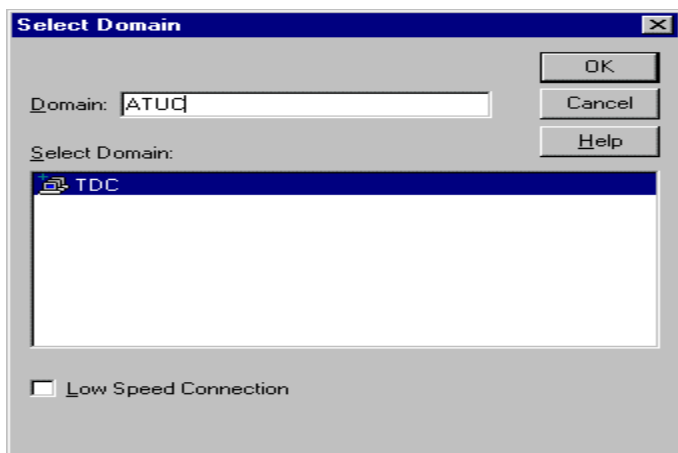


After creating new user on the server side, server setup is completed. Now you can start the server.

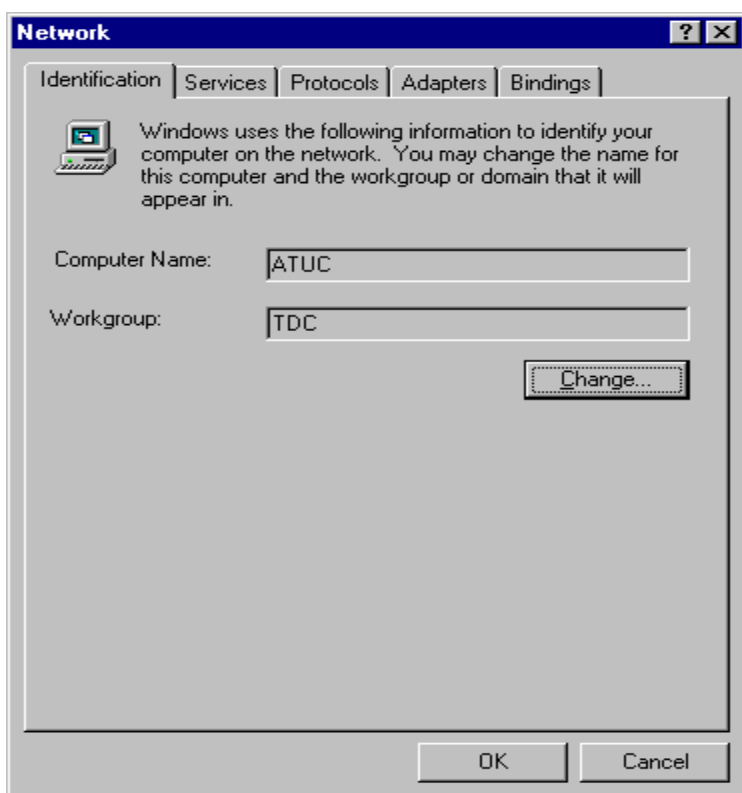
Starting server

Go to “Administrative Tools” and “Remote Access Admin” and start server for pull down menu. If you cannot see name of server, just click on “Select Domain/Server” and choose Workgroup and type the name of the server.



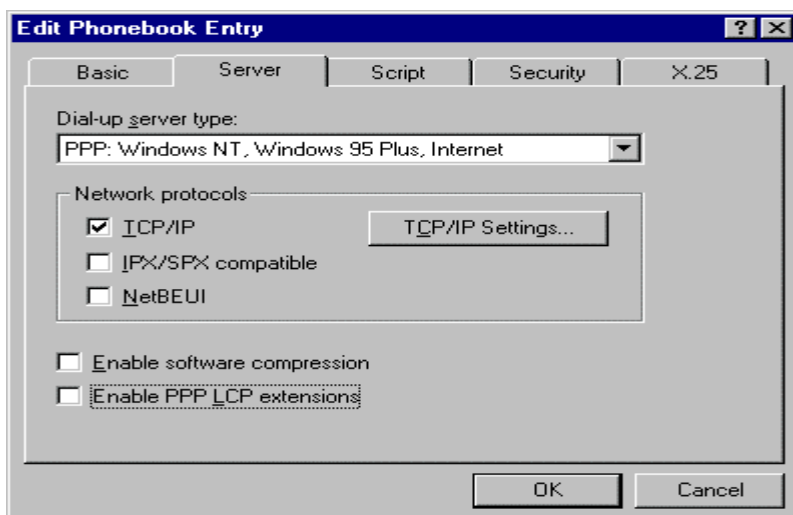


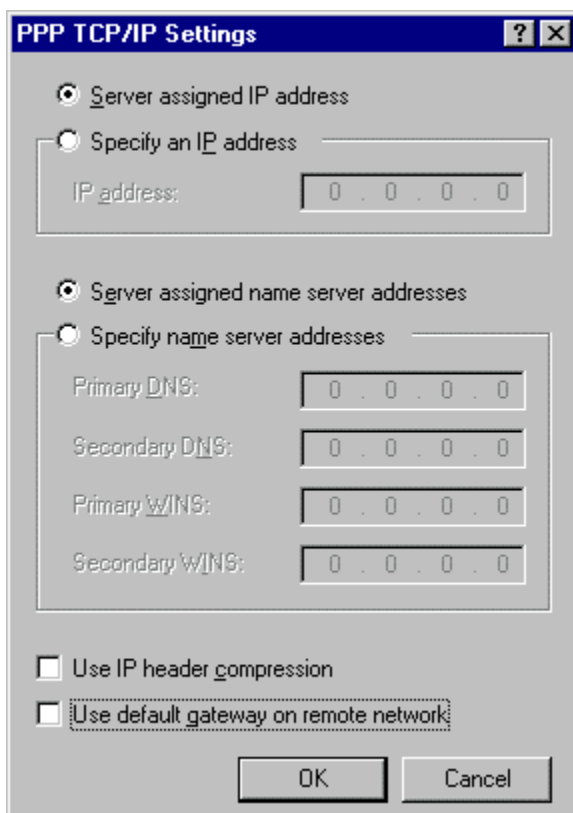
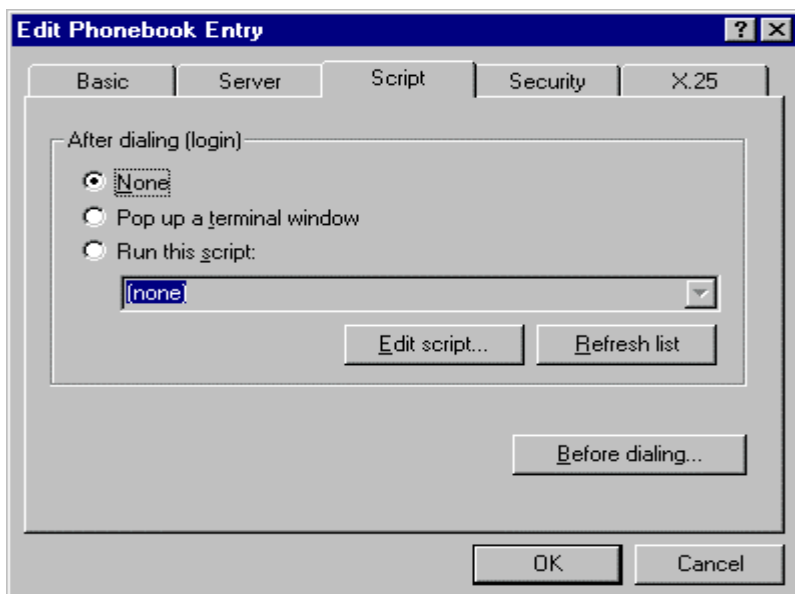
You should have unique workgroup for both CO and RT. Workgroup can be changed on the “Identification” tab of the “Network” panel. Reboot machine after changing workgroup.

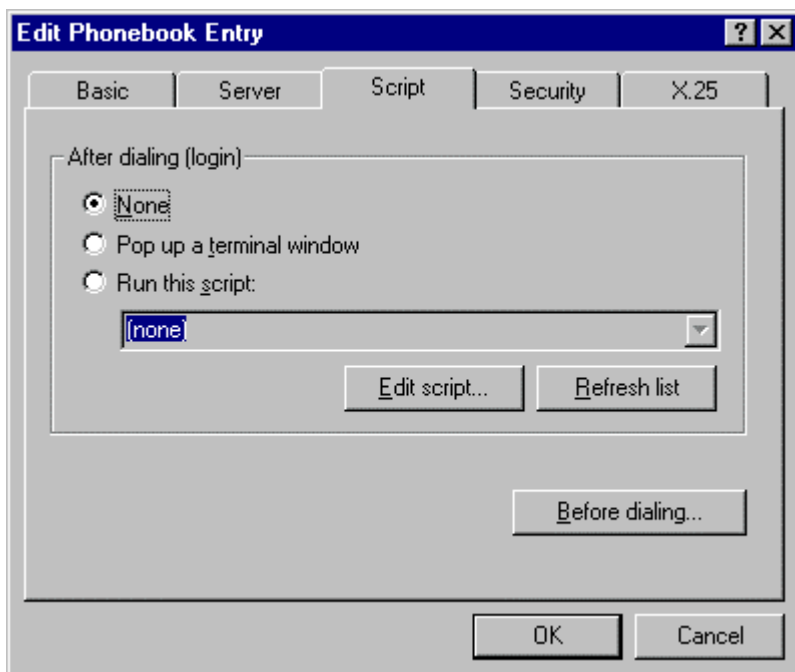


Create an entry in phone book on the client side

Select the “Dial-Up Networking” via Start -> Programs -> Accessories. Add new entry similar to the following windows with your desired setting.







The screenshot shows a Windows-style dialog box titled "Edit Phonebook Entry". It has a tabbed interface with four tabs: "Basic", "Server", "Script", and "Security". The "X.25" tab is currently selected. The dialog contains the following elements:

- Text: "Select your X.25 network provider and type the X.25 address of the remote server:"
- Field: "Network:" with a dropdown menu showing "(none)".
- Field: "Address:" with an empty text box.
- Section: "Optional" (indicated by a small tab-like header).
- Field: "User Data:" with an empty text box.
- Field: "Facilities:" with an empty text box.
- Buttons: "OK" and "Cancel" at the bottom right.

Utility Programs

There are four utility programs supplied with the hardware:

6481Diag is a MS-DOS program that tests different functions of the PCI SAR controller and the NIC board to determine if they are functioning properly. By running this program from both ends (PCI RT NIC and PCI CO NIC), end-to-end protocol testing can be done. You need run this program in DOS mode without Windows operating system loaded.

AdiCmv is a Windows-DOS program that allows user to test the access to ADI PCI NIC device driver. ADI CMV modem commands can be entered here for low level modem configuration and monitoring. Windows based **CommAgnt** driver is required to be installed first.

CMVP is a MS-DOS program which enables ADSL modem configuration and monitoring without running Windows. It gives fast access to modem when frequent reboot is required during testing.

BootLoad is a MS-DOS program which program on-board Flash for modem firmware upgrade without removing existing Flash. If IDMA boot (Flashless) is used on the ADSL PCI NIC RT (Remote Terminal) card, this program will not be used.

All of the above programs can be supplied upon request.

Troubleshooting

Checklist

Please use the following checklist to help debugging problems with your ADI PCI NIC product.

Determine if ADI PCI NIC driver is installed correctly.

Open the Network panel in the Control Panel. The 'ADI PCI NIC PCI Adapter' entry under the Adapter tab should exist. This shows that ADI PCI NIC driver is correctly installed.

Determine if modem is trained.

On your ADI PCI NIC board, when LED (Modem Connect) is constantly ON, it indicates that the modem is correctly linked to the central office modem. If the modem is not trained, please retrain the modem by rebooting the machine. Full LED description is located in Hardware Installation section of this menu. Also make sure CO equipment has same modem line type (T1.413, G.DMT or G.LITE) or multi-mode support.

Determine if CRCs are occurring.

On your ADI PCI NIC board, when LED (CRC Errors) is blinking, it indicates that CRCs are occurring over the ADSL link. CRCs can cause a reduction in data flow. To remove CRCs, please reset the modem and check improvement. Modem can be reset from the GUI (ADI ADSL Monitor).

Determine if data flow is occurring.

To determine if data flow is occurring, please execute the program **Netstat.exe** (e.g. 'netstat -e' to view Ethernet statistics). If data flow is occurring, the values given by Netstat should be increasing every time it is executed.

Also make sure ATM VC is setup properly. VCI/VPI setting should be matched on both CO and RT devices.

Determine if your MAC address is valid.

To determine your MAC address, please execute the program **ipconfig.exe** (e.g. 'ipconfig /all'). The MAC address is located on the line 'Physical Address'. For example:

Physical Address : 00-60-F9-01-02-03

Please report your MAC address to your network administrator or service provider to determine if it is valid or not. No duplicated address is allowed for all systems in the same network.

Determine if your IP address is valid.

To determine your IP address, please execute the program **ipconfig.exe** (e.g. 'ipconfig /all'). The IP address is located on the line 'IP Address'. For example:

IP Address : 196.168.0.2

Please report your IP address to your network administrator or service provider to determine if it is valid or not.

Ordering Information

Please contact your local ADI sales representatives to purchase the complete ADSL PCI evaluation kit.

Part Number for ADSL PCI NIC (RT): **NRE20MSP930EVR-PCI**

Part Number for ADSL PCI NIC (CO): **NRE20MSP930EVC-PCI**

Next Release

- Add driver installation instructions for Windows NT4, 2000 and Me.
- IDMA boot firmware upgrade procedures on the ADSL PCI NIC RT (remote terminal) board.