

EXHIBIT C

User Manual



ITeX™
Apollo 2 ADSL Network Modem
Installation Manual

For Windows® 95, 98, and NT4.0

August 16, 1999



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1. INTRODUCTION

The Apollo 2 ADSL Network Modem is an internal ADSL modem, which conveniently plugs into a PC system, eliminating the need for an external modem. The Apollo 2 ADSL Network Modem connects to a telephone line via a standard RJ-11 connector and fully complies with practices governing the PC world (e.g. Plug 'n Play). The Apollo 2 ADSL Network Modem supports DMT (Discrete Multi-Tone) modulation to ensure interoperability with the service providers DSL systems.

Features

1. Remote bridging with RFC 1483 encapsulation, both LLC-SNAP and VC multiplexing options
2. Classical IP over ATM per RFC 1577
3. PVCs per ATM UNI 3.1
4. PPP/ATM
 - Full LCP: NBCP, IPCP, and IPXCP
 - Authentication: PAP, CHAP, SPAP, and Microsoft® password encryption extensions
 - TAPI style interface
 - Van Jacobson IP header compression
 - Software frame compression

WAN Protocols Supported under Microsoft Operation Systems

The following is a list of supported WAN protocols by Apollo 2 ADSL Network Modem.

Microsoft Windows Operating Systems	RFC 1483	RFC 2364	RFC 1577
Win95 – OSR1 and OSR2	Yes	Yes	No
Win98 – 1 st edition	Yes	Yes	No
Win98 – 2 nd edition	Yes	Yes	Yes
NT 4.0 – Service Pack 3	Yes	Yes	No



System Requirement

The following equipment and information is required (at a minimum) to setup your ADSL network modem.

Hardware Requirement

The following is the minimum hardware requirement. Please make sure your PC system meets ALL of the following requirements.

- ✓ IBM PC/AT or its compatibles
- ✓ CPU speed: Pentium® 100Mhz or above
- ✓ Hard disk space: 6Mbyte space available or above
- ✓ CD-ROM: 24x CD-ROM drive or above
- ✓ Main memory: 32Mbyte or above

Software Requirement

The Apollo 2 ADSL Network Modem supports most of Microsoft Windows operating systems. Please make sure you have one of the following operating systems in your PC.

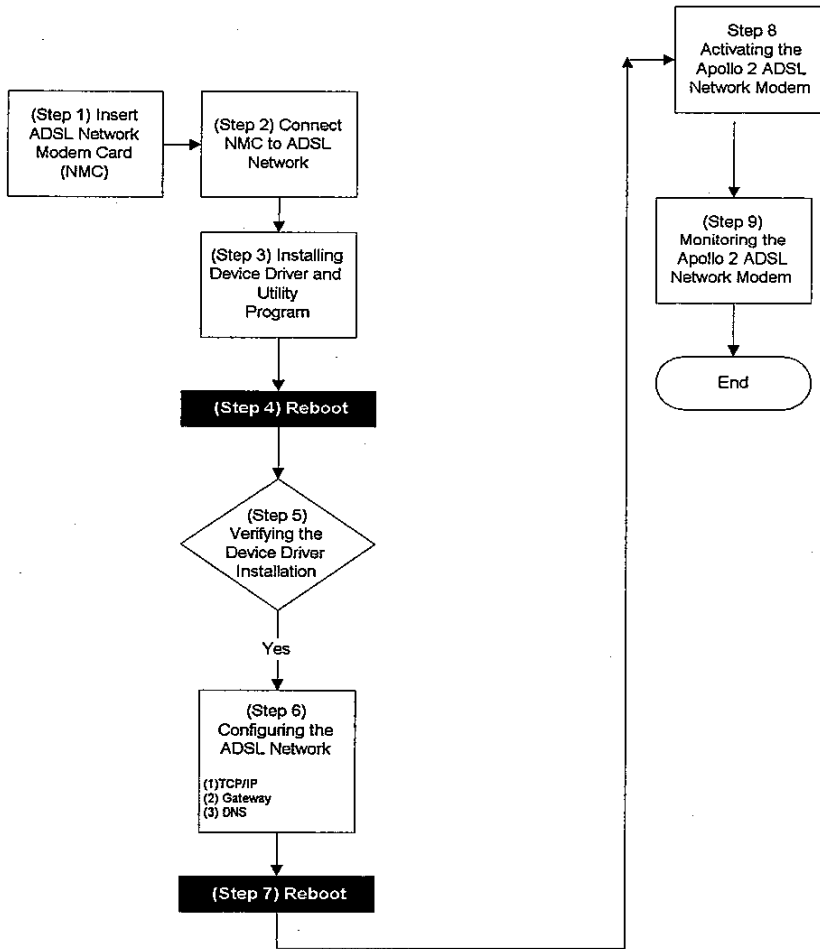
- ◆ Microsoft Windows 95 – OSR1 and OSR2, or
- ◆ Microsoft Windows 98 – 1st edition and 2nd edition, or
- ◆ Microsoft NT – NT 4.0 service pack 3.

NOTE: You need the Windows operating system installation files (CAB files) to complete the installation.



Before you start:

ITeX ADSL Network Modem
Installation and Configuration Flow Chart





2. INSTALLING THE ADSL NETWORK MODEM BOARD

To install the Apollo 2 ADSL Network Modem in your PC and connect it to ADSL network, follow these steps:

Insert ADSL Network Interface Card – Step 1

- 1) Open the shipping container and inspect each item for damage.
- 2) Remove all jewelry from your hands and wrists. Use only insulated or nonconductive tools.
- 3) Unplug the PC and disconnect all cables.
- 4) Remove the PC cover.
- 5) Choose an empty bus mastering PCI slot.
- 6) Unscrew the screw holding the PCI slot's backplate and remove it.
- 7) Insert the Apollo 2 ADSL Network Modem into an empty PCI slot.
- 8) Secure the NIC with the screw you removed earlier.
- 9) Replace the PC cover and reconnect all previously connected cables.
- 10) Turn on the power to the PC.
- 11) Proceed to the next section, "Connecting to the ADSL Network."

Connect NIC to ADSL Network – Step 2

- 1) Connect the network cable to the RJ-11 port on the Apollo 2 ADSL Network Modem.
- 2) Connect the other end of the telephone cable to your ADSL wall jack.
- 3) Replace the PC cover and reconnect all cables.



3. INSTALLING THE APOLLO 2 DEVICE DRIVERS AND UTILITY

Please have the following information available in order to complete the installation and setup of the ITeX Apollo 2 ADSL Network Modem.

1. TCP/IP properties, this includes the PVC values (VPI and VCI), IP address, the gateway, and the domain name server. You will need this information to complete the configuration of the network modem card. Please contact your MIS manager for more information regarding the TCP/IP settings.
2. Windows 95, 98 or NT4.0 diskettes or Installation CD.

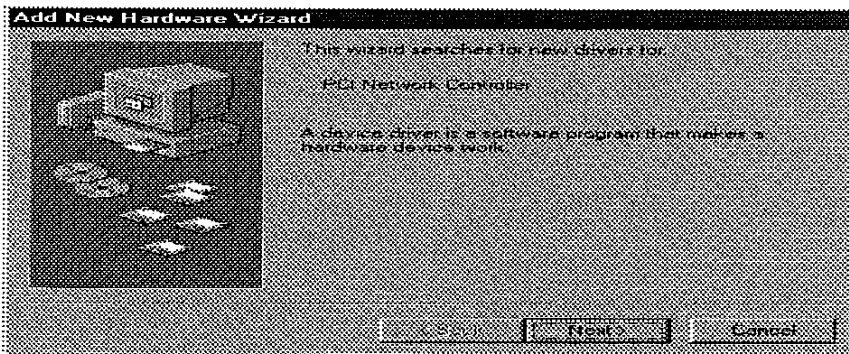
3.1 Windows 98

* BEFORE YOU START: You need the Windows 98 system installation files (CAB files) to complete the installation (Which comes with your PC system).

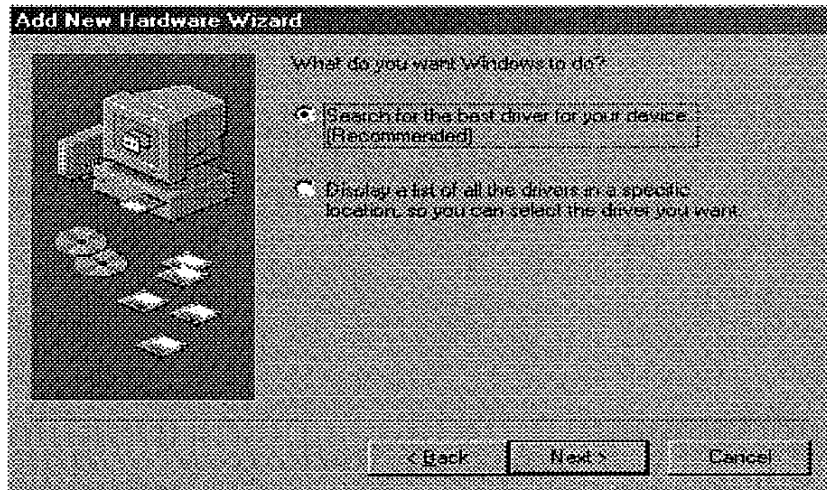
This section describes how to install the network driver when your PC is running Windows 98. There are two major revisions of Windows 98:

- 1) Windows 98 original (or it may be referred to as the 1st Edition)
- 2) Windows 98 2nd Edition

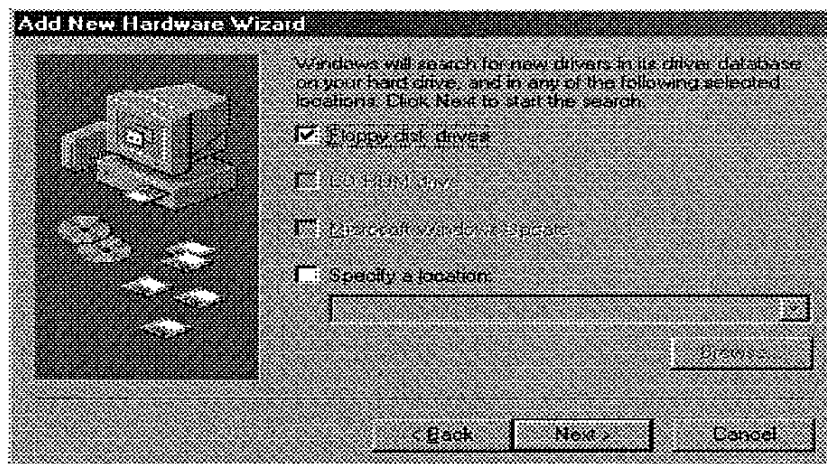
Please make sure your OS is either Windows 98 1st Edition or Windows 98 2nd Edition. Windows 98 2nd Edition can support advanced features which Windows 98 1st Edition can not. If you are running Windows 98 2nd Edition, installing the Windows drivers to your system is highly recommended. If you are not sure of the operating system version currently used, please contact your original PC manufacturer for information. Make sure the Apollo 2 ADSL Network Modem is installed. Turn your PC on.



Windows will find the ITeX ADSL Network Modem and will search for a device driver for the card. Click Next.

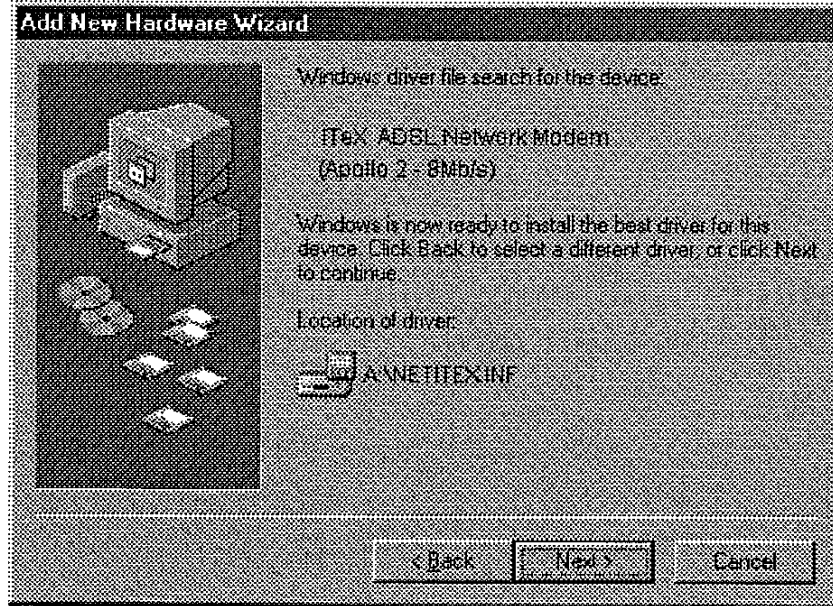


The Add New Hardware Wizard window will appear. When prompted, select "Search for the best driver for your device. (Recommended)". Click "Next".

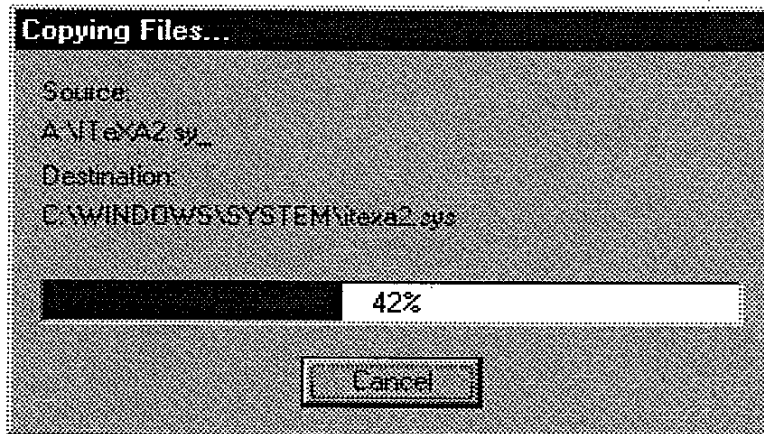


If your Apollo 2 ADSL Network Modem comes with floppy diskettes, then insert the Windows 98 driver diskette (use the Windows 98 2nd edition diskette for installing on Windows 98 2nd edition and the Windows 98 diskette for installing on Windows 98 1st edition) into the floppy disk drive. Select the "Floppy disk drives" option from the menu and click "Next."

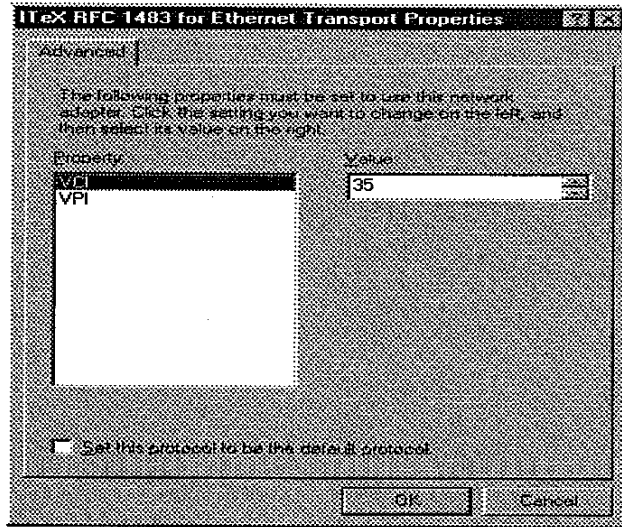
If your Apollo 2 ADSL Network Modem comes with a CD, then insert the CD into the CD-ROM, select "Specify a location", enter the correct path (i.e. d:\win98-v1 for Windows 98 1st edition; d:\win98-v2 for Windows 98 2nd edition). Select "Next."



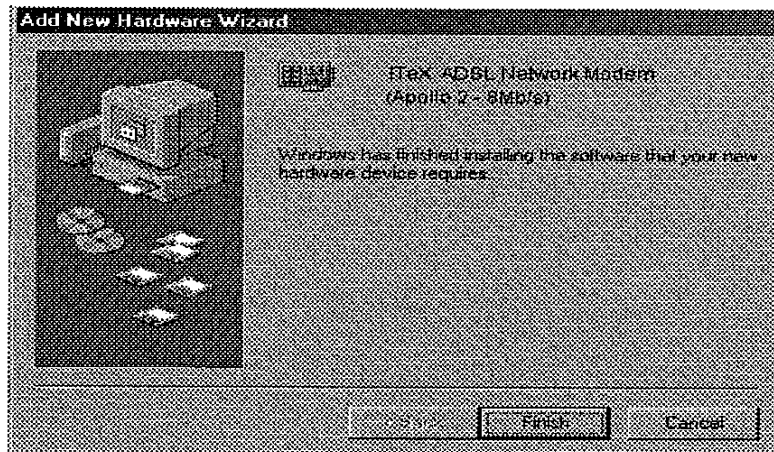
Windows should find the *.INF (NETITEX.INF for Windows 98 2nd edition) file in the directory specified. Click "Next" to continue.



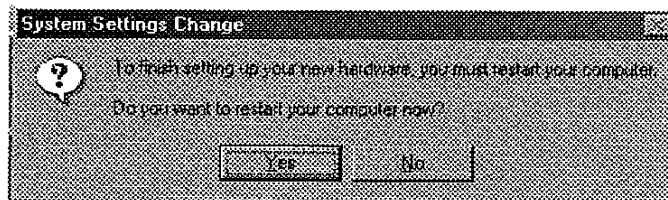
Windows will start to copy the drivers. Make sure that the Windows 98 CD is in the CD-ROM or that it is easily accessible.



For RFC1483, the default PVC values are 8 and 35 for VPI and VCI respectively. If necessary, these values can be changed at this time. The range for both VPI and VCI is from 0 to 255.



Windows has finished installing all the ITeX ADSL Network Modem drivers. Click "Finish" to complete the installation.



Click "Yes" when prompted "Do you want to restart your computer now?" If you are using floppy diskettes, remove the floppy diskette from the diskette drive. Continue on to 3.4



3.2 Windows 95

* **BEFORE YOU START:** You need the Windows 95 system installation files to complete the installation.

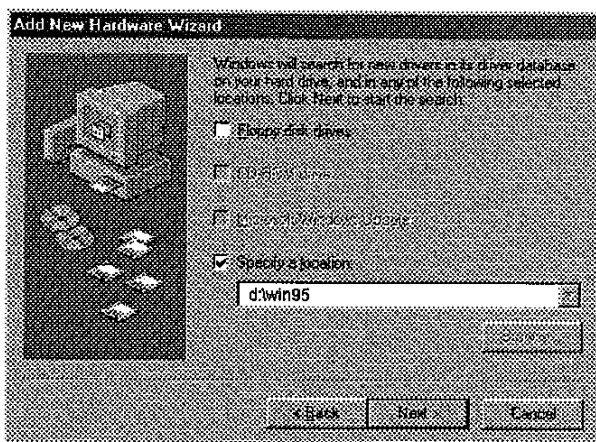
This section describes how to install the network driver when your PC is running Windows 95. There are three major revisions of Windows 95:

- Windows 95 original
- Windows 95 OSR1
- Windows 95 OSR2

NOTE: Before you install your Apollo 2 ADSL Network Modem, please make sure your operating system is either Win95 OSR1 or Win95 OSR2 to ensure the ADSL network performs well. If you are not sure of the operating system version, please contact your original PC manufacturer for information.

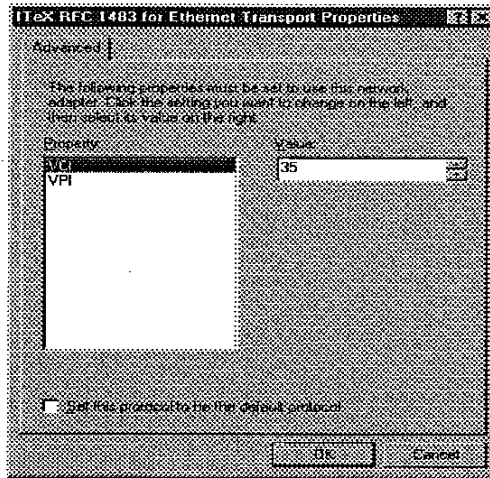
Make sure you have already installed the Apollo 2 ADSL Network Modem into your PC. Power on the PC. Windows 95 automatically detects the NIC in the PC. The Add Hardware Wizard window will appear. When prompted, select "Search for the best driver for your device."

If your Apollo 2 ADSL Network Modem comes with diskettes, insert the Windows 95 driver diskette in the floppy disk driver and select "Floppy Disk Drives". Click "Next."



If your Apollo 2 ADSL Network Modem comes with a CD, insert the Apollo 2 CD into your CD-ROM and select "Specify a location." Enter the correct path (i.e. "d:\win95") and click "Next."

Follow the screen instructions until the "ITeX RFC 1483 for Ethernet Transport Properties" window appears.



For RFC 1483, the default PVC values are VPI=8 and VCI=35 respectively.

If necessary, these values can be changed at this time. The range for both VPI and VCI is 0 to 255.

For more detailed information regarding the values of VPI and VCI, please check with your ADSL service provider.

CAUTION: Failure to setup the right VPI, VCI may cause the ADSL network to fail.

Follow the screen instructions until Windows 95 asks you to restart your computer. Click "Yes" to restart your computer. Restart Your System. If you are using floppy diskettes, then remove the disk from the diskette drive. Continue on with section 3.4

3.3 Windows NT4.0 with Service Pack 3

From the Start menu, select Settings and then select Control Panel. Double-click on the Network icon.

In the Network dialog window, select Adapters. Click "Add".

In the Select Network Adapter dialog window, Click "Have Disk".

If the Apollo 2 ADSL Network Modem comes with diskettes, insert the Windows NT4.0 driver diskette into the floppy disk drive. If the Apollo 2 ADSL Network Modem comes with a CD, insert the Apollo 2 CD into your CD-ROM drive.

Click Ok.

Select OEM Option window

You don't have to restart your computer when under Windows NT4.0.

3.4 INSTALLING THE APOLLO 2 MODEM ICON UTILITY

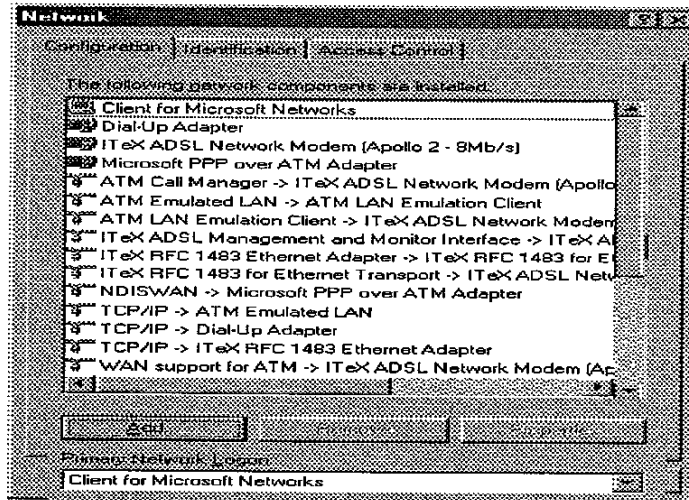
Note: The Apollo 2 modem icon utility is provided as a tool to monitor and test the Apollo 2 ADSL modem. Please refer to the User's Guide for more advanced information regarding this test application.

Windows will ask if you want to install the ITeX utility software, click "Yes" to continue. To install the software into the default folder, click "Next". Otherwise, click "Browse" to select a different folder. Click "Next" again to complete the installation. Select "No" when prompted if you want to restart your computer. Click "OK."



4. Verifying the Driver Installation

4.1 Windows 95 and Windows 98



From the Start menu, select settings and open the control panel. Double click on the Network icon. Verify that the following network components were installed:

Windows 98 1st Edition

- ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- ITeX ADSL Management and Monitor Interface → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- TCP/IP → Dial up Adapter
- TCP/IP → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)

Windows 98 2nd Edition

- ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- ATM Call Manager → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- ATM Emulated LAN → ATM LAN Emulation Client
- ATM LAN Emulation Client → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- ITeX ADSL Management and Monitor Interface → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- ITeX RFC1483 Ethernet Adapter → ITeX RFC1483 for Ethernet Transport
- ITeX RFC1483 for Ethernet Transport → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- TCP/IP → ATM Emulated LAN
- TCP/IP → Dial up Adapter
- TCP/IP → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- TCP/IP → ITeX RFC1483 Ethernet Adapter



Windows 95

- ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- ATM Call Manager → ITeX ADSL Network Modem (Apollo 2 - 8MB/s)
- TCP/IP

Click "Cancel" to close the Network window.

4.2 Windows NT 4.0

Double-click the Network icon. The network dialog window appears. In the Network dialog window, select the Configuration tab.

Verify the following network components were installed in the:

Adapters Tab

- ITeX ADSL Network Modem (Apollo 2 – 8Mb/s)

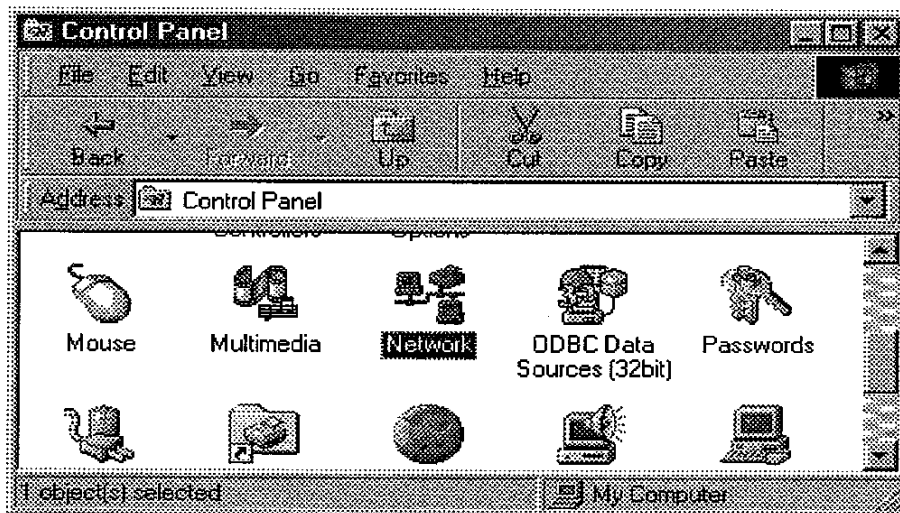
Protocols Tab

- ADSL Management and Monitor Interface
- TCP/IP Protocol

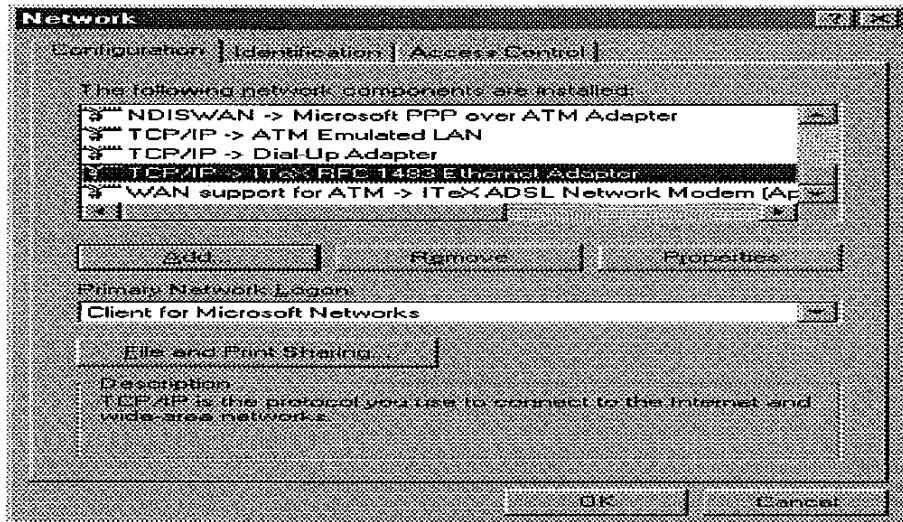
Click Ok to close the Network dialog window.

5. CONFIGURING THE ADSL NETWORK FOR ETHERNET OVER ATM (RFC1483)

5.1 Windows 95 (OSR1/OSR2) and Windows 98 (1st and 2nd Edition)

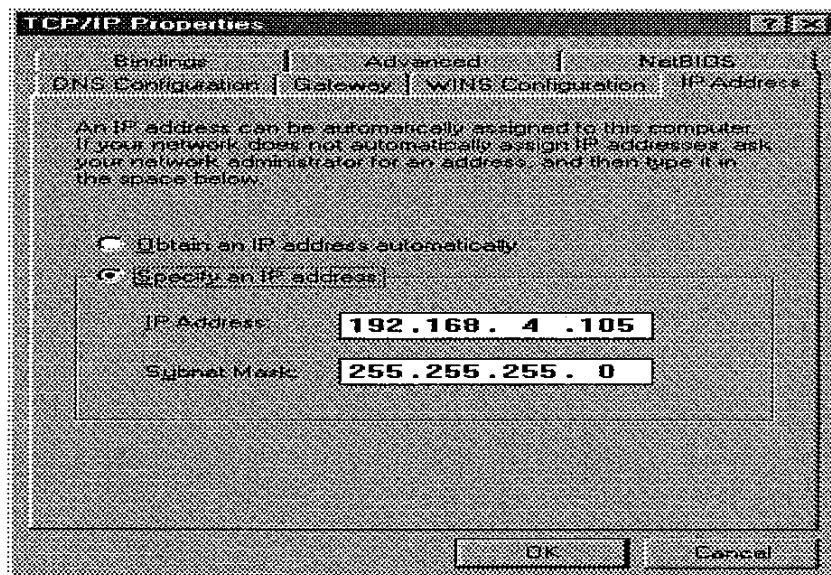


From the Start menu, select settings and open the control panel. Double click on the Network icon. The Network window will appear.

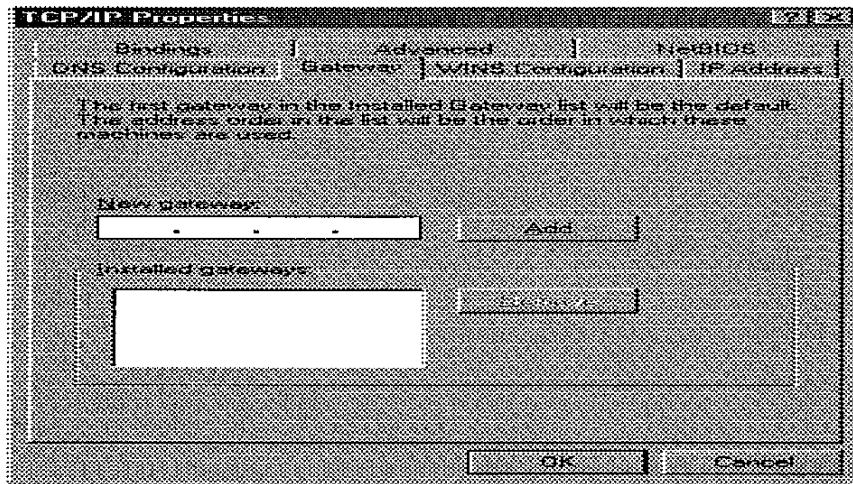


Select the Configuration Tab and scroll through the installed network component list.

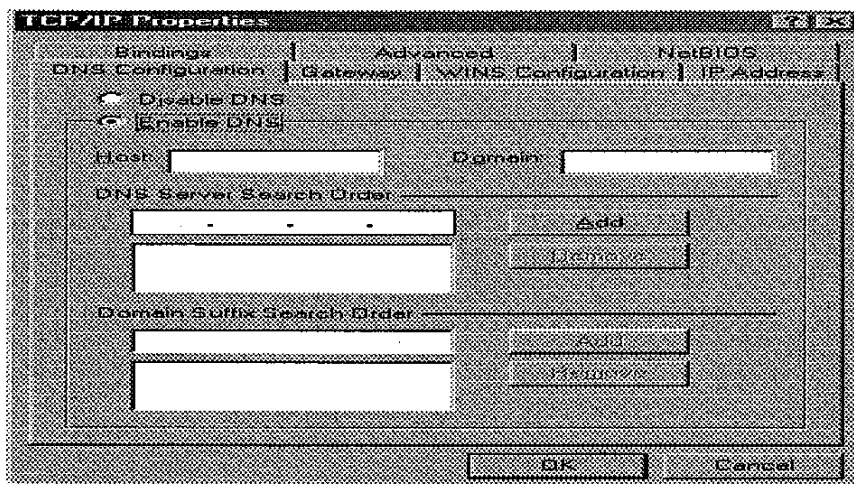
For Windows 98 2nd Edition, highlight the TCP/IP → ITeX RFC1483 Ethernet Adapter component. For Windows 98 1st Edition, highlight the TCP/IP→ITeX ADSL Network Modem (Apollo 2 - 8Mbps). For Windows 95, highlight "TCP/IP". Click "Properties." The TCP/IP Properties window will appear.



To setup the IP Address, select the IP Address tab and then select the "Specify an IP address" option. Enter the IP Address and Subnet Mask settings.

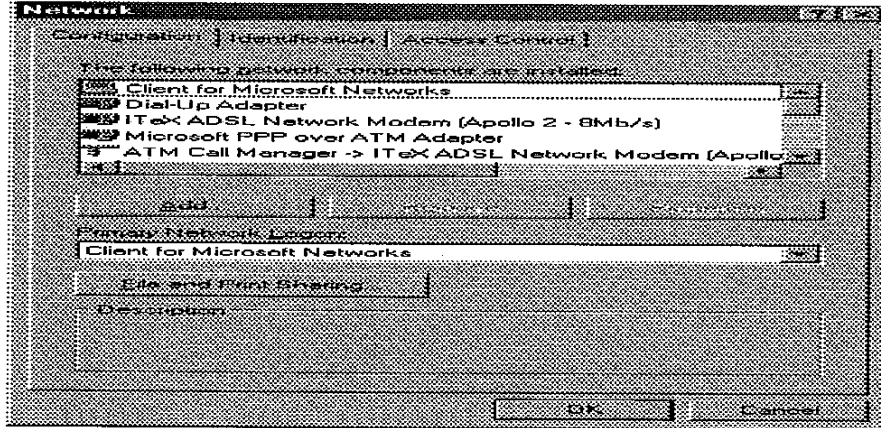


To setup a new gateway, enter the setting in the new gateway section and click "Add." This will add the setting into the installed gateways.

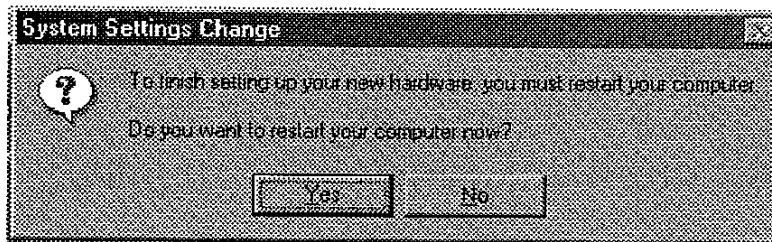


To configure the Domain Name Server, simply select the Enable DNS option. Enter the Host and Domain settings. Enter the DNS Server search order and click "Add."

Once all the TCP/IP properties have been set, click "OK" to return to the Network window.



Click "OK" to close the Network window.



Click "No" when prompted "Do you want to restart your computer now?"

SETTING THE PVC VALUES FOR ETHERNET OVER ATM (RFC1483)

Windows 98 2nd Edition

For RFC1483, the VPI and VCI have a default setting of 8 and 35 respectively. To change the values for RFC1483, follow these instructions:

Using the Modem Icon Utility to Set the PVC Values

Refer to "User's Guide to the Modem Icon Utility" for more information.

Parameter	Value	Meaning
VPI	0 - 255	Virtual Path Identifier
VCI	0 - 255	Virtual Channel Identifier

Close the ITeX ADSL Test Application window and restart the computer. Configuring the ADSL modem for RFC1483 is completed.

Windows 98 1st Edition and Windows 95

From the Network configuration window, select "ITeX ADSL Network Modem (Apollo 2 - 8Mb/s)". Select Properties and then select the Advanced tab. Enter the VPI and VCI values.



5.2 Windows NT4.0

Ethernet over ATM (RFC1483)

Open the Network dialog window by double clicking My Computer->Control Panel->Network.

In the Network window, select the Adapters tab.

Scroll through the installed network components list. Highlight the "ITeX ADSL Network Modem (Apollo 2 - 8Mbps)" and click Properties.

The TCP/IP Properties window appears.

Please check your TCP/IP configuration with your Internet service provider.

After setting up the TCP/IP configuration. Restart your computer.

6. CONFIGURING THE ADSL NETWORK FOR CLASSICAL IP OVER ATM (RFC1577)

Note: Windows 98 2nd Edition is required to support RFC1577

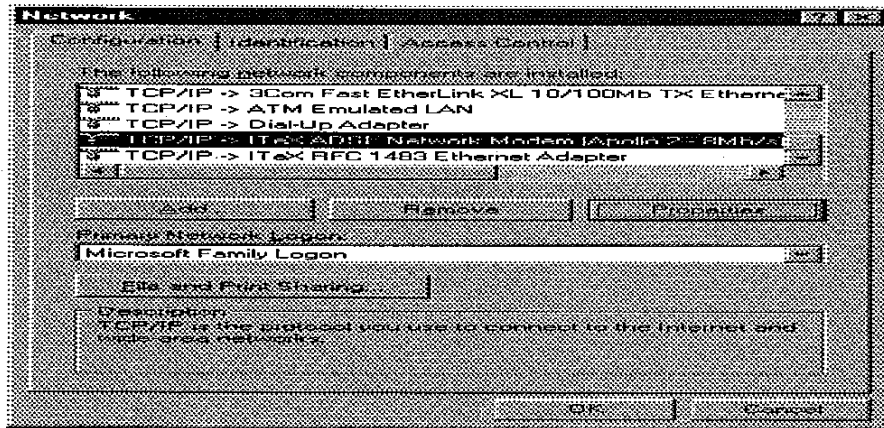
The next few steps are used to help in identifying the bindings of TCP/IP to each protocol from the network component window.

From the "Start" menu, select "Settings," select "Control Panel," open the Network icon. Scroll through the installed network component window and look for any form of a TCP/IP binding, i.e. TCP/IP or TCP/IP → ATM Emulated LAN. If no TCP/IP binding exists, then click "Add," select "Protocol," click "Settings," select "Microsoft" from the manufacturer window, select "TCP/IP" from the protocol window. Click "OK." If a TCP/IP binding exists, skip to the next paragraph.

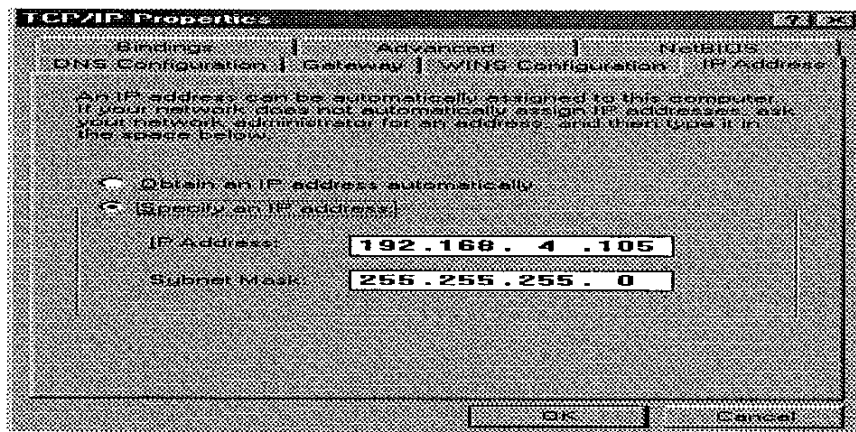
From the Network Configuration tab, select "TCP/IP → ATM Emulated LAN" from the configuration window, click "Properties". Select the "Advanced" tab, and change the "Allow Binding to ATM" value to "Yes." Click "OK."

Highlight the "ITeX A2 ADSL NIC" adapter in the installed components list of the Network configuration window, click "Add", select "Protocol", click "Add", select "Microsoft" from the manufacturers window, select "TCP/IP" from the protocol window, click "OK".

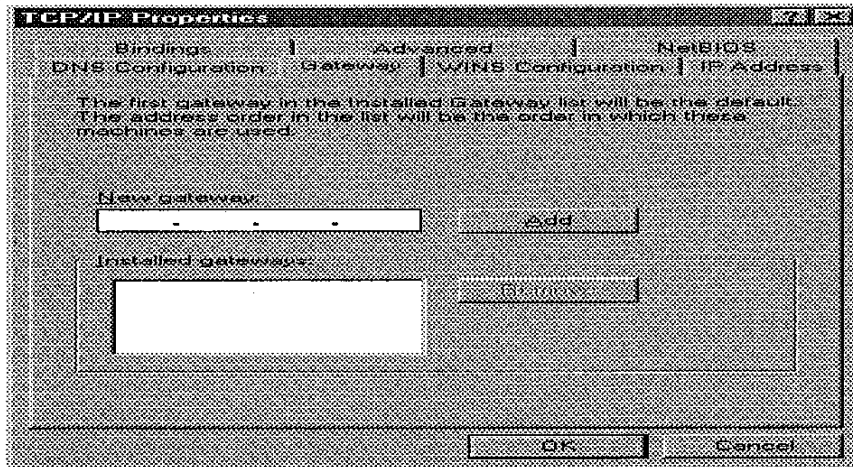
Scroll through the installed network component window looking for the following component: TCP/IP → ITeX ADSL Network Modem (Apollo 2 - 8Mbps). If this network component is not found, click "Add", select "Adapter," click "Add", select "Microsoft" from the manufacturer window, select "Dial up Adapter" from the network adapter window, click "OK". Return to the network configuration window. If this network component is found, skip to the next paragraph.



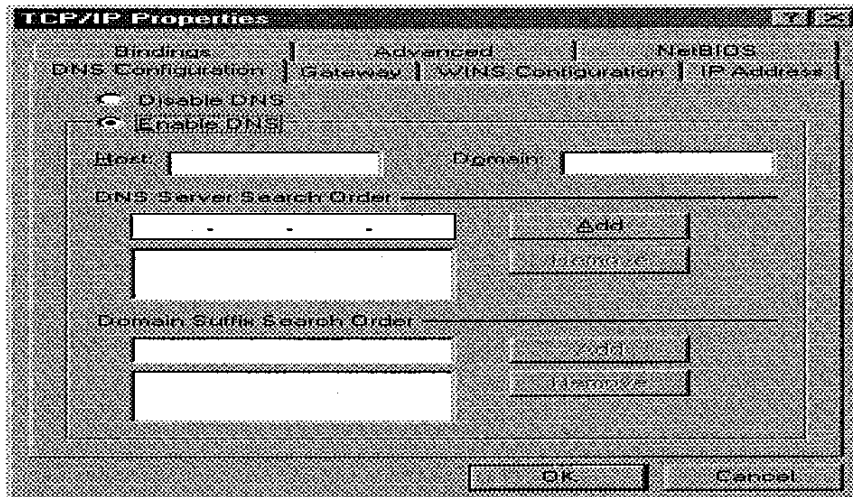
From the Network configuration window, select the "TCP/IP → ITeX ADSL Network Modem (Apollo 2 - 8 Mb/s)" option in the configuration tab, click "Properties." The TCP/IP Properties window will appear.



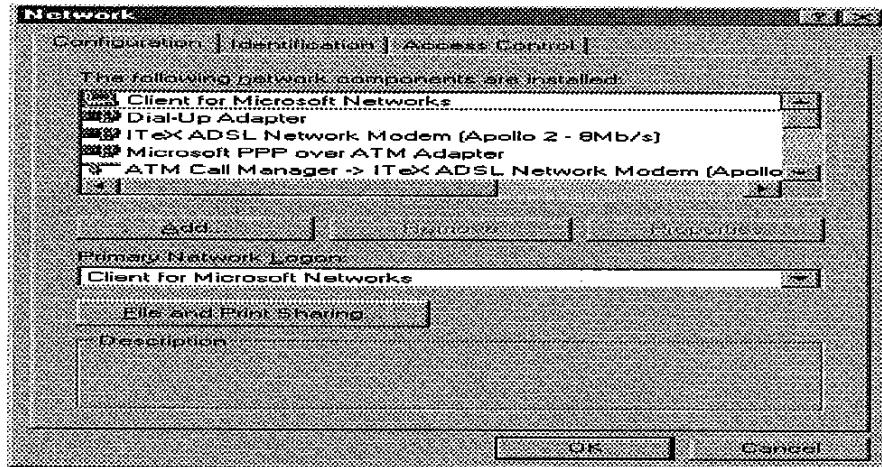
To setup the IP Address, select the IP Address tab and then select the "Specify an IP address" option. Enter the IP Address and Subnet Mask settings.



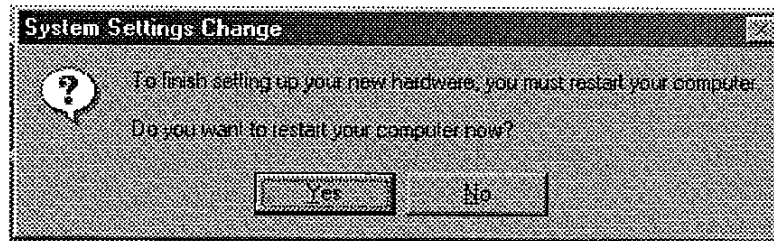
To setup a new gateway, enter the setting in the new gateway section and click "Add." This will add the setting into the installed gateways.



To configure the Domain Name Server, simply select the Enable DNS option. Enter the Host and Domain settings. Enter the DNS Server Search Order and click "Add."
Once all the TCP/IP properties have been set, click "OK" to return to the Network window.



Click "OK" to close the Network window.



Click "No" when prompted "Do you want to restart your computer now?"

Configuring the ADSL modem for RFC1577 is completed.

SETTING THE PVC VALUES FOR CLASSICAL IP OVER ATM (RFC1577)

Using the Modem Icon Utility to set the PVC values

Refer to "User's Guide to the Modem Icon Utility" for more information.

7. CONFIGURING THE ADSL NETWORK FOR PPP OVER ATM (RFC 2364)

Note: Windows 98 2nd Edition is required to support PPP over ATM

7.1 SETTING UP PPP OVER ATM

From the Start menu, select Setting, then open the Control Panel. Open the Network icon. The Network window will appear. In the configuration window, scroll through the installed network components and verify that the "Dial up adapter" is installed (The Dial up Adapter will have to be installed if it does not exist.) Click "Add" to add a network component. Double click on "Adapter". Click "Add", Choose Microsoft in the Manufacture section and the Microsoft PPP over ATM Adapter in the "Network Adapters" section. Click "OK" to return to the Configuration window.

In the configuration window, the following three bindings will now exist:



NDISWAN -> Microsoft PPP over ATM Adapter
WAN support for ATM -> ITeX A2 ADSL NIC
Microsoft PPP over ATM Adapter

Click "OK," Windows may ask to insert the Windows 98 CD. Make sure that the Windows 98 CD is in the CD-ROM, click "OK." Restart the computer.

7.2 ESTABLISHING A PPP OVER ATM CONNECTION

From the Start menu, select Programs, select Accessories, select Communications, and then double click on Dial-Up Networking. Double click on the "Make New Connection" icon. Type in a name for the computer you are dialing. Select the PPP ATM Adapter option in the "Select a device" section. Click Configure.

The Quality of Service window will appear. For Type, select "Unspecified Bit Rate". For Rate, select 25Mbps. For Circuit type, select Permanent Virtual Circuit and enter VPI and VCI values. For Framing, select "Null Encapsulation". Click OK, click Next, enter "0" or any telephone number. Select the country and click Next. Click Finish. Windows will generate a dial up network icon which will be used for activating the PPP over ATM connection. Insert the Windows 98 CD into the CD-ROM when prompted. Click OK to exit the Communications window. Restart the computer.

8. ACTIVATING THE APOLLO 2 ADSL NETWORK MODEM

For RFC1483 and RFC1577:

Once the drivers are installed and the setup is complete, the ITeX ADSL Network Modem is ready to run. Each time the computer is turned on, the modem automatically connects to the central office equipment. Simply run the internet browser software to verify.

For PPP over ATM:

From the Start menu, select Program, select Accessories, select Communications, select dial up network. Double click on the dial-up network icon that was created.

When the "Connect to" window appears, enter the user name and password. Click on "Connect" and enter the user name, password, and logon domain information in the user logon window. Click OK. If the connection is established, Windows will display a connection established window. Click Close. PPP over ATM is now running.

9. MONITORING THE APOLLO 2 ADSL NETWORK MODEM

Please refer to the User's Guide to the Modem Icon for more information on how to monitor the Apollo 2 ADSL network modem.



10. UNINSTALLING THE APOLLO 2 ADSL NETWORK MODEM AND TEST APPLICATION

To uninstall the software drivers:

- Right click on the "My Computer" icon; select Properties; select Device Manager; Scroll down to "Network Adapters." Open the "Network Adapters" folder.
- Right click "ITeX A2 ADSL NIC" and click "Remove." Click "OK" when prompted with a warning about removing an adapter. Click "OK" to close the Systems window.

To uninstall the test application:

- From the Start menu, select "Programs," select "ITeX ADSL," select "Uninstall ADSL," then click on the "Uninstall Test Application."

11. SPECIFICATIONS

1. Protocol Support

O/S	Protocol
Windows 98	RFC1483, RFC1577, PPP over ATM
Windows 95	RFC1483
Windows NT4.0	RFC1483
Windows 2000	RFC1483, RFC1577, PPP over ATM

2. Jumper Settings

Jumper	Description	Comments
J1	EEPROM enable	1. Left pin - GND 2. Center pin - EEPROM_SEL 3. Right pin - 3.3V Pin 1-2 connected - EEPROM disabled Pin 2-3 connected - EEPROM enabled Note: EEPROM is for programming the vendor ID. EEPROM is not installed on the board
J8, J9	Transmission and Test	J8 1-2 & J9 1-2 must always be connected with a jumper
J10, J11	Tone Detection	J10 1-2 & J11 1-2 - tone detection enabled J10 & J11 not connected - tone detection disabled Note: Tone detection is a power management feature in the ITU G.992.2 (G.lite) specification.



2. Connector Pinout

The Apollo 2 ADSL NIC card has a dual RJ-11 connector. The top jack is for the ADSL phone line. The bottom jack can be used to connect a phone or an analog modem. The table below describes the connector pinout for both jacks.

Pin	Signal Name	Function
		ADSL Line
1	NC	Not Connected
2	NC	Not Connected
3	Wire A	Subscriber line wire A
4	Wire B	Subscriber line wire B
5	NC	Not Connected
6	NC	Not Connected
		Phone Line
1		Not Connected
2	NC	Not Connected
3	Wire C	Phone line wire C
4	Wire D	Phone line wire D
5		Not Connected
6	NC	Not Connected