

EXHIBIT C

User Manual

ADSL PRO

Quick Reference Guide

DETERMINING YOUR INTERNET SERVICE PROTOCOL

Your Internet service protocol will be one of the following. Contact your ADSL service provider if you are unsure of your service type.

- RFC 1483 ⇒ Bridged Ethernet over ATM
- RFC 2364 ⇒ Point-to-Point Protocol over ATM
- RFC 1577 ⇒ Classical Internet Protocol over ATM

DETERMINING YOUR CONNECTION ADDRESS AND CONFIGURATION

You will need to know the connection address and configuration for your Internet service. Find your Internet Service Protocol below and proceed gathering the connection address and configuration. If you are unsure or do not have all the information, please contact your ADSL service provider.

- **RFC1483 - Bridged Ethernet over ATM** service requires the following information:

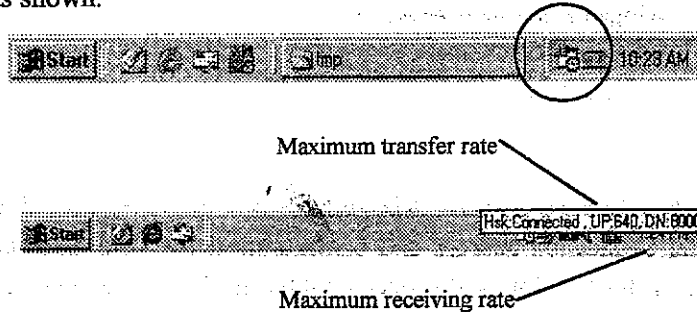
IP Address	_____
Subnet Mask	_____
Gateway	_____
(Domain Name Service) DNS Host	_____
DNS Domain	_____
DNS Server	_____
VPI value	VPI = ____ (Default VPI=0)
VCI value	VCI = ____ (Default VCI=35)
ADSL Mode Type	<input type="checkbox"/> ANSI T1.413 Issue 2 <input type="checkbox"/> ITU G.992.2 Annex A (G.lite) <input type="checkbox"/> ITU G.992.1 Annex A (G.dmt)

- **RFC2364 - Point-to-Point Protocol over ATM** } services require the following information:
➤ **RFC1577 - Classical Internet Protocol over ATM** }

User Name	_____
Password	_____
Logon Domain	_____
VPI value	VPI = ____ (Default VPI=0)
VCI value	VCI = ____ (Default VCI=35)
ADSL Mode Type	<input type="checkbox"/> ANSI T1.413 Issue 2 <input type="checkbox"/> ITU G.992.2 Annex A (G.lite) <input type="checkbox"/> ITU G.992.1 Annex A (G.dmt)

DIAGNOSTIC TOOLS

The diagnostic tools allow the user to monitor the ADSL connectivity, setup the service connection address, and run diagnostic tests. The Diagnostic Tools icon is displayed on the task bar as shown.



By positioning the mouse cursor over the icon, the upstream and downstream line rates of the ADSL connection are displayed.

The Diagnostic Tools icon consists of two lights side by side. The left light indicates data is being transmitted whereas the right light indicates data is being received. The state of the connection can be determined as follows:

Color Code	Description
Red, Red	No ADSL connection and No ADSL handshaking. Check your cable connections.
Black/Yellow or Yellow/Black flashing	ADSL handshaking – Connection not established. Precursor to establishing an ADSL connecting.
Black, Black	ADSL connection established – no data traffic or idle connection
Black, Green	ADSL connection established – NIC is receiving data (TX/off, RX/on)
Green, Black	ADSL connection established – NIC is transmitting data (TX/on, RX/off)
Green, Green	ADSL connection established – NIC is transmitting and receiving data (TX/on, RX/on)
Ø	NIC is disconnected or a driver problem exists. Try using Connect command in Diagnostic Tools. If persists, restart the PC system and last resort reload the drivers.

ADVANCED DIAGNOSTICS TOOLS

On the **Diagnostic Tools** icon on the right hand side of the status bar. Right-click the icon to display the menu, then Click **Open**. The **ADSL Diagnostic Tools** window appears on the desktop. The three tabs of the Diagnostic Tools are **ADSL Status**, **Diagnostic** and **ADSL Statistics**.

ADSL Status window displays the current state of the ITeX ADSL connection, including current ADSL State, ADSL protocol in use and the net data rates for upstream and downstream data.

NOTE: ADSL protocols supported by the ITeX drivers are T1.413, G.dmt and G.lite. The ADSL equipment located at the central office must support the protocol also. The ITeX drives use the protocol that results in the most efficient ADSL connection.

ADSL Diagnostic Tools window is used for hardware testing of the ITeX ADSL modem Card. **ADSL Statistic** window keeps tabs on errors that that might affect overall system performance. The counts are reset whenever the PC system is restarted.

Re-training Count tracks the number of ADSL connections performed. Due to unexpected line condition changes, the ITeX drivers can retrain the connection causing the **Re-training Count** total to increment. The Diagnostic Tool icon will flash yellow while reconnecting.

ADSL implements Reed Solomon (RS) error checking:
FEC Count tracks the forward error correction count.
CRC Count tracks the accuracy of correcting data errors over each 17msec.
ATM HEC Count (header error check) errors are recorded as an indication of ATM packet accuracy.
As a measure of packet transfer performance, the **Packet Errors** are counted and tracked against the total number of **Packets Received**. An error rate of less than 0.1% is reasonable under clean ADSL line conditions.
If you have Bad Received Packets and are concerned about your service, multiply the **Bad Received Packets** count by 1000 and compare the result with the total **Packets Received** count. If the number is smaller than the total **Packets Received** count, then the board is operating normally.

HARDWARE DIAGNOSTICS

The Diagnostic Tool is used to verify the Apollo 2 card functionality. Running the **Diagnostic** program will disconnect the NIC from the ADSL line. Close all Dial-up sessions and close all files before running the Diagnostic program. Right-click the **Diagnostic Tool icon** (located on the Taskbar), then select the **Diagnostic** option. Product Information, e.g. driver revisions, are displayed by clicking the **Product Info** tab.

Product Information lists the versions of the Diagnostic Tools (e.g. version 2.1) and the protocol Drivers installed (e.g. Version 1.3). The DLL version describes the software being used by both the drivers and Diagnostic Tools software.

NOTE: This information is helpful whenever making a technical support call. Click **Close** and exit the product information window.

Click **Run Diagnostics** to run the diagnostic program that will test PC functionality and report the status. A warning message pops up that the ADSL service will disconnect before performing the Diagnostic test. If connected to the Internet at this time, disconnect any Dial-up sessions. Click **Yes** to begin the **diagnostic** program or click **No** to exit diagnostic program. The Diagnostic program performs a brief hardware check and displays the hardware status.

If the Apollo 2 fails the Diagnostic tests (shown below), then record the test result and contact customer support.

ADSL bridge - PCI I/O Test	I90188 chip test	→	Pass
I90135 Register Test	I90135 chip test	→	Pass
I90135 Memory Test	I90135 chip test	→	Pass
ADSL Bridge - Loopback	I90188 Fast datapath	→	Trial 20, Pass 20
	nterleave datapath	→	Trial 20, Pass 20
90135 Utopia Loopback	I90135 Fast datapath	→	Trial 20, Pass 20
	nterleave datapath	→	Trial 20, Pass 20

NOTE: For all loopback tests, both Trial and Pass counts equal 20 for success.

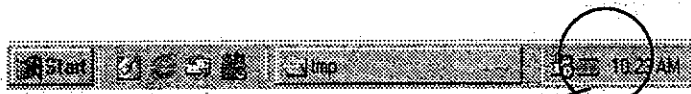
Click **Close** to exit the Diagnostic program. The modem is disconnected for these diagnostic tests. To Apollo 2 card is functioning properly, it will automatically reconnect.

CONFIGURATION YOUR ADSL MODE

Your Internet service protocol will be one of the following. Contact your ADSL service provider if you are unsure of your service type.

- ADSL Mode Type
- ANSI T1.413 Issue 2
 - ITU G.992.2 Annex A (G.lite)
 - ITU G.992.1 Annex A (G.dmt)

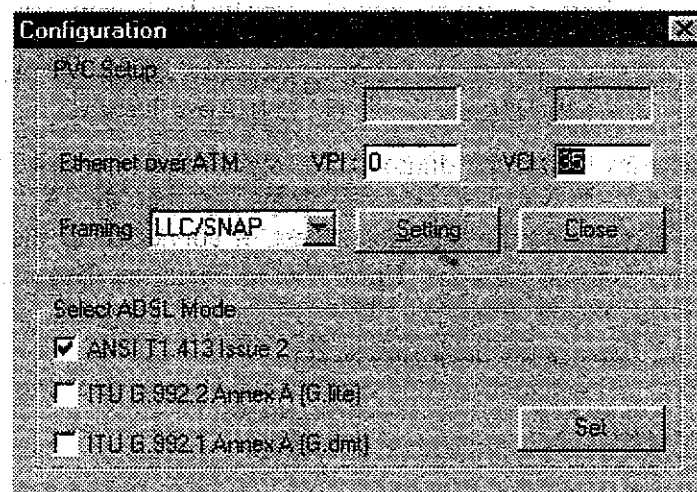
The diagnostic tools allow the user to monitor the ADSL connectivity, setup the service connection address, and run diagnostic tests. The Diagnostic Tools icon is displayed on the task bar as shown.



Press mouse right key in the here

By positioning the mouse cursor over the icon, and press right key .

Select ADSL Mode in **“Configuration”**



TROUBLE SHOOTING

If you have completed the Apollo 2 installation procedures and your ADSL connection is not operational, then refer to the following guidelines for assistance in getting your ADSL modem connection up and running.

	Description of Problem
1	<p>Is there a Diagnostic ICON on the Taskbar?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Try Restarting the PC system. <input type="checkbox"/> Are the correct drivers installed for the Operating system used? <input type="checkbox"/> Point-to-Point - If system OS is Windows 95, is the DUN upgraded v1.3? <input type="checkbox"/> Have you deleted the drivers and tried the installation again?
2	<p>Is the NIC achieving ADSL connection?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Try using the Diagnostic Tools Connect option <input type="checkbox"/> Is the cable installed between the Apollo 2 and the ADSL service? <input type="checkbox"/> Try Restarting the PC system. <input type="checkbox"/> Has any cabling adapter or wiring converter been removed?
3	<p>Is the NIC constantly trying to negotiate a connection – with blinking yellow panels – but failing to reach ADSL connection?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Select Disconnect from the Diagnostic Tools then try to reconnect. <input type="checkbox"/> Restart the PC system and try to reconnect. <input type="checkbox"/> Examine the RJ-11 connectors and cable for any deterioration. <input type="checkbox"/> Has the wiring for your ADSL service been altered recently? <input type="checkbox"/> Does condition change with time of day? (a possible problem with line noise) <input type="checkbox"/> Are appliances near the PC system introducing noise into your ADSL service? <input type="checkbox"/> Power down the PC system and re-seat the Apollo 2 card.
4	<p>Is the NIC achieving ADSL connection - but you can't reach the Internet?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Is the service connection address correct? <input type="checkbox"/> Can you PING the Internet? To run the PING command, Open DOS and type: <C:\Windows\PING Gateway_Addr> (e.g. C:\Windows\Ping www.microsoft.com) <input type="checkbox"/> Ping Connects? If Yes then upgrade the Internet Browser or check the Option settings for the Internet Browser. <input type="checkbox"/> Bridged Ethernet – Are the TCP/IP, Gateway and DNS addresses correct (refer to your ADSL or ISP provider documentation) <input type="checkbox"/> Point-to-Point – For Windows 95 is the Dial-Up Network Upgrade to v1.3 installed? <input type="checkbox"/> Win NT4.0 – Is service Pack 3.0 installed? <input type="checkbox"/> Browser configured correctly – check your browser documentation.
5	<p>How can I determine the TCP/IP address for Point-to-Point?</p> <ul style="list-style-type: none"> <input type="checkbox"/> For Windows 95/98, run the program Ipconfig from the DOS prompt (e.g. C:\Windows\IPCONFIG) All network devices will list their TCP/IP and Gateway Address. By knowing what network hardware is installed and configured in your PC system, any unusual TCP/IP address belongs to Point-to-Point.
6	<p>How do I tell if Service Pack 3.0 is installed on my Windows NT4.0?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Click on the Start menu at the tool bar, select Programs, Administrative Tools and then Windows NT Diagnostics. Verify that Service Pack 3.0 is installed. <input type="checkbox"/> When the system is restarting, service pack 3 is displayed at the beginning of the driver loading sequence.
7	<p>How do I resolve confusion about which protocol to install?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Refer to your ADSL or ISP provider documentation
8	<p>Can I determine which protocol is installed?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Windows 95/98 – Yes. In the Network window (in the Control Panel) select the Configuration tab and look for TCP/IP → Apollo 2. If found, then the Bridged Ethernet drivers are installed. <input type="checkbox"/> Point-to-Point for Windows 95/98 or NT4.0 – No.
9	<p>Can I determine which upgrade of Dial-Up Network (DUN) is installed?</p> <ul style="list-style-type: none"> <input type="checkbox"/> There is no easy way to determine the version of the DUN. The safest approach is to install the DUN v1.3 downloaded from the Microsoft Corporation Web-site → www.microsoft.com
10	<p>Must TCP/IP be loaded for both Point-to-Point and Bridged Ethernet protocols?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes. Please carry out the TCP/IP installation procedure before loading the Apollo 2 driver.
11	<p>Driver installation resulted in unexpected errors or warnings, and you can't connect.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Perform the driver removal procedure. <input type="checkbox"/> Verify which version of Microsoft Windows is loaded in the PC system. <input type="checkbox"/> Perform the Apollo 2 driver removal procedure <input type="checkbox"/> For Point-to-Point – Reload Dial-Up Network upgrade 1.3 <input type="checkbox"/> Install the Apollo 2 driver again.

ADSL MODEM

ADSL-PRO

USER'S MANUAL

FCC Connection Information

FCC Part 68

This equipment complies with Part 68 of the FCC Rules. On the bottom of this equipment is a label that contains the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. You must provide this information to the telephone company upon request.

The REN is useful to determine the quantity of devices you may connect to the telephone line and still have all of those devices ring when your number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If the modem causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this modem, please contact your dealer for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Installation

This device is equipped with a USOC RJ11C connector.

FCC Part 15

The modem generates and uses radio frequency energy. If it is not installed and used properly in strict accordance with the user's manual, it may cause interference with radio and television reception. The modem has been tested and found to comply with the limits for Class B computing devices in accordance with the specifications in Subpart B, Part 15 of the FCC regulations. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. FCC regulations require that shielded interface cables be used with your modem.

If interference does occur, we suggest the following measures be taken to rectify the problem:

- 1) Move the receiving antenna.
- 2) Move the modem away from the radio or TV.
- 3) Plug the modem into a different electrical outlet.
- 4) Discuss the problem with a qualified radio/TV technician.

CAUTION : Changes or modifications not expressly approved by the party responsible for compliance to the FCC Rules could void the user's authority to operate this equipment.

Cable connections :

All equipment connected to this modem must use shielded cable as the interconnection means.

Notes :

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
 - (2) This device must accept any interference received including interference that may cause undesired operation.
-

Features

The ADSL Modem provides the following features:

- * Employs ADSL using the maximum downstream (receive) rate of 8 Mb/s and the maximum upstream (transmit) data rate of 1.1 Mb/s. The data rates are automatically adjusted to the line quality
- * Compatible with all T1.413 and G.lite compliant CO DSLAM equipment
- * Software upgradable.
- * Includes a Microsoft Windows ADSL monitoring program for configuring the adapter and checking the status of the connection
- * Provides an RJ-11 connector for connection to the telephone line

TABLE OF CONTENTS

The following chapters are included in this manual:

- Chapter 1** "Overview" offers a brief description of ADSL, and the features and operation of the ADSL Modem.
- Chapter 2** "ADSL Modem Installation" describes the steps for installing the ADSL Modem.
- Chapter 3** "Software Installation" provides detailed steps for installing the ADSL Modem into three operating systems: Windows NT 4.0 and Windows 98.
- Chapter 4** User's Guide to the ITEX Modem Icon Utility
- Appendix A** "Specifications" provides a list of specifications for the ADSL Modem.

Chapter 1 Overview

About ADSL

Asymmetric Digital Subscriber Line (ADSL) technology provides high-speed data access across regular phone lines (copper wires) by making use of previously unused frequency bandwidth above the voice band. By placing the ADSL signal above the frequency of the voice signal, ADSL service is able to coexist on the same line with your telephone service. ADSL is asymmetric in the sense that it provides a higher data rate in the downstream (receive) direction than in the upstream (transmit) direction. Asymmetric operation is ideal for typical home and small office use where files and information are downloaded more frequently than uploaded.

There are several standard and defacto standard types of ADSL modulation including Discrete Multitone (DMT). Further, there are two DMT standards: T1.413 (also referred to as DMT heavy) and G.992.2 (also referred to as G.lite). The ADSL Modem supports each of the aforementioned standards.

Adapter Operation

The ADSL Modem is multimode, that is, it automatically determines the type of modem at the central office and configures itself accordingly. Once the correct mode is determined, the modem then automatically determines the optimal data rate for the line. Depending on the type of modem at the central office and the line characteristics, the downstream data rate is up to 8 Mbps.

The ADSL Modem can be easily installed into a PCI 2.1 compliant PC that is running Microsoft Windows NT 4.0 or Windows 98 operating systems. The ADSL Modem is fully software upgradable so that new features and updates may be added by simply loading a new version of the device driver onto your PC.

The ADSL Modem follows recommendations from the ADSL forum regarding framing, data format, and upper layer protocols. Point to Point Protocol (PPP) over Asynchronous Transfer Mode (ATM) over ADSL is employed to provide robust

operation. PPP is the protocol of choice for most ISPs for dial modem access. It provides session setup, user authentication, and protocol encapsulation for upper layer protocols such as IP and IPX. ATM is a protocol that divides packets into small fixed sized cells for rapid transmission over high-speed networks. ATM allows various types of traffic (e.g. data, voice, and video) to be securely and efficiently carried over the same network. ATM is being widely deployed by phone companies in their backbone networks. Therefore, the choice of PPP and ATM enables the ADSL Modem to operate seamlessly over the existing telecommunications and Internet infrastructure.

Chapter 2 ADSL Modem Installation

To install the ADSL Modem card perform the following steps:

1. Turn off power to your PC. Disconnect the AC power cord from the AC power source.

Note: *Static discharge can severely damage the ADSL Modem. Before handling any of the PC boards inside your PC, please take standard precautions, such as touching the metal covering on the PC box to ground yourself.*

2. Open the computer housing. Locate an empty PCI slot.
3. Line the ADSL Modem card so that the connector slides into the PC first and connects securely into the slot.
4. Install the mounting screw to ensure that the card faceplate is securely held.
5. Close the PC.
6. On the back panel of the ADSL Modem card, locate the connector labeled ADSL / Line
7. Plug a telephone cable into the ADSL / Line In connector and into an RJ-11 telephone jack.
8. Plug in the AC power and turn on your PC.

Chapter 3 Software Installation

There are different software drivers to support the following operating systems:

Installing The ATU-R Device Drivers

- * Microsoft Windows 98SE
- * Microsoft Windows NT4.0

Verifying The Driver Installation

Configuring The ADSL Network (TCP/IP) For RFC1483

Configuring The ADSL Network (TCP/IP) For RFC1577

Be sure to follow the instructions provided for your PC's operating system.

Installing The ATU-R Device Drivers

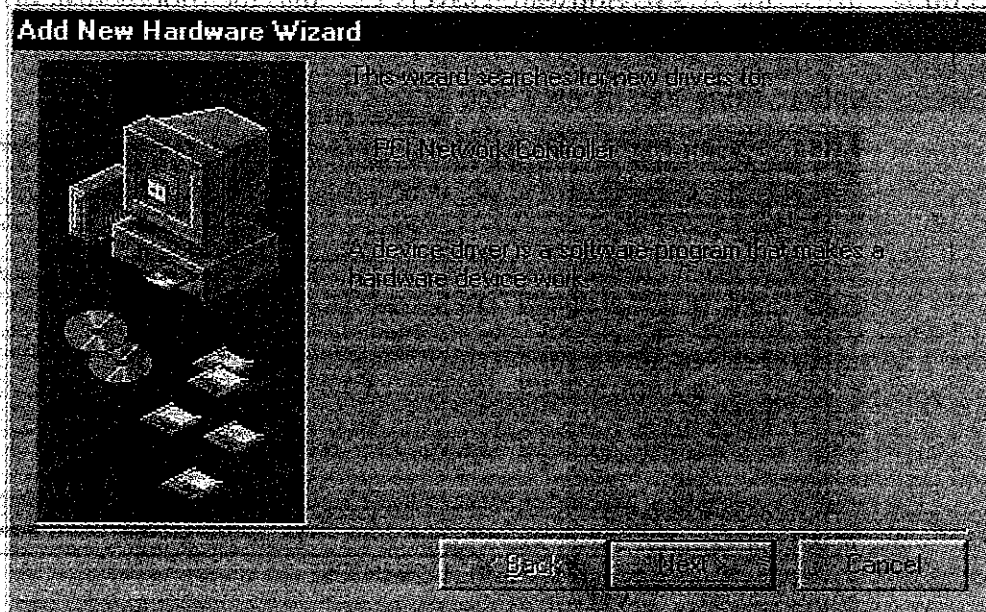
Please have the following information available in order to complete the installation and setup of the ADSL Network Modem.

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.

Windows 98 Second Edition

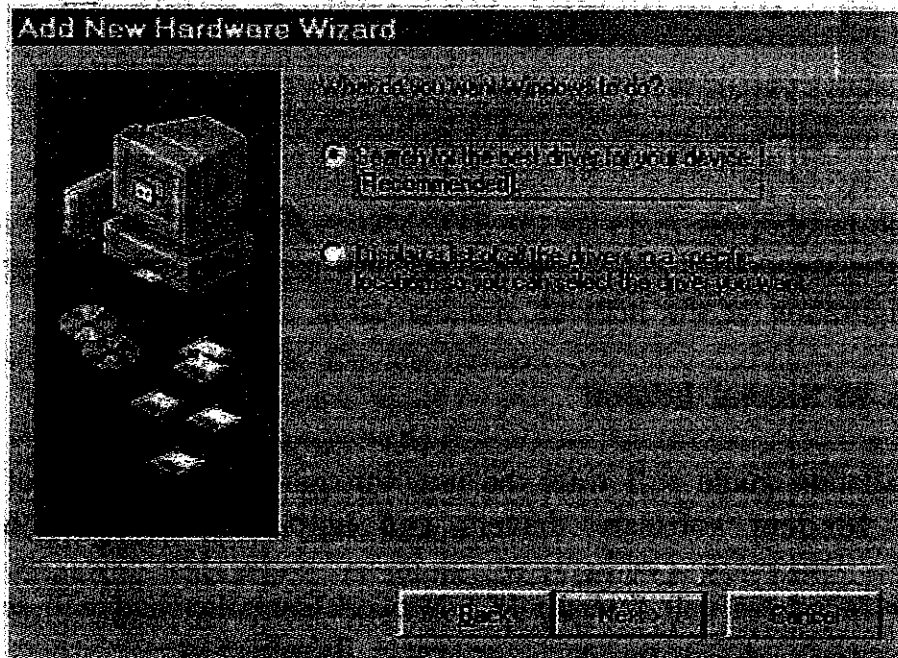
This installation guide will walk the user through the installation of the ADSL Network Modem software drivers and help to configure the modem.

<Step01> Windows will find the PCI Network Controller and will search for a device driver for the card. Click 



<Step02> The Add New Hardware Wizard window will appear. When prompted, select "search for the best driver for your device. (Recommended)."

Click 

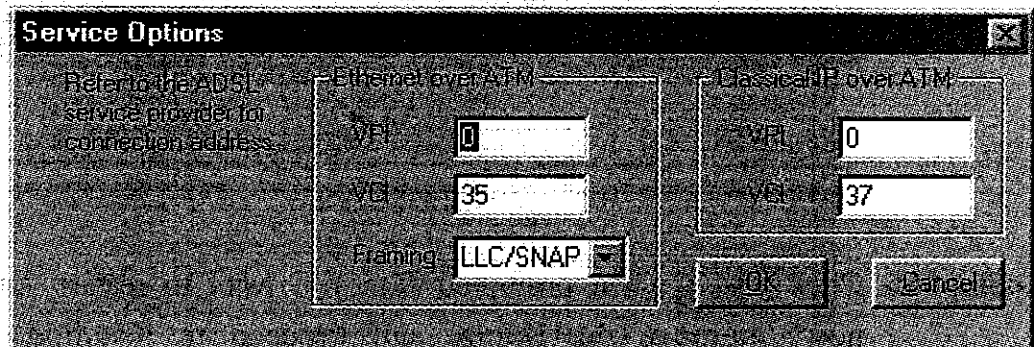
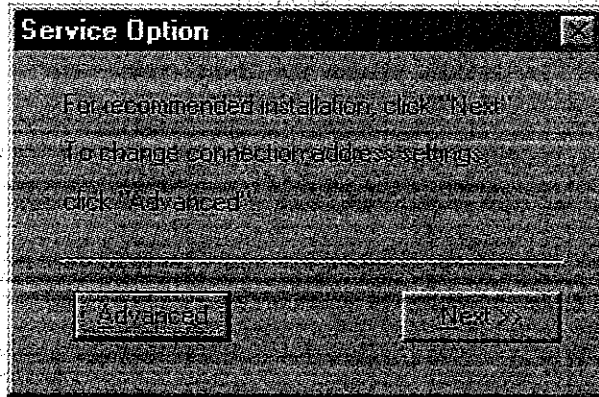


<Step03> Insert the ADSL Software Drivers CD into the floppy disk drive and select the "specify a location" from CD-ROM location: \A2win98SE option from the menu. Click 

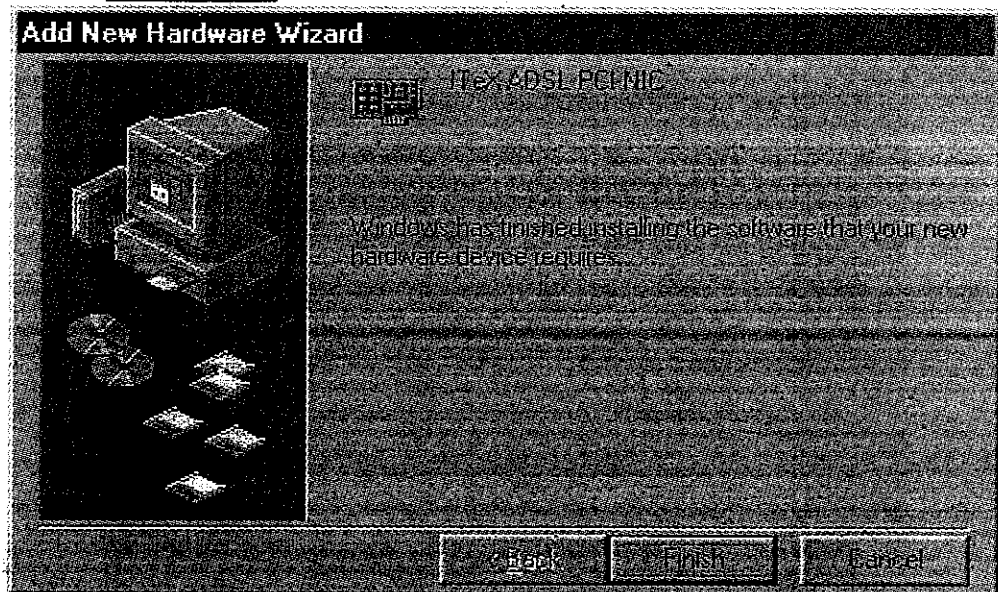


Windows should find the NETTEX.INF file in the floppy disk drive. If this is correct, then click Next to continue. Otherwise, click Back to re-enter the location of the driver. Windows may not be able to find some of the Windows 98 files. If so, enter the location of the Windows 98 CD and proceed with the installation. Windows will start to copy the drivers.

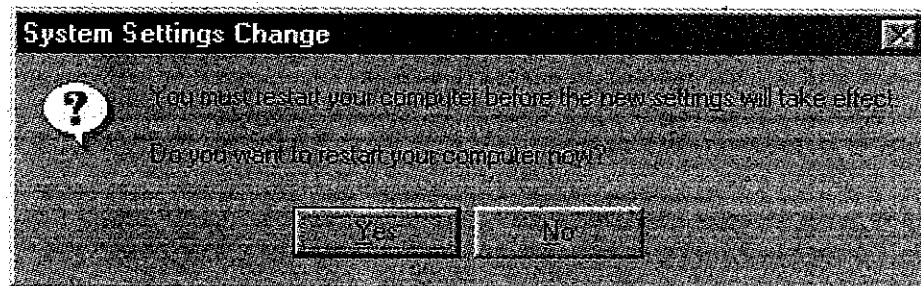
<Step04> The Service Options window will show in the installation process "Advanced" to set VPI, VCI. The default VCI value is 35. The default VPI value is 0. Again, click **OK** to continue.



<Step05> Windows has finished installing all the ADSL Network Modem drivers. Click to complete the installation.



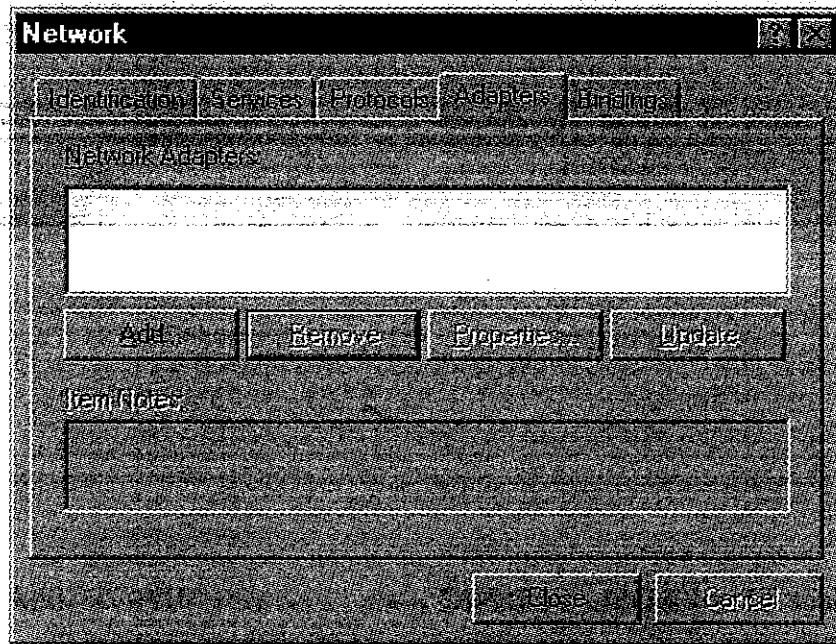
<Step06> Click when prompted "Do you want to restart your computer now? Remove the floppy and Proceed to installing the ADSL Diagnostic Software."



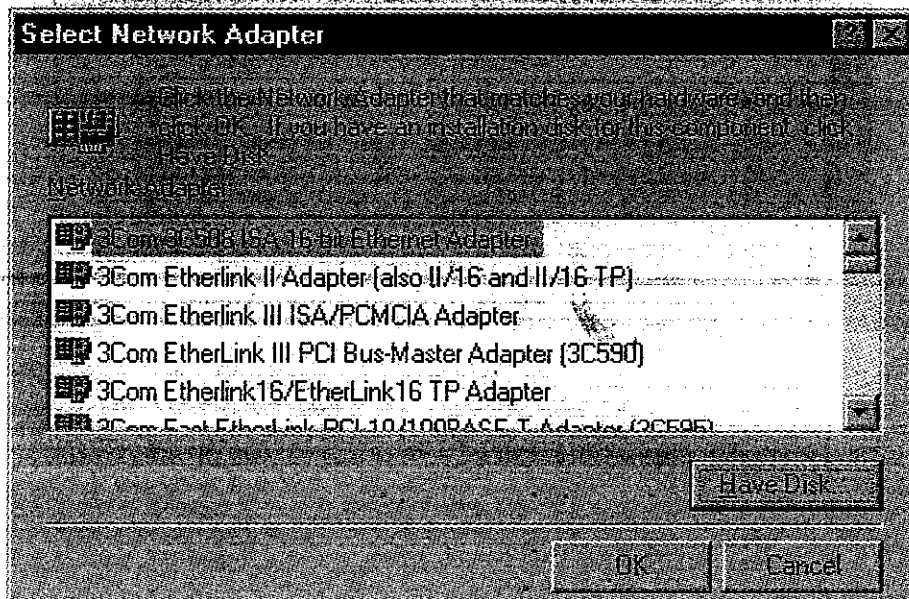
Windows NT 4.0


This installation guide will walk the user through the installation of the ADSL Network Modem software drivers and help configure the modem.

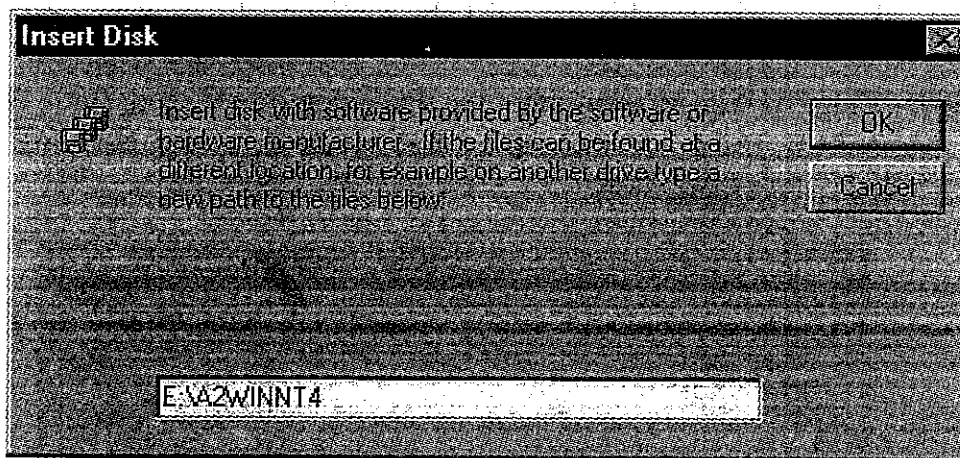
<Step01> Plug ADSL Modem into the PCI slot of PC and start Windows NT4.0 Then install ADSL Modem driver under Network and Press **Add**



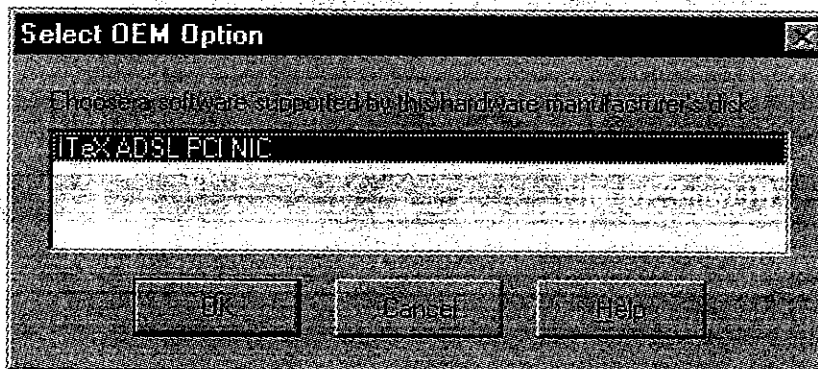
<Step02> Press **Have Disk**



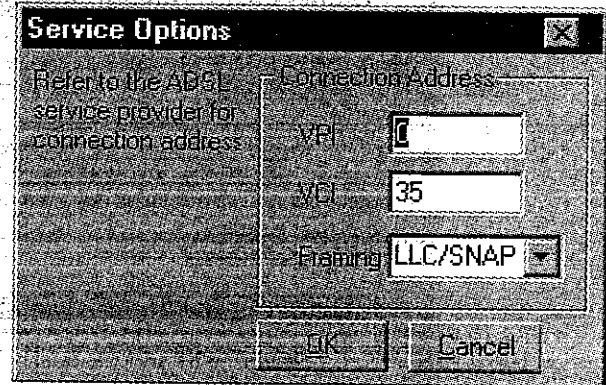
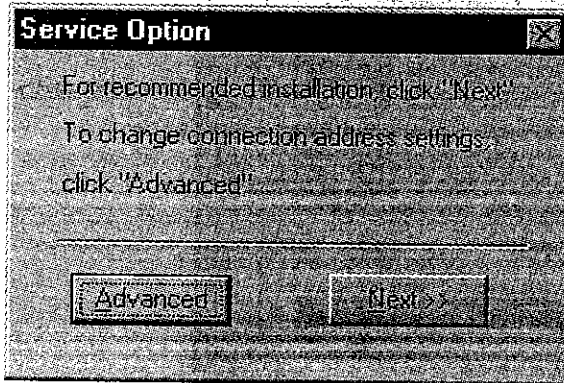
<Step03> Insert the ADSL Software Drivers CD into the CD Driver and Type path "CD driver:\A2WINNT4" and press 



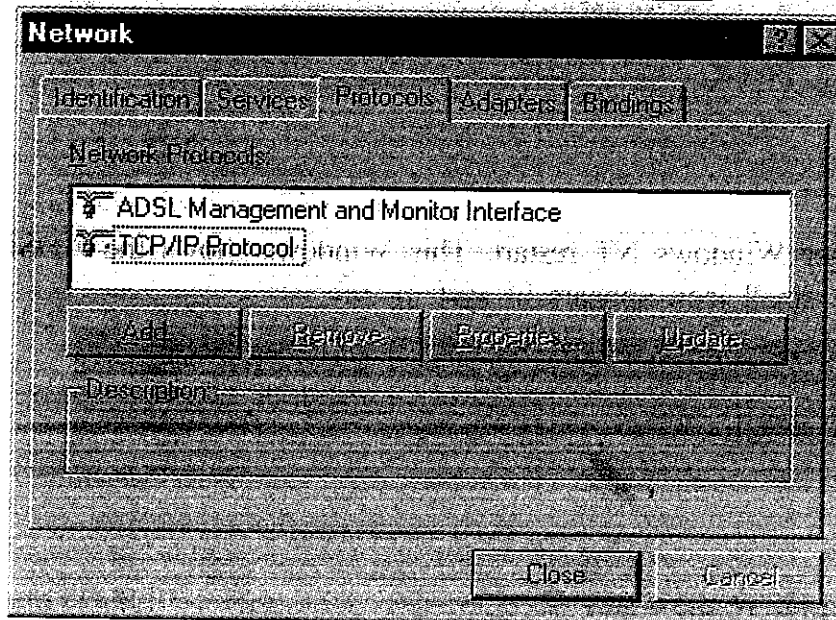
<Step04> Select ITeX ADSL PCI NIC



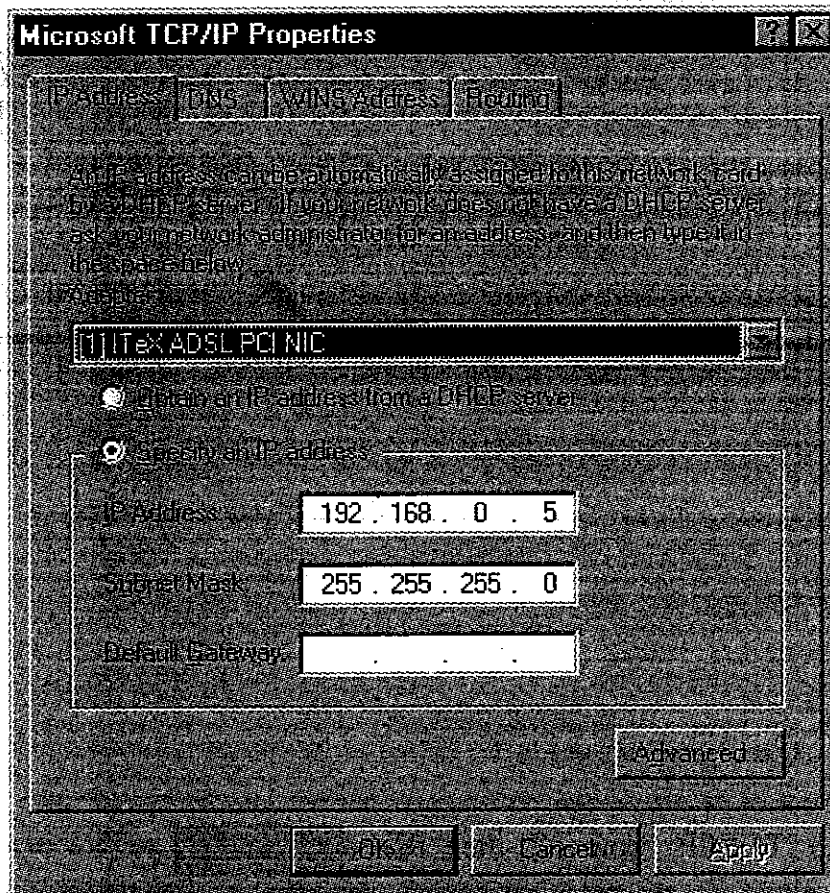
<Step05> Press **Advanced** to set VPI/VCI, the default VPI/VCI is 0/35



<Step06> Add "TCP/IP Protocol" then Press **Close**



<Step07> Set the IP, Gateway, DNS, then press



<Step08> After Windows NT restart, This Windows shows the ADSL status in the small icon appears in system tray.



Verifying The Driver Installation

<Step01> 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:

ITeX ADSL PCI NIC

ATM Call Manager ->ITeX ADSL PCI NIC

ATM LAN Emulation Client->ITeX ADSL PCI NIC

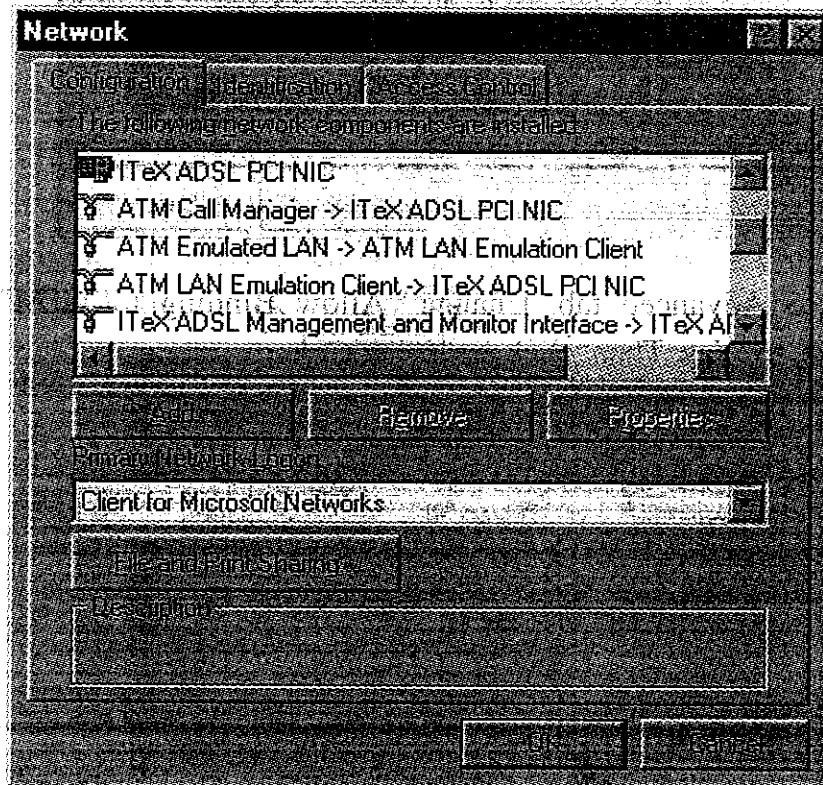
ITeX ADSL Management and Monitor Interface->ITeX ADSL PCI NIC

ITeX RFC1483 Ethernet Adapter ->ITeX RFC1483 for Ethernet Transport

ITeX RFC1483 for Ethernet Transport -> ITeX ADSL PCI NIC

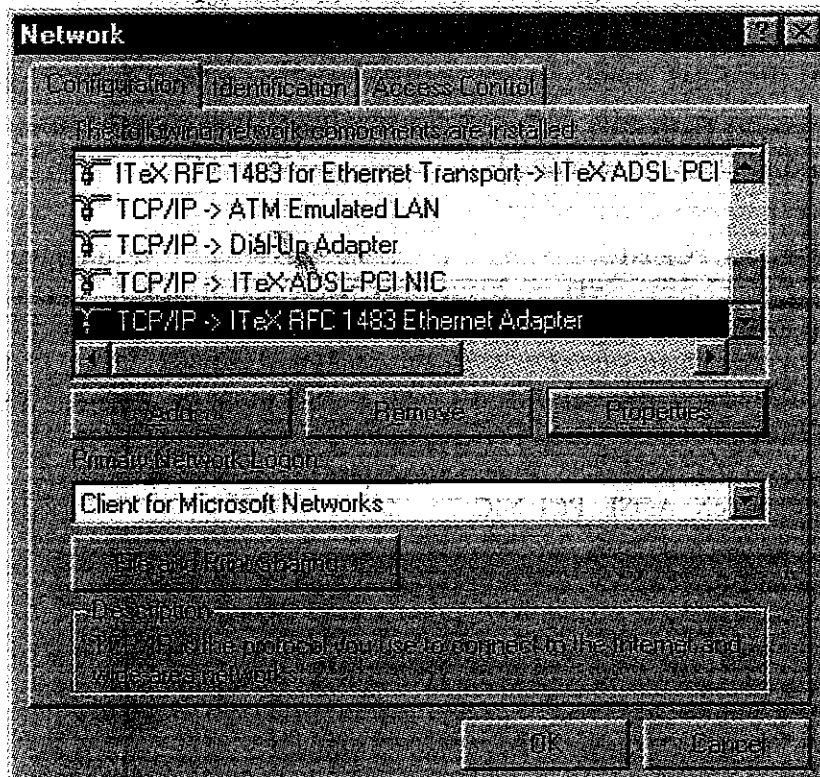
TCP/IP ->ITeX RFC1483 Ethernet Adapter

TCP/IP ->ITeX ADSL PCI NIC

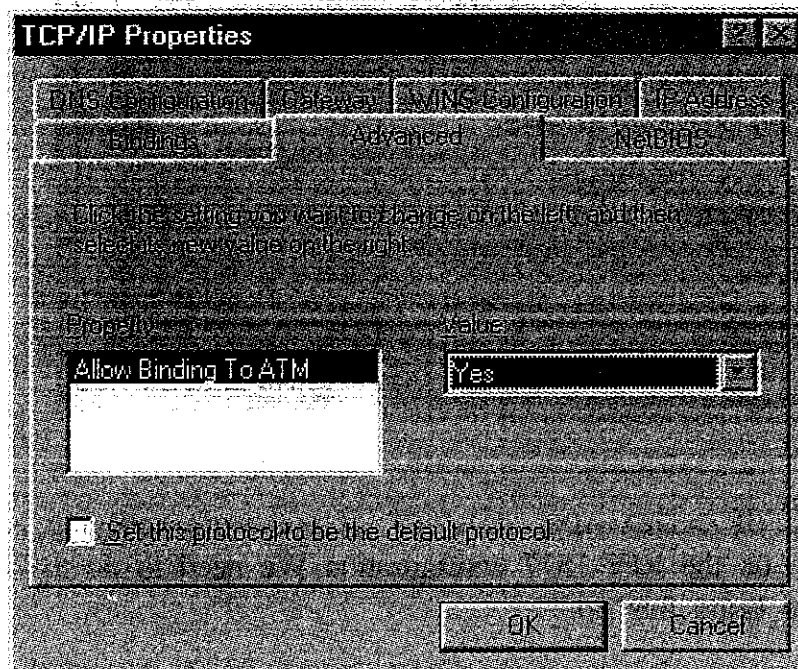


The last item (TCP/IP -> ITeX ADSL PCI NIC), if you were verifying, is not there. This is where we do the RFC 1577 configuration. We need to do the following additional steps to bring this up.

<Step02> Just like what we did before, go to Start/settings/control panel. Double click on Network icon. Double click on "TCP/IP-> ITeX RFC 1483 Ethernet Adapter".

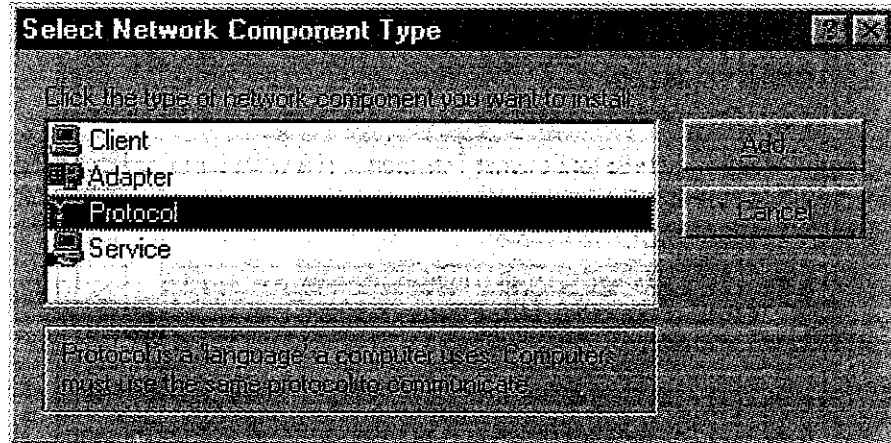


<Step03> Go to Advanced tab. Change "Allow Binding to ATM" Property value to Yes. Then click on **OK**.

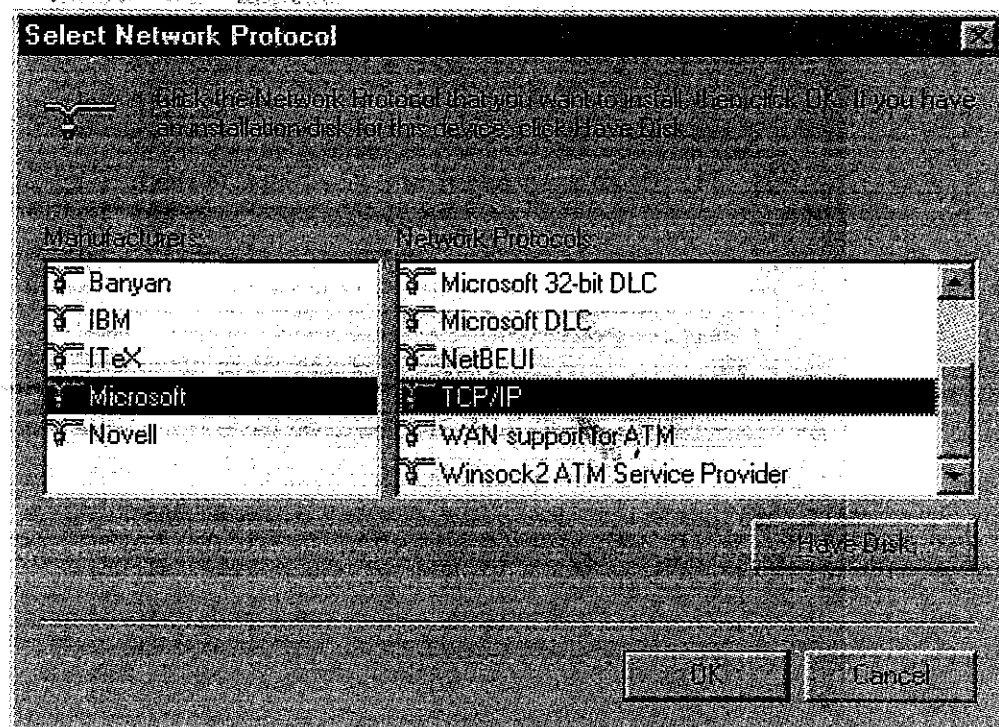



Go to the previous Network window, click on **Add**

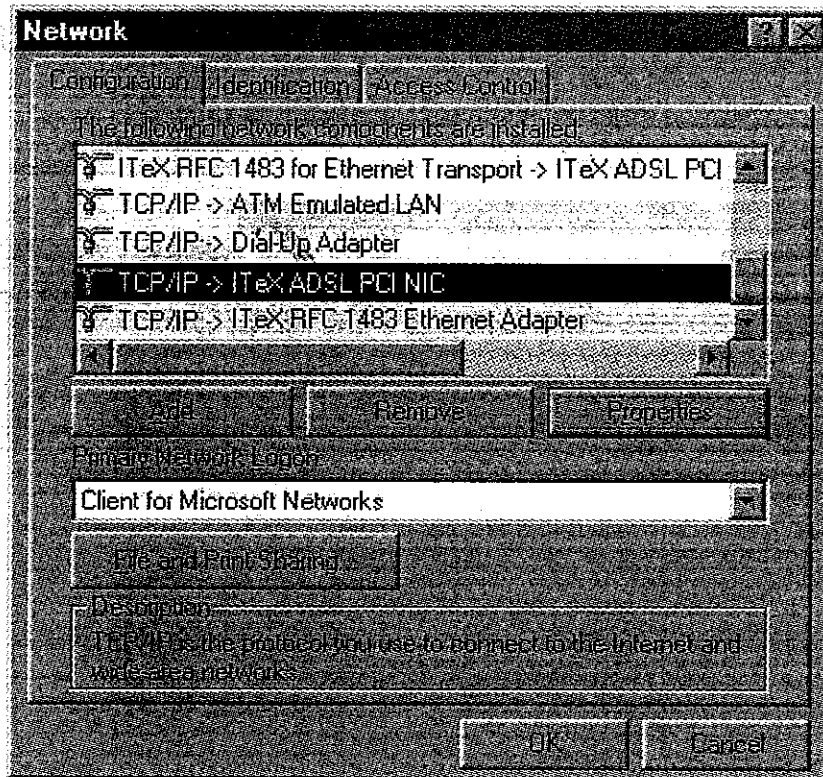
<Step04> The Select Network Component Type window will show up, double click on Protocol.



<Step05> In Manufactureres, chose Microsoft. In Network Protocols, chose TCP/IP then click on .

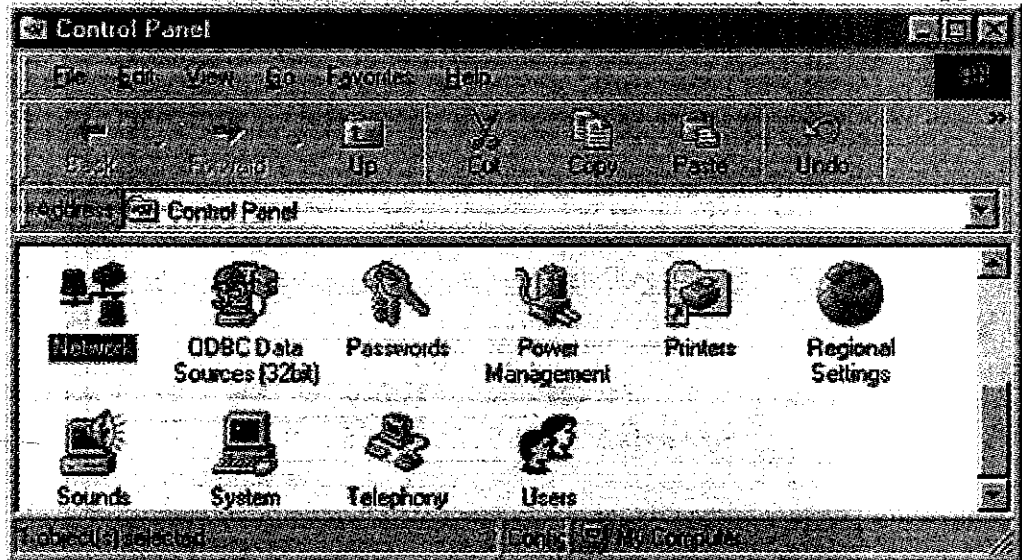


<Step06> Now, back to the Network window. The TCP/IP -> ITeX ADSL PCI NIC appears then Click  to close the Network window.

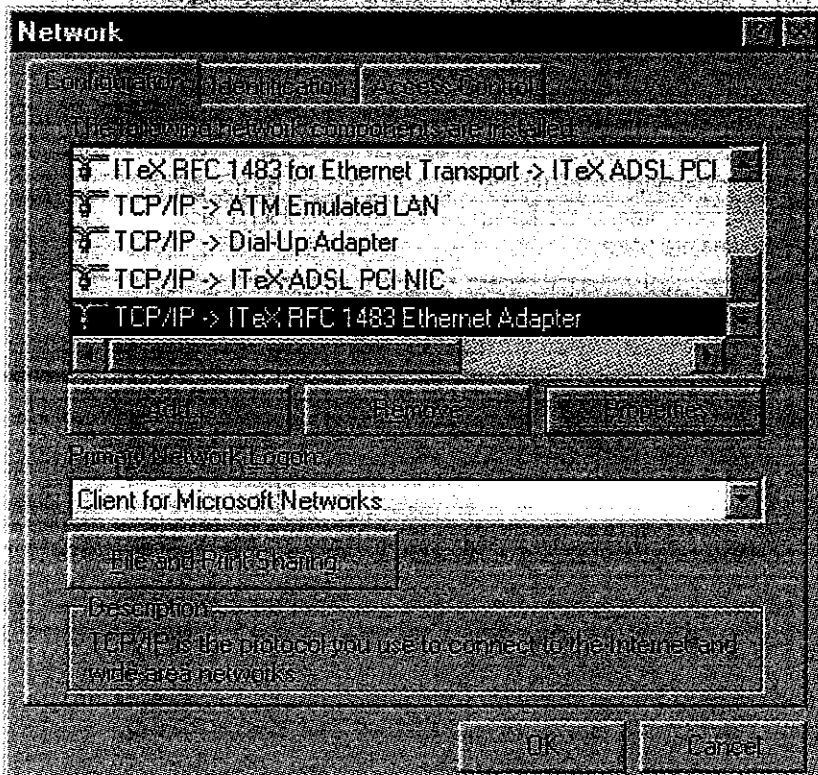


Configuring The ADSL Network (TCP/IP) For RFC1483

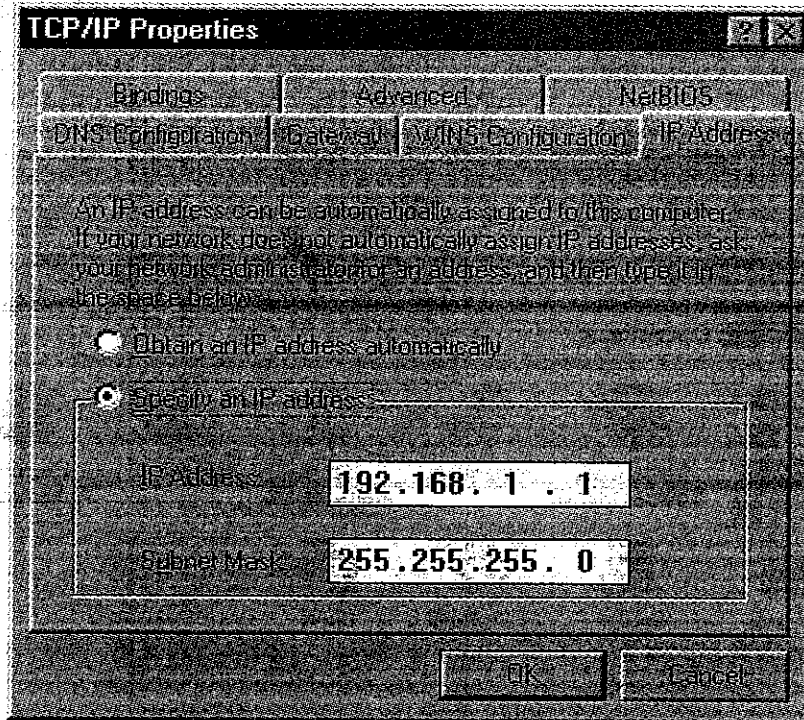
<Step01> From the Start menu, select settings and open the control panel. Double click on the Network icon. The Network window will appear.



<Step02> Select the Configuration tab and scroll through the installed network components list. Highlight the TCP/IP -> ITeX RFC1483 Ethernet Adapter component and click Properties. The TCP/IP Properties window will appear.



<Step03> 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.



<Step04> 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.

