IBM International ISDN PC Card

User's Guide

Declaration of CE Conformity

The manufacturer	AVM GmbH
Address	Alt-Moabit 95 D-10559 Berlin

herewith declares that the product

Type	ISDN-Controller
Product	IBM International ISDN PC Card

complies with the following directives:

- 1991/5/EC — Radio equipment and telecommunications terminal equipment
- 89/336/EEC — EMC Directive: Electromagnetic Compatibility
- 73/23/EEC — Low Voltage Directive: Electrical equipment designed for use within certain voltage limits

The following norms were consulted to assess conformity:

- CTR 3/1994.11.18
- EN 55022/9.98 Class B
  EN 55024/9.98
- EN 60950/1992+A1+A2+A3+A4+A11
  EN 41003/1993

CE The CE symbol confirms that this product conforms with the above mentioned norms and regulations.

Berlin, 16.03.2000 Peter Faxel, Technical Director

Contents

Preface

Note: Before using this guide and the product it documents, be sure to read the information under “Appendix A: Package Contents” on page 194, “Appendix E: Help and Service Information” on page 215, and “Appendix F: Product Warranties and Notices” on page 218.

Note: Any references in this publication to non-IBM web sites are provided for convenience only and do not in any way constitute an endorsement of those web sites. The materials at those web sites are not part of the materials for this IBM product, and use of those web sites is at your own risk.

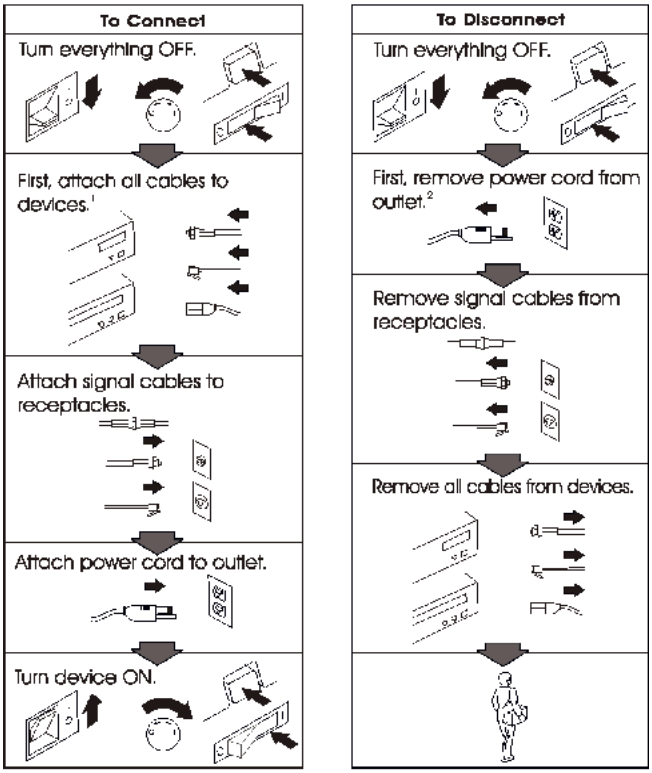
Second Edition (December 2001)

Important Safety Information

This ISDN PC Card is designed only for use in Personal Computers that have installation instructions describing user installation of PC Cards in PCMCIA slots.

DANGER!

Electrical current from power and ISDN communication cables is hazardous. To avoid shock hazards, connect and disconnect cables as shown below when installing, moving, or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



[1] In the U.K., by law, the telephone cable must be connected after the power cord.

[2] In the U.K., by law, the power cord must be disconnected after the telephone line cable.

DANGER!

To avoid shock hazards, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

To avoid shock hazards:

- The power cord must be connected to a properly wired and grounded receptacle.
- Any equipment to which this product is to be attached must also be connected to properly wired receptacles.

This is a high-performance ISDN adapter. Prolonged high-speed data transfers will result in the ISDN adapter becoming noticeably warm. If you need to remove the ISDN adapter immediately after prolonged operation and you are uncomfortable with handling the ISDN adapter while it is warm, eject the ISDN adapter from the PCMCIA slot and let it cool for about 15 seconds before handling it.

1 Welcome to the IBM International ISDN PC Card!

Welcome to the IBM International ISDN PC Card. Thank you for choosing this product.

The IBM International ISDN PC Card is a passive ISDN adapter in PCMCIA (credit-card size) format. It was designed for ISDN basic-rate interfaces, and can be used with one B channel at a rate of 64 kbit/s or, for multilink connections with two B channels simultaneously (multilink connections,) at 128 kbit/s .

The IBM International ISDN PC Card is fully CAPI 2.0-compliant.

The adapter can be installed and operated in Microsoft® Windows® 95, Windows® 98, Windows® NT 4.0 Workstation, Windows® 2000 Professional and Windows® Millennium Edition.

For more information on how to install and use the adapter, please see the corresponding sections in this manual. For further assistance, please refer to the telephone numbers included in “Appendix E: Help and Service Information” on

page 215 . If you need additional assistance, please contact your nearest IBM dealer or, if possible, consult the following Internet site:

IBM Personal Computing Support Web Site Language	URL
English	http://www.ibm.com/pc/support
German	http://www.ibm.com/pc/support/de
French	http://www.ibm.com/pc/support/fr
Italian	http://www.ibm.com/pc/support/it
Spanish	http://www.ibm.com/pc/support/es

Note: If the national language version of the IBM Personal Computing Web Site is not available or not working, you can use the English language version at

`http://www.pc.ibm.com/pc/support`

2 How the IBM International ISDN PC Card Installation Software CD Is Organized

The IBM International ISDN PC Card Installation Software CD contains the following directories:

\PORT	CAPI Port Drivers for Windows 95, Windows 98, Windows NT, and Windows 2000
\TOOLS	Tools, patches and updates
\WIN2000	CAPI 2.0-compliant device drivers for the IBM International ISDN PC Card for Windows 2000 Professional
\WIN95	CAPI 2.0-compliant device drivers for the IBM International ISDN PC Card for Windows 95
\WIN98	CAPI 2.0-compliant device drivers for the IBM International ISDN PC Card for Windows 98
\WINNT	CAPI 2.0-compliant device drivers for the IBM International ISDN PC Card for Windows NT 4.0 Workstation

For device driver updates, see the PCD support web site at

http://www.pc.ibm.com/support

Double click underneath the Browse menu on the link called “Options”. In the “Category” list, select “Communication Adapters”. In the “Subcategory” list, select “ISDN”. From the “Option” list, select “09N3606 International ISDN PC Card”.

3 Before You Install the IBM International ISDN PC Card

Before installing your IBM International ISDN PC Card, make sure your operating system is up to date. Refer to the following web sites if possible:

The Microsoft® Windows® 95 update page:

http://www.microsoft.com/windows95/downloads/

The Microsoft® Dial-Up Networking 1.3 update download page for Windows 95:

http://www.microsoft.com/windows95/downloads/contents/wurecommended/s_wunetworking/dun13win95/license.asp

The Microsoft® Windows® 98 update page:

http://www.microsoft.com/windows98/downloads/corporate.asp

The Microsoft® Windows® 2000 update page:

http://www.microsoft.com/windows2000/downloads/

The Microsoft® Windows® Millennium Edition home page:

http://www.microsoft.com/windowsme/

The Microsoft® download home page:

http://www.microsoft.com/downloads/

For further assistance regarding the installation of specific patches or updates for any Microsoft Windows operating system, contact either Microsoft or your computer manufacturer's help desk.

Be sure to have the user's manual or installation guide for your computer available for quick reference.

Also keep the original Windows 95, Windows 98, Windows Millennium Edition, Windows NT 4.0 Workstation, or Windows 2000 CD at hand when installing the device drivers or software.

If you do not have a CD for your operating system, check whether the required .CAB files for Windows 95 or 98 or Millennium Edition Setup are installed on the hard disk of your computer.

If you are using Windows NT 4.0 Workstation or Windows 2000 Professional, check whether your hard disk contains the I386 directory and its sub-directories from the original CDs.

If this is not the case, or if you require assistance to find the Setup files in question, contact the manufacturer of your computer or your IT department specialist.

4 Installing the Device Drivers in Windows® 95

4.1 Outline of the Installation Process for Windows 95

The device drivers for the IBM International ISDN PC Card are installed in two steps:

1. Install the CAPI 2.0-compliant device drivers
2. Install the NDIS WAN CAPI drivers

The following section explains in detail the prerequisites for the device driver installation, and how to perform the installation on your specific version of Windows 95.

4.2 Determining the Windows 95 Version in Use

Before you begin installing the IBM International ISDN PC Card in Windows 95, check which version of Windows 95 you are using. For this purpose Microsoft has released the following instructions for determining the Windows 95 version on its technical support web site:

To determine the version of Windows 95 you are running, proceed as follows:

1. In the Control Panel, double-click the “System” icon.
2. Click the “General” tab.
3. Locate the version number under the “System” heading and compare it with the following table:

Release	Version	File Dates
Windows 95 retail, OEM	400.95	11/07/95
Windows 95 retail SP1	4.00.950A	11/07/95
OEM Service Release 1	4.00.950A	11/07/95

Release	Version	File Dates
OEM Service Release 2	4.00.1111 (4.00.950B)	24/08/96
OEM Service Release 2.1	4.03.1212-1214 (4.00.950B)	24/08/96-27/08/97
OEM Service Release 2.5	4.03.1214 (4.00.950C)	24/08/96-18/11/97

A comprehensive, up-to-date article on this subject can be found on the web at the following site:

http://search.support.microsoft.com

Search for the article “Q158238”.

If you are running the initial release of Windows 95 (Windows 95 retail or OEM) you must first upgrade it to Windows 95 SP1 by downloading the corresponding Service Pack for your Windows 95 version. The Service Pack 1 can be found at

http://microsoft.com/windows/software/localize/localize.htm.

If any of the above URLs is outdated, please contact your local Microsoft support desk for further assistance.

4.3 Removing any PCMCIA Support Software

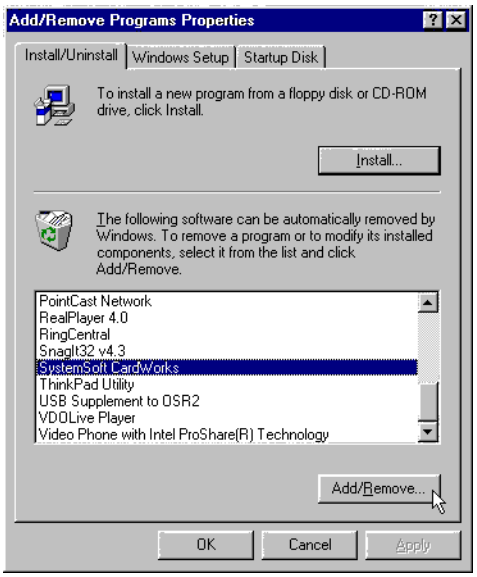
Some notebook manufacturers install PCMCIA support software such as Systemsoft's® CardWizard(TM) as part of the Windows 95 package. IBM includes this program with its Thinkpad notebook series. This section briefly describes how to remove CardWizard(TM) from the system. This software must be removed to ensure correct operation of the IBM International ISDN PC Card.

1. Click “Settings / Control Panel” in the Windows “Start” menu.

2. Double-click the “Add/Remove Programs” icon in the Control Panel.

3. In the “Add/Remove Programs Properties” window, select “SystemSoft CardWorks” in the list of installed programs.

4. Click the “Add/Remove” button to remove CardWizard(TM).



5. Confirm that you want this software is to be completely removed.

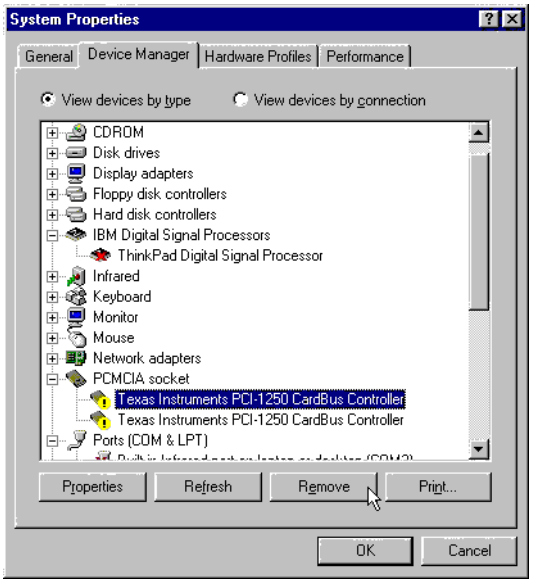
6. Once the removal has been completed, click the “OK” button and then confirm that you want to restart the computer.

7. After Windows has restarted, open the Control Panel again by clicking “Start / Settings / Control Panel”.

8. Double-click the “System” icon and select the “Device Manager” tab. Both PCMCIA sockets are now highlighted with a yellow exclamation mark in the list of devices.

Select each socket in turn and click “Remove” to remove it from the Device Manager.

Even if the PCMCIA sockets are not highlighted with the exclamation mark, you must remove them, and follow the instructions in this chapter.



Make sure that you have removed both sockets !

Some Windows 95 versions may show only one PCMCIA socket instead of two.

Once you have removed the PCMCIA sockets, restart your computer.

When Windows 95 restarts, the operating system reinstalls the drivers for the PCMCIA sockets. After system start-up has been completed, return to the “System” applet in the Control Panel and check in the Device Manager to make sure that the PCMCIA sockets are now installed properly. If so, close the Device Manager by clicking the “OK” button.

The next step is to install PCMCIA support in Windows 95. Proceed as follows:

1. Double-click the “PC Card (PCMCIA)” icon in the Control Panel. Windows 95 now asks you for some information and offers default settings. Please read the next dialog boxes carefully and answer the questions accordingly.
2. Windows 95 prompts you to shut down your notebook. Confirm this action by clicking “Yes”. When your notebook has been restarted, it is ready to use PCMCIA adapters.

4.4 Upgrading Dial-Up Networking for Windows 95

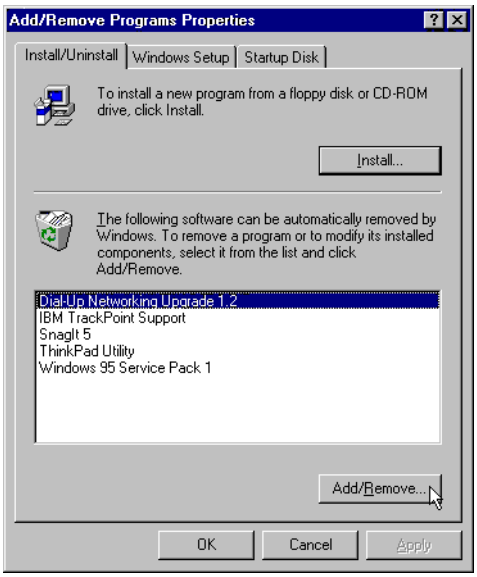
For proper operation of the IBM International ISDN PC Card your computer must have at least Microsoft Windows 95 with Service Pack 1 (Windows 95 version 4.00.950A) installed.

Check first whether Dial-Up Networking or any ISDN accelerator kit is installed:

1. Click through “Start / Settings / Control Panel” and then double-click “Add/Remove Programs”.
2. In the first dialog, entitled “Install/Uninstall”, check whether a newer version of the Microsoft Dial-Up Networking update is installed.

If an entry called “Dial-Up Networking Upgrade 1.2” is listed:

1. Select this entry in the list, then click the “Add/Remove” button to uninstall the older Dial-Up Networking upgrade.



2. Then restart your system and install the Microsoft Dial-Up Networking 1.3 Upgrade from the \TOOLS\MSDUN13 directory on the CD, choosing the language subdirectory corresponding to the the language of your Windows 95 operating system.

3. Run the file MSDUN13.EXE and follow the instructions on the screen.

If your language version is not available on the CD, you can either install the English Dial-Up Networking update or download the desired language version from

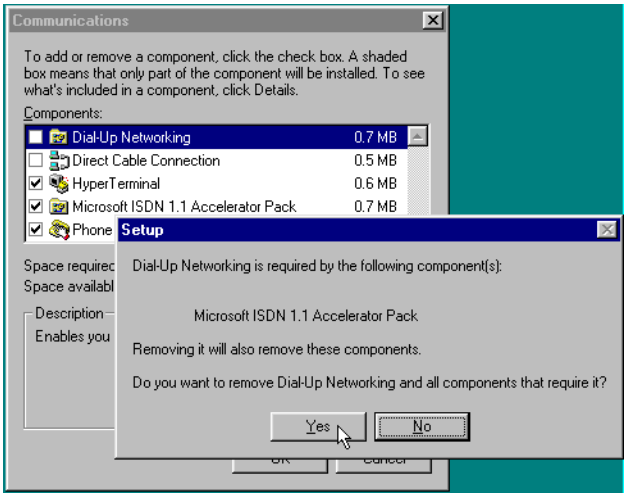
`http://www.microsoft.com/windows95/downloads/contents/wurecommended/s_wunetworking/dun13win95/license.asp`

and install it on your Windows 95 computer.

If the “Install/Uninstall” list contains no entry for a Dial-Up Networking update:

1. Click the “Windows Setup” tab.
2. Double-click the “Communications” icon, then deactivate the “Dial-Up Networking” option.
3. Click the “OK” button to confirm the operation.

If the Microsoft ISDN 1.1 Accelerator Pack is installed on your computer, you are prompted to confirm that you want to remove it as well. Click “Yes” to confirm this operation.



4. Restart your system and install the Microsoft Dial-Up Networking 1.3 Upgrade from the CD directory \TOOLS\MSDUN13, choosing the language version corresponding to your Windows 95 operating system.
5. Run the file MSDUN13.EXE and follow the instructions on the screen.

If your language version is not available on the CD you can either install the English Dial-Up Networking update or download the desired language version from

http://www.microsoft.com/windows95/downloads/contents/wurecommended/s_wunetworking/dun13win95/license.asp
and install it on your Windows 95 computer.

4.5 Installing the IBM International ISDN PC Card in Windows 95 Service Release 1

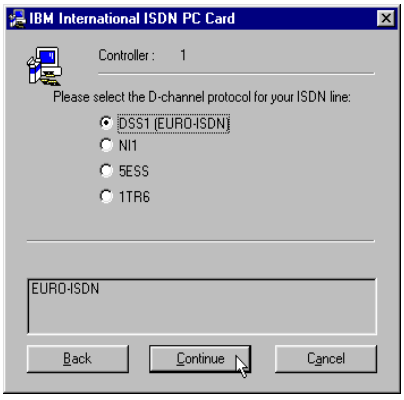
Once you have prepared Windows 95 by following the instructions above, you are ready to install the IBM International ISDN PC Card.

1. Turn off the PC, choose a PCMCIA slot and insert the IBM International ISDN PC Card into the slot without the ISDN cable attached.
2. Turn the PC back on. The “New Hardware Found” Wizard appears and reports that it has detected an “ISDN PC Card”.
3. Now the drivers for the new hardware are requested. Insert the CD labeled “IBM International ISDN PC Card Installation Software” into your computer's CD-ROM drive.
4. Make sure that the option “Driver from disk provided by hardware manufacturer” is selected, then click “OK”.
5. The “Install From Disk” dialog appears. Click the “Browse” button and select the letter of the CD-ROM drive containing the “IBM International ISDN PC Card Driver” CD in the “Open” dialog. Select the “Win95” directory and then confirm your selection by clicking “OK”. The updated drivers for Windows 95 will be placed in the directory WIN95\DRV.
6. In the “Install From Disk” dialog, click “OK” once more to confirm that you want to install the device drivers.
7. Click “OK” in the “Select Device” window. Installation of the device drivers begins.

8. The next dialog allows you to select the installation language. Confirm the default language “English” by clicking “OK”, then “Continue”.

9. In the next dialog, specify the installation directory for the drivers. By default this path is “C:\IBM_ISDN”. Click “Continue” to confirm this path, or enter a different path in the “Directory” field.

10. In the next dialog, select the appropriate D-channel protocol for your ISDN line. For newer ISDN lines in Europe select DSS1, the Euro-ISDN D protocol. NI-1 and 5ESS are D-channel protocols used in the USA. 1TR6 is the older national D-channel protocol for Germany.



Although some older ISDN lines in Germany still use the D-channel protocol 1TR6 , DSS1 is generally preferable. The 1TR6 protocol is no longer very common and may be excluded from future driver releases for this adapter.

11. Once you have selected the appropriate D-channel protocol, click the “Continue” button.
12. The last dialog informs you of the resources used by the IBM International ISDN PC Card. Click “Continue” to complete the installation, then connect the ISDN cable.

Your IBM International ISDN PC Card is now ready to use with any CAPI 2.0-compliant application software.

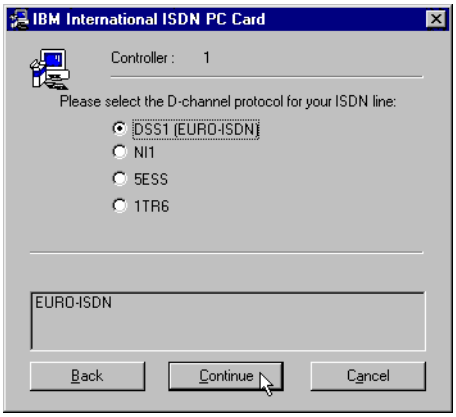
4.6 Installing the IBM International ISDN PC Card in Windows 95 Service Release 2.x

Once you have prepared Windows 95 by following the instructions above, you are ready to install the IBM International ISDN PC Card.

1. Turn off the PC, choose a PCMCIA slot and insert the IBM International ISDN PC Card into this slot without the ISDN cable attached.
2. Turn the PC back on. The “New Hardware Found” Wizard detects the newly inserted IBM International ISDN PC Card as “ISDN PC Card”.
3. Now insert the CD labeled “IBM International ISDN PC Card Drivers” into your computer’s CD-ROM drive.
4. The “Update Device Driver Wizard” prompts you to install the device drivers for it. Click “Next”.
5. When the Wizard has finished searching for the device drivers, click first “Other Locations” and then the “Browse” button.

6. In the “Browse for Folder” dialog, select the letter of the CD-ROM drive containing the “IBM International ISDN PC Card Driver” CD. Select the the “Win95” directory entry and then confirm your selection by clicking “OK”. The updated drivers for Windows 95 will be placed in the directory WIN95\DRV.
7. In the “Select Other Location” dialog, click “OK”.
8. Next, click the “Finish” button in the “Update Device Driver Wizard” window.
9. The following message now appears: “Please insert the disk labeled ‘IBM International ISDN PC Card Installation Windows 95’, and then click “OK.”
10. Click the “OK” button to close this dialog. In the “Copying Files...” dialog, click the “Browse” button, and in the “Open” dialog, select the “WIN95” directory on the CD. Click “OK” twice. The updated drivers for Windows 95 will be placed in the directory WIN95\DRV.
11. The next dialog allows you to select the installation language. Confirm the default language “English” by clicking “OK”, then “Continue”.
12. In the next dialog window you can specify the installation directory for the drivers. The default path is “C: \ IBM_ISDN”. Click “Continue” to confirm this path, or enter a different path in the “Directory” field.

13. In the next dialog, select the appropriate D-channel protocol for your ISDN line. For newer ISDN lines in Europe, select DSS1, the Euro-ISDN protocol. The NI-1 and 5ESS are D-channel protocols used in the USA. 1TR6 is the older national D-channel protocol for Germany.



Although some older ISDN lines in Germany still use the D-channel protocol 1TR6, DSS1 is generally preferable. The 1TR6 protocol is no longer very common and may be removed from future driver releases for this adapter.

14. Once you have selected the appropriate D-channel protocol, click the “Continue” button.

15. The final dialog informs you of the resources used by the IBM International ISDN PC Card. Click “Continue” to complete the installation, then connect the ISDN cable.

Your IBM International ISDN PC Card is now ready to use with any CAPI 2.0-compliant software.

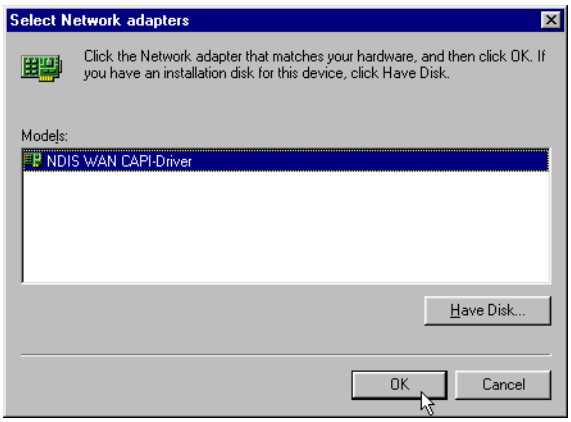
4.7 NDIS WAN CAPI Driver Installation in Windows 95

If you have not yet installed the CAPI 2.0-compliant device drivers, please return to the corresponding chapters and install them first.

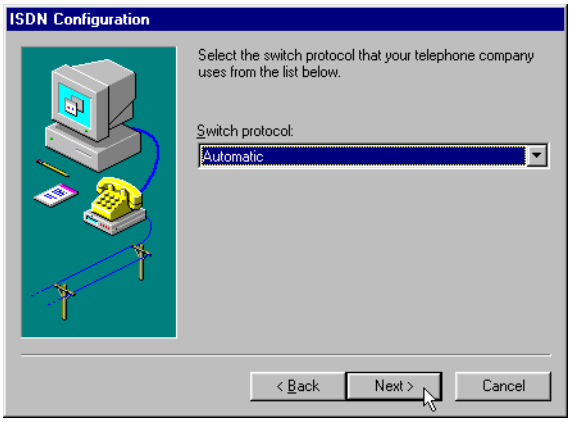
During installation you may be asked to specify the location of the NDIS WAN CAPI drivers a second time. In this case, simply enter the path to the driver source files again.

1. Insert the CD labeled “IBM International ISDN PC Card Installation Software” into your computer's CD-ROM drive.

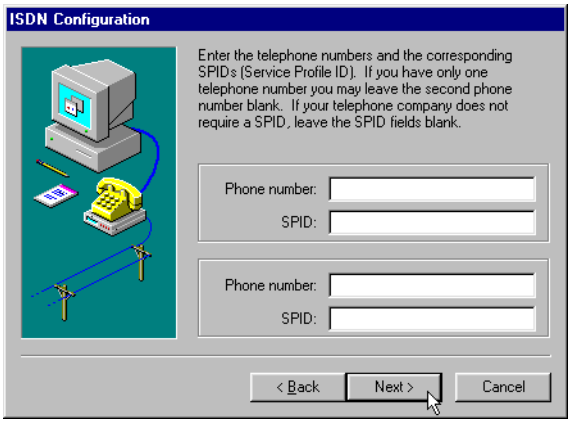
2. Click “Start / Settings / Control Panel” to open the Control Panel. Double-click the “Network” icon.
3. In the Network Configuration window, click “Add”.
4. In the “Select Network Component Type” dialog, click “Adapter”, then “Add”.
5. In the “Select Network Adapters” dialog, click “Have Disk”.
6. In the “Install From Disk” dialog, click the “Browse” button. Select the CD-ROM drive in the “Drives” list in the “Open” dialog, then browse to the path “TOOLS / NDISWAN / NDISWAN.W95”. Click “OK”. The updated NDIS drivers for Windows 95 are copied to the directory WIN95\NDIS.
7. Click “OK” to close the “Install From Disk”, “Select Network adapters”, and “Network” dialogs.



8. Windows 95 now starts the ISDN configuration. Click the “Next” button. Leave the “Switch protocol” selection at “Automatic” and click “Next” again.



9. The next dialog prompts you to enter two phone numbers and the corresponding SPIDs. The SPID entries are applicable only in the USA and Canada. However, even if you are in the USA or Canada, SPID entries are not mandatory. Leave these fields blank and click the “Next“ button.



10. In the last dialog, click “Finish”.
11. Restart your computer when prompted to do so.

The NDIS WAN CAPI Drivers are now installed. You will also find the guide for the NDIS WAN CAPI Drivers as a Windows Help file on your Windows 95 desktop. This guide is only available in English.

5 Installing the Device Drivers in Windows® 98

5.1 Outline of the Installation Process for Windows 98

The device drivers for the IBM International ISDN PC Card are installed in two steps:

1. Install the CAPI 2.0-compliant device drivers
2. Install the NDIS WAN CAPI drivers

5.2 Installing the IBM International ISDN PC Card in Windows 98

The installation for the IBM International ISDN PC Card is the same for both Windows 98 First Edition and Second Edition.

To install the IBM International ISDN PC Card in Windows 98, proceed as follows:

1. Turn off the PC, choose a PCMCIA slot and insert the IBM International ISDN PC Card into the cable attached.
2. Turn the PC back on. The “New Hardware Found” Wizard appears on screen and reports that it has detected an “ISDN-CARD”.
3. Now insert the CD labeled “IBM International ISDN PC Card Drivers” into the CD-ROM drive of your computer’s CD-ROM drive.
4. The “Add New Hardware Wizard” soon informs you that the system is searching for a driver for the adapter. Click “Next”.
5. Accept the default option “Search for the best driver for your device.” by simply clicking “Next”.

6. In the next dialog you may indicate where Windows should search for drivers. By default, the option “Floppy disk drives” is checked. Activate the option “Specify a location”, then click the “Browse” button. Select the letter of the CD-ROM drive containing the “IBM International ISDN PC Card Drivers” CD, then click the “WIN98” directory, and confirm your selection by clicking “OK”. The updated drivers for Windows 98 will be copied to the directory WIN98\DRV.

7. Now click the “Next” button to start the driver installation.

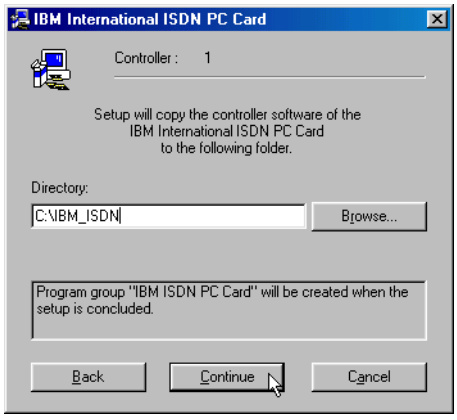
The dialog that follows informs you that the PC is ready to install the file FPCMSET.INF file for the ISDN PC Card. Click “Next”.

8. When the “Add New Hardware Wizard” reports that it has finished copying the required software for the “IBM International ISDN PC Card”, click “Finish”.

9. The next dialog informs you that the driver software in English is ready to install. Click “Continue”.

10. The IBM International ISDN PC Card Setup program's sign-on window appears. Click “Continue”.

11. The following dialog allows you to select the target directory. The default this path is “C:\IBM_ISDN”, but you can enter any other directory desired in the dialog. Once your entries are complete, click “Continue”.



12. In the next dialog, select the appropriate D-channel protocol for your ISDN line. For newer ISDN lines in Europe, select DSS1, the Euro-ISDN D-channel protocol. NI-1 and 5ESS are D-channel protocols used in the USA. 1TR6 is the older national D-channel protocol for Germany.

Although some older ISDN lines in Germany still use the D-channel protocol 1TR6, DSS1 is generally preferable. The 1TR6 protocol is no longer very common and may be removed from future driver releases for this adapter.

13. Once you have selected the appropriate D-channel protocol, click “Continue”.
14. The final dialog informs you which resources are used by the IBM International ISDN PC Card. Click “Continue” to complete the installation, then connect the ISDN cable.

Your IBM International ISDN PC Card is now ready to use with any CAPI 2.0-compliant software.

5.3 NDIS WAN CAPI Driver Installation in Windows 98

If you have not yet installed the CAPI 2.0-compliant device drivers, please return to the corresponding chapters and install them first.

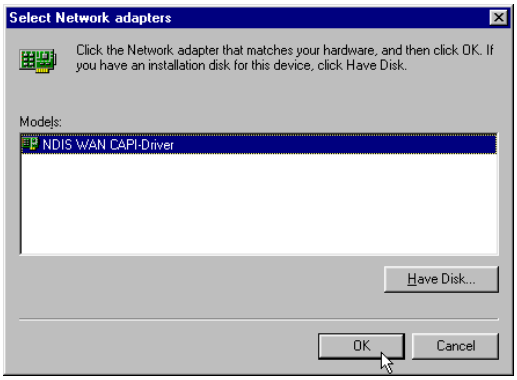
During installation you may be asked to specify the location of the NDIS WAN CAPI drivers a second time. In this case, simply enter the path to the driver source files again.

1. Insert the CD labeled “IBM International ISDN PC Card Installation Software” into your computer's CD-ROM drive.

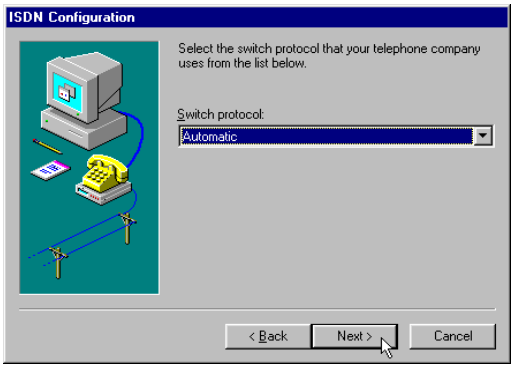
2. Click “Start / Settings / Control Panel” to open the Control Panel. Double-click the “Network” icon.
3. In the Network Configuration window, click “Add”.
4. In the “Select Network Component Type” dialog, click “Adapter”, then “Add”.
5. In the “Select Network Adapters” dialog, click “Have Disk”.

6. In the “Install From Disk” dialog, click the “Browse” button. Select the CD-ROM drive in the “Drives” list in the “Open” dialog, then browse to the path “TOOLS / NDISWAN / NDISWAN.W95”. Click “OK”. The updated NDIS drivers for Windows 98 are placed in the directory WIN98\NDIS.

7. Click “OK” to close the “Install From Disk”, “Select Network adapters”, and “Network” dialogs.

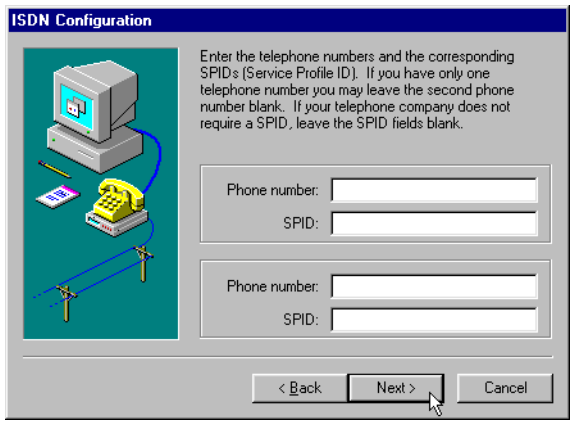


8. Windows 98 now starts the ISDN Configuration. Click the “Next” button. Leave the “Switch protocol” selection on “Automatic” and click “Next” again.



9. The next dialog prompts you for two phone numbers and the corresponding SPIDs. The SPID entries are applicable only in the USA and Canada. However, even if

you are in the USA or Canada, SPID entries are not mandatory. Leave these fields blank and click the “Next” button.



10. In the last dialog, click “Finish”.
11. Restart your computer when prompted to do so.

The NDIS WAN CAPI Drivers are now installed. You will also find the guide for the NDIS WAN CAPI Drivers as a Windows Help file on your Windows 98 desktop. This guide is only available in English.

6 Installing the Device Drivers in Windows® Millennium Edition

6.1 Outline of the Installation Process for Windows Millennium Edition

The device drivers for the IBM International ISDN PC Card are installed in two steps:

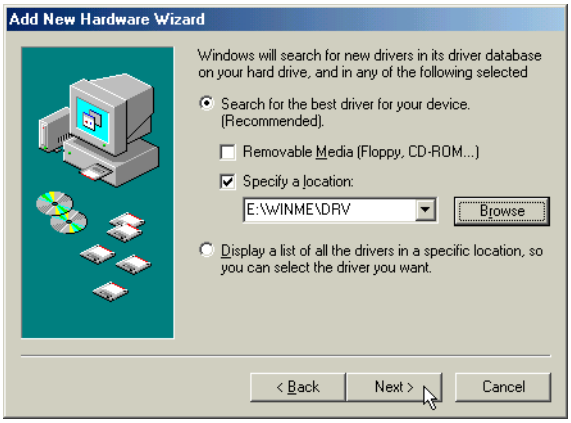
1. Install the CAPI 2.0-compliant device drivers
2. Install the NDIS WAN CAPI drivers

6.2 Installing the IBM International ISDN PC Card in Windows Millennium Edition

To install the IBM International ISDN PC Card in Windows Millennium Edition, proceed as follows:

1. Turn off the PC, choose a PCMCIA slot and insert the IBM International ISDN PC Card into this slot without the ISDN cable attached.
2. Turn the PC back on. The “New Hardware Wizard” appears and reports that it has detected an “ISDN-CARD”.
3. Now insert the CD labeled “IBM International ISDN PC Card Installation Software” into your computer's CD-ROM drive.
4. Since Windows Millennium Edition cannot find the proper driver for the adapter automatically, select the option “Specify the location of the driver (Advanced)” in the “Add New Hardware Wizard” window. Then click “Next”.

5. In the next dialog, click to remove the check mark next to the option “Removable Media (Floppy, CD-ROM,...)”, then click the “Browse” button. In the “Browse for Folder” dialog, select the CD-ROM drive and double-click the directory “WIN98”. Click “Next” to confirm your selection. The updated drivers for Windows Millennium Edition will be placed in the directory WINME\DRV.



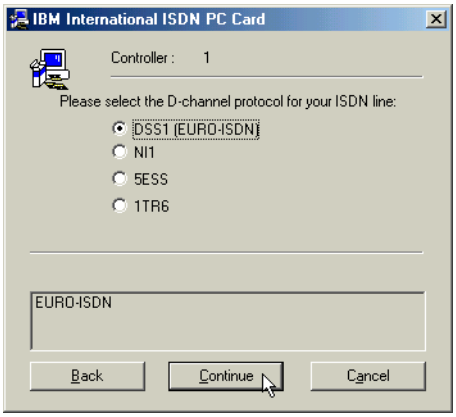
6. Now click the “Next” button to start the driver installation. Windows Millennium Edition copies a number of files to the hard disk. In the last “Add New Hardware Wizard” dialog, click “Finish”.

7. The next dialog informs you that the New Hardware Wizard is ready to install the drivers in English. Click “Continue”.

8. The IBM International ISDN PC Card Setup program's sign-on window appears. Click “Continue”.

9. The following dialog allows you to select the installation directory. The default installation directory is “C:\IBM_ISDN”, but you can enter any other directory desired in the dialog. Once your entries are complete, click “Continue”.

10. In the next dialog, select the appropriate D-channel protocol for your ISDN line. For newer ISDN lines in Europe, select DSS1, the Euro-ISDN protocol. NI-1 and 5ESS are D-channel protocols used in the USA. 1TR6 is the older national D-channel protocol for Germany.



Although some older ISDN lines in Germany still use the D-channel protocol 1TR6, DSS1 is generally preferable. The 1TR6 protocol is no longer very common and may be excluded from future driver releases for this adapter.

11. Once you have selected the appropriate D-channel protocol, click “Continue”.

12. The final dialog informs you which resources are used by the IBM International ISDN PC Card. Click “Continue” to complete the installation, then connect the ISDN cable.

Your IBM International ISDN PC Card is now ready to use with any CAPI 2.0-compliant software.

6.3 NDIS WAN CAPI Driver Installation in Windows® Millennium Edition

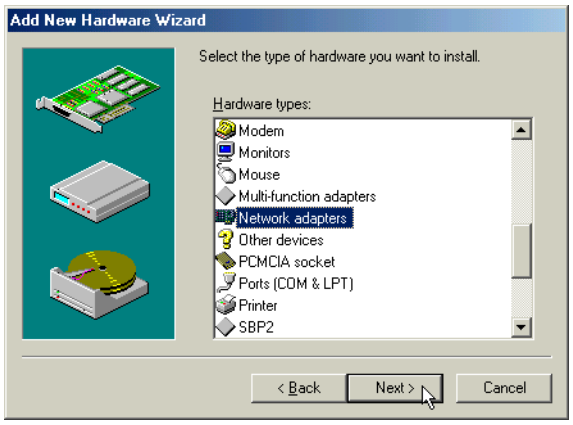
If you have not yet installed the CAPI 2.0-compliant device drivers, please return to the corresponding chapters and install them first.

To install the NDIS WAN CAPI Drivers in Windows Millennium Edition, proceed as follows:

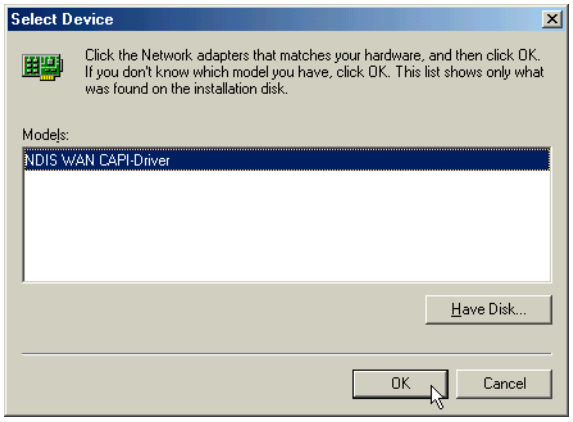
1. Click “Start / Settings / Control Panel”, then double-click the “Add New Hardware” icon.

2. In the “Add New Hardware Wizard”, click “Next” twice. In the next dialog you are asked whether you want Windows to search for new hardware. Select the option “No, I want to select the hardware from a list”, then click “Next”.

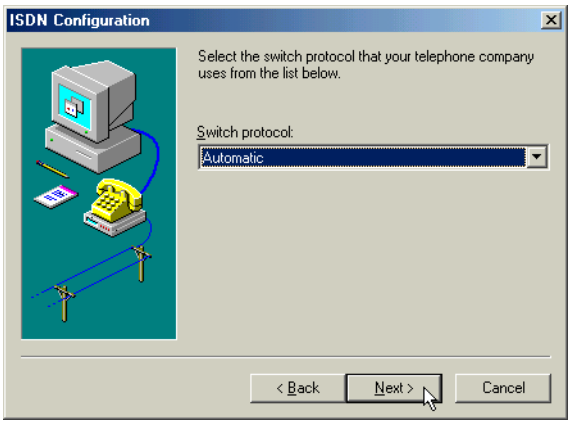
3. In the “Hardware types” dialog, select “Network adapters” and click on the “Next” button.



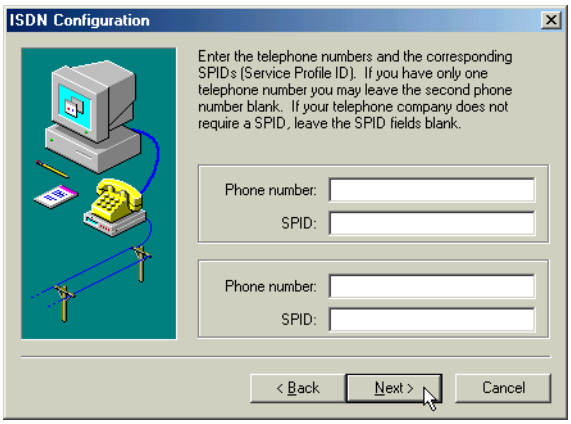
4. In the “Select Device” dialog, click “Have Disk”, then in the “Install From Disk” dialog, click “Browse”. Browse to the path “TOOLS / NDISWAN / NDISWAN.W95”. Click “OK”. In the next dialog, click “OK” again to install the “NDIS WAN CAPI Driver”. The updated NDIS drivers for Windows Millennium Edition will be placed in the directory WINME\NDIS.



5. In the “Add New Hardware Wizard” dialog, click “Finish”. Windows Millennium Edition now starts the ISDN Configuration. Click “Next”. Leave the “Switch protocol” selection at “Automatic” and click “Next” again.



6. The next dialog prompts you to enter two phone numbers and the corresponding SPIDs. The SPID entries are applicable only in the USA and Canada. However, even if you are in the USA or Canada, SPID entries are not mandatory. Leave these fields blank and click “Next”.



7. In the last dialog, click “Finish”.
8. Restart your computer when prompted to do so.

The NDIS WAN CAPI Drivers are now installed. You will also find the guide for the NDIS WAN CAPI Drivers as a Windows Help file on the desktop of your Windows Millennium Edition computer. This guide is only available in English.

7 Installing the Device Drivers in Windows® NT® 4.0 Workstation

Throughout this chapter it is assumed that you are logged on to the Windows NT 4.0 Workstation system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

The IBM International ISDN PC Card works under Windows NT 4.0 with CardWizard 5.10 or higher installed.

7.1 Outline of the Installation Process for Windows NT 4.0 Workstation

The device drivers for the IBM International ISDN PC Card are installed in two steps:

1. Install the CAPI 2.0-compliant device drivers
2. Install the NDIS WAN CAPI drivers

The following section explains in detail the prerequisites for the device driver installation.

7.2 Before You Begin

Before you begin installing the IBM International ISDN PC Card in Windows NT Workstation, you must have Service Pack 3 or higher installed. To check which Service Pack version is installed on your Windows NT 4.0 Workstation operating system, proceed as follows:

1. Click through the menus “Start / Programs / Command Prompt”. In the command prompt window, type **`WINVER`** and press “Return”. A window appears as illustrated below. In the illustration, the “About Windows NT” window shows that Service Pack 3 is installed.

2. Click “OK” to close this window, then type **`EXIT`** and press “Return” to close the command prompt window .

7.3 Checking the PCMCIA Support Software for Windows NT 4.0 Workstation

Some notebook manufacturers install PCMCIA support software, such as SystemSoft's® CardWizard(TM) as part of the Windows NT 4.0 Workstation package. IBM includes this program with its ThinkPad notebook series. This section briefly describes how to find out what version of CardWizard(TM) is installed, and how to remove it from the system if necessary.

The IBM International ISDN PC Card works either without SystemSoft's® CardWizard(TM) installed, or with CardWizard(TM) 5.10 or higher.

1. Start SystemSoft's® CardWizard(TM) by clicking “Start / Programs / CardWizard for Windows NT”.
2. Once SystemSoft's® CardWizard(TM) for Windows NT has started, click “Help / About CardWizard”. This opens a window indicating the version in use. If the version number is lower than 5.10, follow the following steps in order to remove it.

You can download a trial version of CardWizard(TM) 5.20 from IBM’s PCD support web page for the IBM International ISDN PC Card.

3. In order to remove the current installation of SystemSoft's® CardWizard(TM), click “Settings / Control Panel” in the Start menu to open the Control Panel. Doubleclick the “Add/Remove Programs” icon.

4. The first panel of the “Add/Remove Programs Properties” window contains an entry for “CardWizard for Windows NT”. Select this entry and then click the “Add/Remove...“ button.

5. In the “Confirm File Deletion” dialog, confirm that you want to remove CardWizard for Windows NT by clicking the “Yes” button. In the next dialog, confirm that you want to remove all files

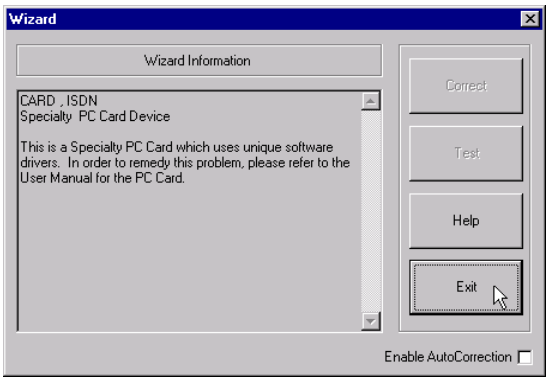
6. Once the removal of CardWizard (TM) has been completed, you are prompted to restart your system. Click “No”, since restarting your system at this point may cause problems. Instead, run the current Service Pack installation for your Windows NT 4.0 Workstation computer.

After the Service Pack has been installed again, your computer will restart. After the system has restarted, you may either install a newer version of SystemSoft's® CardWizard(TM) for Windows NT (see page 158), or install the drivers for the IBM International ISDN PC Card.

7.4 Installing the IBM International ISDN PC Card in Windows NT 4.0 Workstation

To install the IBM International ISDN PC Card in Windows NT 4.0 Workstation, proceed as follows:

1. Turn off the PC, choose a PCMCIA slot and insert the IBM International ISDN PC Card into this slot without the ISDN cable attached.
2. Turn your PC back on and insert the CD labeled “IBM International ISDN PC Card Drivers” into your computer’s CD-ROM drive.
3. If you have SystemSoft's® CardWizard(TM) 5.10 or higher installed on your notebook, the following message may appear. Click “Exit” to close this window and continue the installation as described below.



4. Double-click the “My Computer” icon on the Windows NT desktop, then double-click the CD-ROM icon. Double-click to open the “WINNT” folder. This folder con-

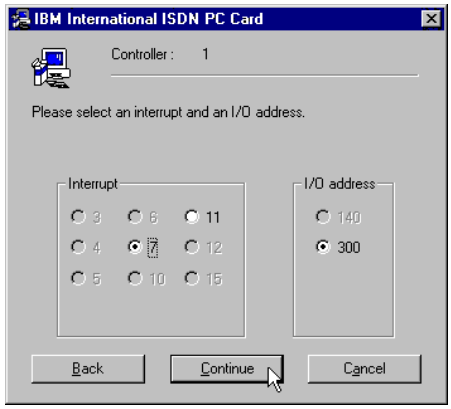
tains an icon called “Setup”. Double-click this icon this icon in order to start the installation. The updated drivers for Windows NT 4.0 will be placed in the directory WINNT\DRV.

5. The first dialog allows you to select the installation language. If the highlighted language selected is not the one desired, select the language you prefer and click “Continue ”.

6. The next window welcomes you to the installation procedure for the IBM International ISDN PC Card. Click “View Readme now” to read the latest information on the product, or “Continue” to proceed with installation of the CAPI 2.0 drivers for the IBM International ISDN PC Card.

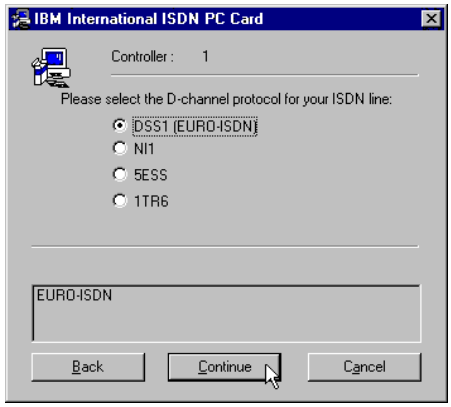
7. The next dialog allows you to specify the installation directory for the IBM International ISDN PC Card. The default installation directory is “C:\IBM_ISDN”. Click “Continue” to confirm this directory, or enter any other drive and path name as the installation directory for the drivers.

8. The next panel shows you what resources are available on your system and how many adapters you have installed. Since Windows NT 4.0 is not a plug-and-play operating system, assigning free resources is not a simple task.



Once you have selected the resources to use, click “Continue”.

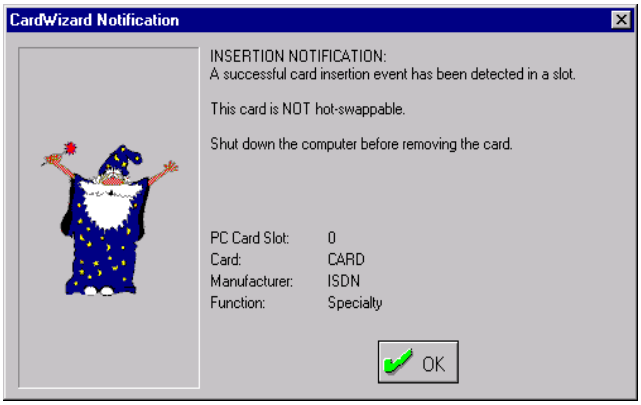
9. In the next dialog, select the appropriate D-channel protocol for your ISDN line. For newer ISDN lines in Europe, select DSS1, the Euro-ISDN D-channel protocol. NI-1 and 5ESS are D-channel protocols used in the USA. 1TR6 is the older national D-channel protocol for Germany.



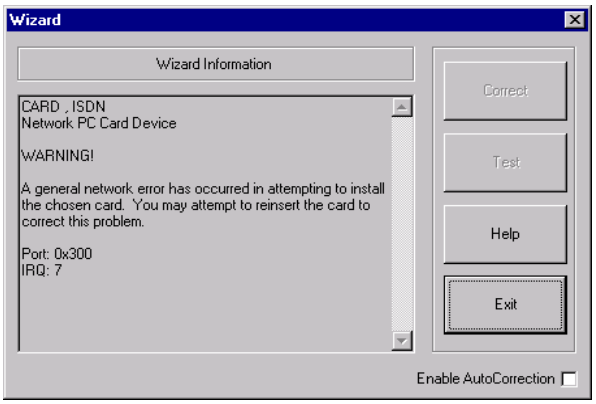
Although some older ISDN lines in Germany still use the D-channel protocol 1TR6, DSS1 is generally preferable. The 1TR6 protocol is no longer very common and may be removed from future driver releases.

10. Once you have selected appropriate D-channel protocol, click the “Continue” button.
11. The last dialog displays the selected adapter settings. Click “Continue” to complete the installation.
12. Once the installation has been completed, confirm that you want to restart the computer, then connect the ISDN cable.

If you have SystemSoft's® CardWizard(TM) for Windows NT 5.10 or higher installed, the software notifies you of the card insertion after the system has restarted.



With version 5.10 and some early version 5.20 releases of SystemSoft's® CardWizard(TM), the following warning message appears.



In this case, click “Exit” and select the entry for the adapter marked with a red X. Select the menu command “Actions / Stop”. Remove the adapter from the PCMCIA slot. Download the file “IBMISDN.REG” from IBM's PCD support web page for the IBM International ISDN PC Card.

Double-click the file and confirm that you want to update the Windows NT Registry by clicking “OK” when prompted. Now reinsert the adapter. This should eliminate the warning message.

The evaluation version of SystemSoft's® CardWizard(TM) 5.20 provided on the IBM International ISDN PC Card support web page does not exhibit this problem.

Your IBM International ISDN PC Card is now ready to use with any CAPI 2.0-compliant application software.

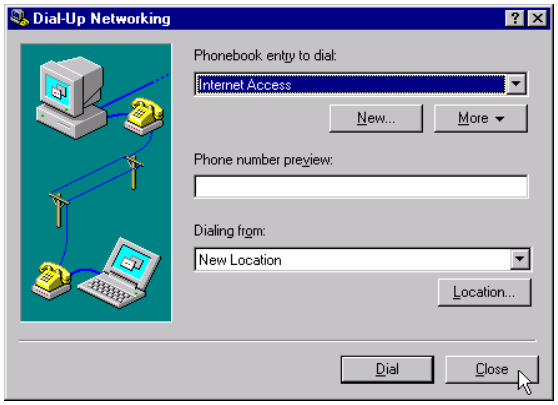
7.5 Checking and Installing Remote Access Service

7.5.1 Checking Whether Remote Access Service Is Installed

In order to install the NDIS WAN CAPI drivers, you must have Remote Access Service installed. In order to check whether Remote Access Service (RAS) is installed on your notebook computer, proceed as follows:

1. Double-click the “My Computer” icon on the Windows NT 4.0 Workstation desktop, then double-click “Dial-Up Networking”.

2. If the phone book appears, then RAS is properly installed on your computer and you can continue with the section “Installing the NDIS WAN CAPI Drivers”. If the phone book does not appear, perform the following steps to install RAS on your computer.

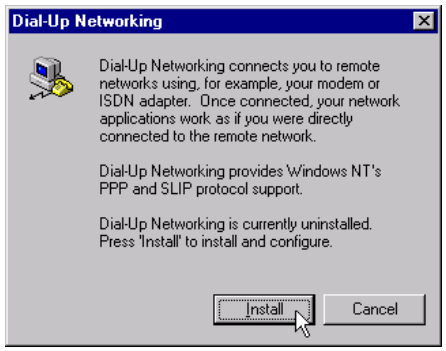


7.5.2 Installing Remote Access Service

Before you install Remote Access Service, check the User's Guide for your notebook to see whether your system has an integrated analog modem. If so, install the modem driver according to the instructions in the User's Guide, or contact the notebook manufacturer's technical support.

Also make sure that you have at least one physical COM port available in your Windows NT 4.0 Workstation system. Double-click the "Ports" applet in the Control Panel to obtain this information.

1. Double-click the "My Computer" icon on the Windows NT 4.0 Workstation Desktop, then double-click "Dial-Up Networking". If a dialog appears informing you that Dial-Up Networking is not installed on your system, then click "Install".

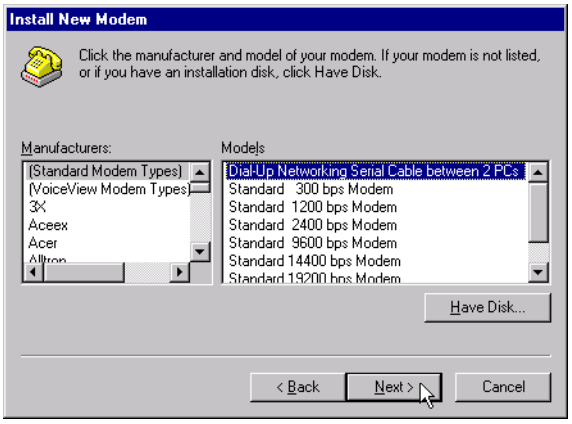


2. The "Files Needed" dialog prompts you for the source directory of your Windows NT 4.0 Workstation Setup files. Enter the correct path in the "Copy files from" field, then click "OK". Windows NT installs the necessary files.

3. Once these files have been installed, the RAS setup searches for a RAS-capable device. Click "OK" to start the modem installer.

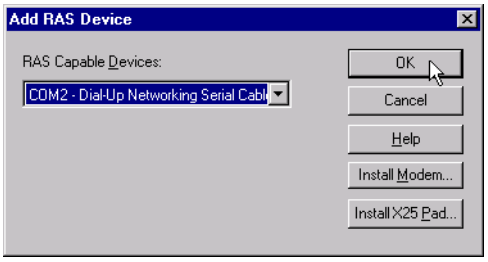
4. When the modem installer has started, check the option "Don't detect my modem; I will select it from a list", and click "Next". If you have an integrated analog mo-

dem, then follow the installation instructions provided by your computer manufacturer. Otherwise, select "(Standard Modem Types)" in the list of manufacturers, then "Dial-Up Networking Serial Cable between 2 PCs", and click "Next".

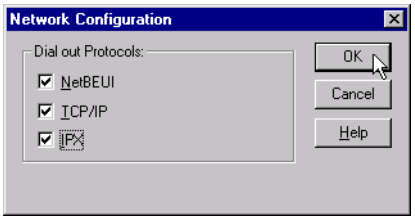


5. In the next window you must select a COM port to be assigned to the modem. Select a port and click "Next". You are then asked to enter your location information: the country you are in, the area code, and other details. Fill in the text fields and click "Next". In the last dialog, click "Finish".

6. The Dial-Up Networking installation now displays the "Add RAS Device" dialog. In the example illustrated below, the RAS device is the "Dial-Up Networking Serial Cable between 2 PCs" on COM 2. Click "OK".



7. The selected device is now displayed in the Setup dialog. Click “Continue”. Remote Access Setup informs you that no networking protocols have been installed. Click “OK”. In the “Network Configuration” dialog, select the network protocols you want to use. The TCP/IP protocol is usually sufficient. Click “OK”.



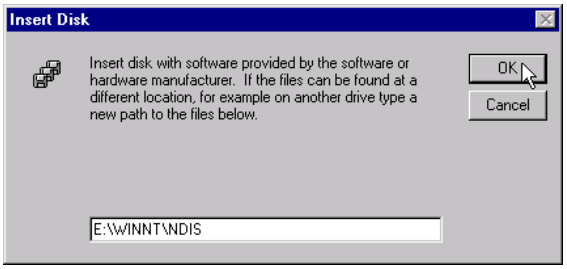
8. Now click “Continue” again. When you are prompted to restart your computer, click “Do Not Restart”. Instead, reinstall the current Service Pack before restarting. This will help you to avoid problems afterwards.

After restarting, your system is ready for the NDIS WAN driver installation.

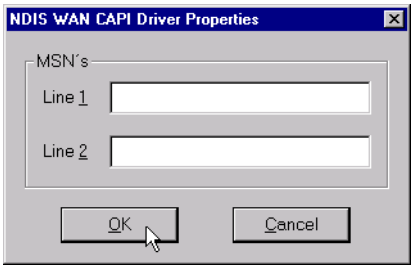
7.6 Installing the NDIS WAN CAPI Drivers

1. Click “Start / Settings / Control Panel” and double-click the “Network” icon.

2. Click the “Adapters” tab, then the “Add” button. In the “Select Network Adapter” dialog, click “Have Disk”. In the “Insert Disk” dialog, enter the complete path to the NDIS driver location. The NDIS WAN CAPI Drivers are located on the CD in the directory \TOOLS\NDISWAN\NDISWAN.NT. If your CD-ROM drive has the letter E, for example, enter the path E:\TOOLS\NDISWAN\NDISWAN.NT. Then click “OK”.

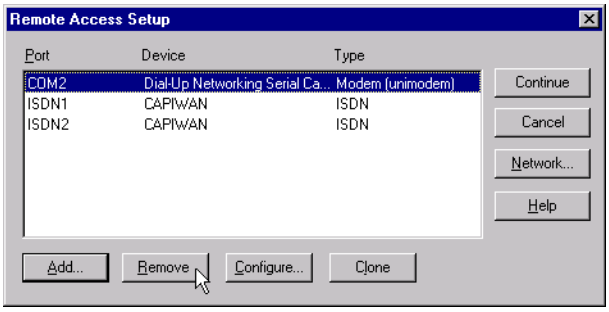


3. Click “OK” again in the “Select OEM Option” dialog. In the “NDIS WAN CAPI Driver Properties” dialog you can enter the desired MSNs (Multiple Subscriber Numbers) of your ISDN line for each B-channel. You may also leave these fields blank for now and click “OK”. You can add an MSN setting later.

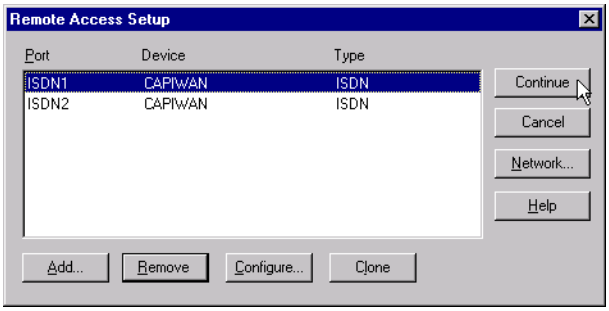


4. Once the NDIS WAN CAPI Driver installation has been completed and you have clicked “OK”, Setup starts the Remote Access Setup utility. Click “Add” and install the “ISDN1 - CAPIWAN” device by clicking “OK”. Repeat this step again to install the “ISDN2 - CAPIWAN” device.

5. If you have installed the “Dial-Up Networking Serial Cable between 2 PCs”, you can now remove it from RAS by selecting it in the list and clicking “Remove”.



6. Now click “Continue“ to complete the installation. Click “Close” in the “Network” Control Panel applet window. Restart your computer when prompted to do so.



The installation of the NDIS WAN CAPI Drivers has now been successfully completed. On the Windows NT 4.0 Workstation Desktop you will find a Help file for the NDIS WAN CAPI Drivers. This file is available in English only.

8 Installing the Device Drivers in Windows® 2000 Professional

The IBM International ISDN PC Card is fully compatible with Windows 2000 and is listed on the Windows 2000 HCL.

Windows 2000 is the direct successor to Windows NT 4.0 and behaves similarly to its predecessor. However, Windows 2000 is a plug-and-play operating system.

Throughout this chapter it is assumed that you are logged on to a Windows 2000 Professional system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

Note that the drivers provided on the CD have not been digitally signed by Microsoft. The updated drivers for Windows 2000 from the IBM International ISDN PC Card support web page are digitally signed. Note that the updated drivers no longer support the German ISDN D-channel protocol 1TR6.

8.1 Outline of the Installation Process for Windows 2000 Professional

Proceed as follows to install the device drivers in Windows 2000 Professional:

The device drivers for the IBM International ISDN PC Card are installed in one step.

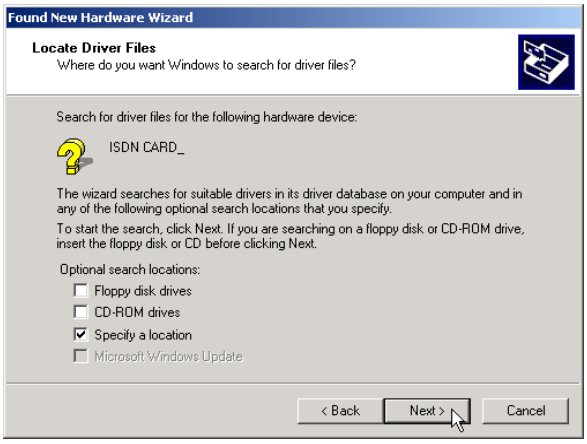
No separate installation is required for the NDIS WAN CAPI Driver: it is installed automatically with the CAPI 2.0-compliant device driver.

8.2 Installing the Device Drivers in Windows 2000 Professional

To install the device drivers in Windows 2000 Professional, proceed as follows:

1. Turn off the PC, choose a PCMCIA slot and insert the IBM International ISDN PC Card into this slot without the ISDN cable attached.
2. Turn the PC back on. The “Found New Hardware” dialog appears and reports that an “ISDN CARD_” was detected.
3. Now insert the CD labeled “IBM International ISDN PC Card Drivers” into your computer's CD-ROM drive.
4. The “Found New Hardware” Wizard now appears. Click the “Next” button to start the driver installation. The following dialog informs you that “this Wizard will complete the installation for this device: ISDN CARD_.” Make sure that the option “Search for a suitable driver for my device” is activated, then click the “Next” button.

5. The next dialog helps you to locate the drivers for the new adapter. By default Windows 2000 searches on the hard disk and CD-ROM drives. This may result in Windows 2000 Professional finding the wrong driver file on the CD. To avoid this, deactivate the options “Floppy disk drives” and “CD-ROM drives”, and activate the option “Specify a location”. Click the “Next” button.



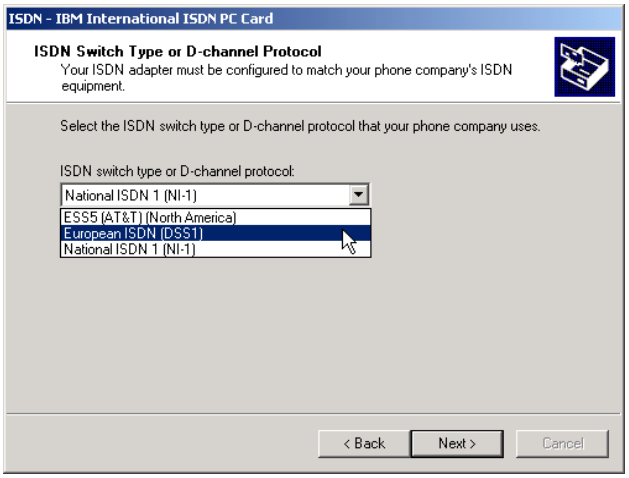
6. Windows 2000 Professional displays a smaller dialog for the the driver source. Click the “Browse” button, then double-click the “WIN2000” folder on the CD. Se-

lect the file “fpcm” and click “Open”. The updated drivers for Windows 2000 Professional are placed in the directory WIN2000\DRV.

7. This returns you to the previous dialog, which now displays the correct source drive and directory are displayed. Click “OK”.

8. The “Found New Hardware Wizard” informs you that appropriate drivers have been found. Click the “Next” button. Windows 2000 begins the driver installation.

9. When the “ISDN - IBM International ISDN PC Card” Setup window appears with the subtitle “ISDN Switch Type or D-channel Protocol”, select the appropriate protocol for your ISDN line. For newer ISDN lines in Europe, select “European ISDN (DSS1)”, the Euro-ISDN D-channel protocol. NI-1 and 5ESS are D-channel protocols used in the USA.



10. Once you have selected the appropriate D-channel protocol, click the “Next” button. If you selected Euro-ISDN, you may now enter MSNs (Multiple Subscriber Numbers). These are numbers used to identify individual ISDN terminal devices such as telephones, computers, etc. when more than one device is connected to your ISDN line. (Due to an abbreviation error in Win-

dows 2000, the term "Multiple Subscriber Numbers" may have been changed to "Multisubscriber Numbers". Please make your entries in the relevant fields despite this incorrect designation.)

11. The “Found New Hardware Wizard” informs you when the installation has been completed. Then click “Finish” to conclude the installation.

12. Once the installation has been completed, connect the ISDN cable.

9 Installing the Device Drivers in Windows® XP Home Edition and Professional

Windows XP is the direct successor to Windows 2000 and behaves similarly to its predecessor.

Windows XP uses the same driver architecture as Windows 2000. You can therefore install the Windows 2000 drivers from the ISDN PC Card CD.

Note that the drivers provided on the CD have not been digitally signed by Microsoft. The updated drivers for Windows 2000 from the IBM International ISDN PC Card support web page are digitally signed. Note that the updated drivers no longer support the German ISDN D-channel protocol 1TR6.

9.1 Outline of the Installation Process for Windows XP Home Edition and Professional

The device drivers for the IBM International ISDN PC Card are installed in one step: install the CAPI 2.0-compliant device drivers.

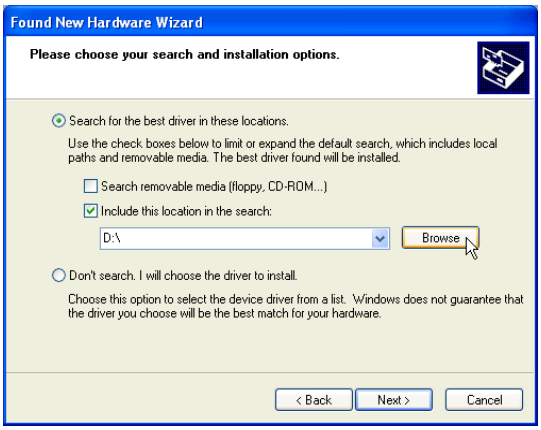
No separate installation is required for the NDIS WAN CAPI Driver: it is installed automatically with the CAPI 2.0-compliant device driver.

9.2 Installing the Device Drivers in Windows XP Home Edition and Professional

To install the device drivers in Windows XP Home Edition and Professional, proceed as follows:

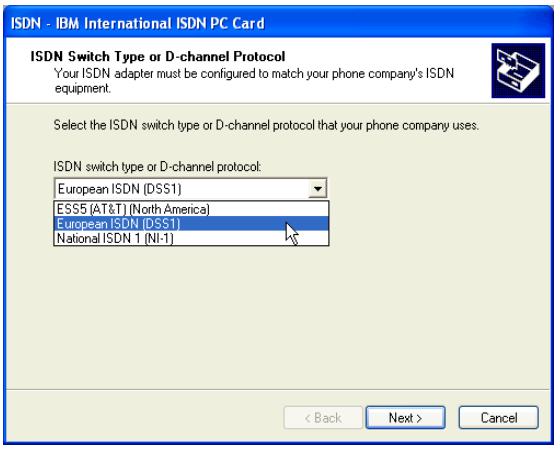
1. Turn off the PC, select a PCMCIA slot and insert the IBM International ISDN PC Card into this slot without the ISDN cable attached.
2. Turn the PC back on. The “Found New Hardware” dialog appears and reports that an “ISDN CARD_” was detected.
3. Now insert the CD labeled “IBM International ISDN PC Card Installation Software” into your computer's CD-ROM drive of your computer. Then select the option “Install from a list or specific location (Advanced)” and click on “Next”.

4. In the next dialog, select the option “Search for the best driver in these locations” and make sure that only the checkbox “Include this location in the search” is activated. Then click “Browse”.



5. In the “Browse For Folder” dialog, select the CD-ROM drive and then double-click the “WIN2000” directory on the CD-ROM, which contains the Windows 2000 drivers. Then click “OK” to close the “Browse For Folder” dialog, then click “Next”. The updated drivers for Windows XP Home Edition and Professional are placed in the directory WINXP\DRV.

6. Windows XP now copies all the necessary device driver files. After Windows XP has finished copying the files, the D-channel switch protocol selection dialog appears. Select the appropriate protocol for your ISDN line. For newer ISDN lines in Europe, select “European ISDN (DSS1)”, the Euro-ISDN D-channel protocol. NI-1 and 5ESS are D-channel protocols used in the USA.



7. Once you have selected the appropriate D-channel protocol, click the “Next” button. If you selected Euro-ISDN, the MSN (Multiple Subscriber Number) configuration dialog appears. (Due to an abbreviation error in Windows 2000, the term "Multiple Subscriber Numbers" may have been changed to "Multisubscriber Numbers". Please make your entries in the relevant fields despite this incorrect designation.)
   If you selected one of the North American D-channel switching protocols (5ESS or NI-1), the SPID configuration dialog appears. Enter the numbers for your line and click on “Next”.

8. The “Found New Hardware Wizard” informs you when the installation has been completed. Then click “Finish” to conclude installation.

9. Once the installation has been completed, connect the ISDN cable.

Your IBM International ISDN PC Card is now ready to use with any CAPI 2.0-compliant application software.

10 Configuration and Diagnostics of the IBM International ISDN PC Card

This chapter briefly describes how to change the D-channel protocol (also called the switch type), how to change MSNs, and how to diagnose problems with the adapter.

No diagnostics tool is available for Windows 2000 Professional and Windows XP.

When you travel to another country outside Europe, it may be necessary to change the adapter's D-channel protocol, also known as the switch type. The IBM International ISDN PC Card supports the following D-channel protocols:

- Euro-ISDN (DSS1)
- NI-1
- 5ESS

Euro-ISDN is used all over Europe, Australia and New Zealand. NI-1 and 5ESS are North American switch types.

In the USA, Canada, Australia, or New Zealand, the IBM International ISDN PC Card cannot be connected directly to the ISDN line. To use this adapter in these countries, an NT1 adapter is required to convert the U interface provided in these countries to the S/T interface used in Europe.

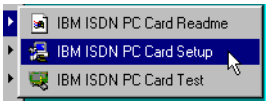
Make sure that you purchase an NT1 with the capability to convert the U interface to a S/T interface.

10.1 Changing the Switch Type

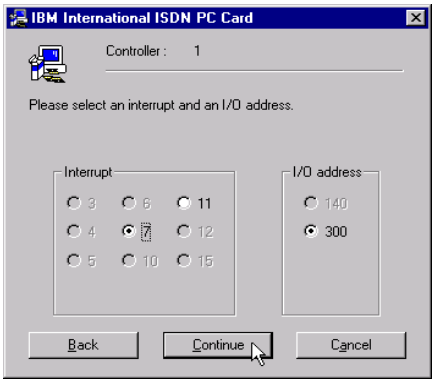
10.1.1 Changing the Switch Type in Windows 95, Windows 98, Windows Millennium Edition, Windows NT 4.0 Workstation

Windows NT 4.0 Workstation Users:
The following section assumes that you are logged on to a Windows NT 4.0 Workstation system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

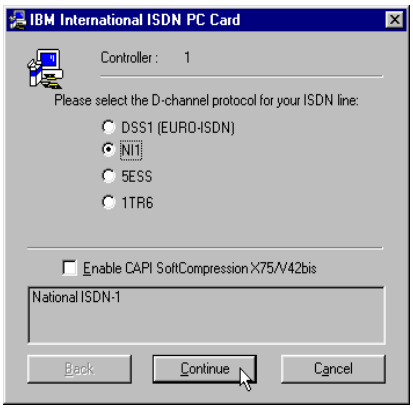
1. Click “Start / Programs / IBM ISDN PC Card” and then “IBM ISDN PC Card Setup” to start the configuration tool.



Windows NT 4.0 Workstation: The first dialog allows you to change the system resources used by the adapter (interrupt and I/O address). Change the resources or simply click “Continue”. The next dialog allows you to select the switch type.



2. Select the desired switch type and then click “Continue”. The next window informs you about the new adapter configuration.



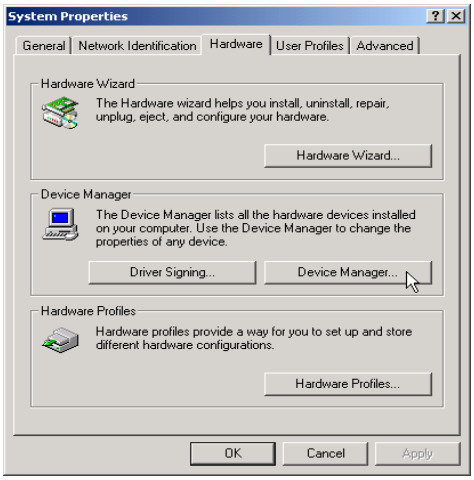
3. Click “Continue” again. In order to activate the selected switch type you must restart your computer.

If you activated either of the North American switch types NI-1 and 5ESS, two dialogs appear prompting you to enter two directory numbers (DN) and the corresponding service profile identifiers (SPID). This information must be obtained from your ISDN service provider (telephone company).

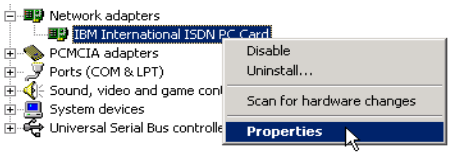
10.1.2 Changing the Switch Type in Windows 2000 Professional

The following section assumes that you are logged on to a Windows 2000 Professional system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

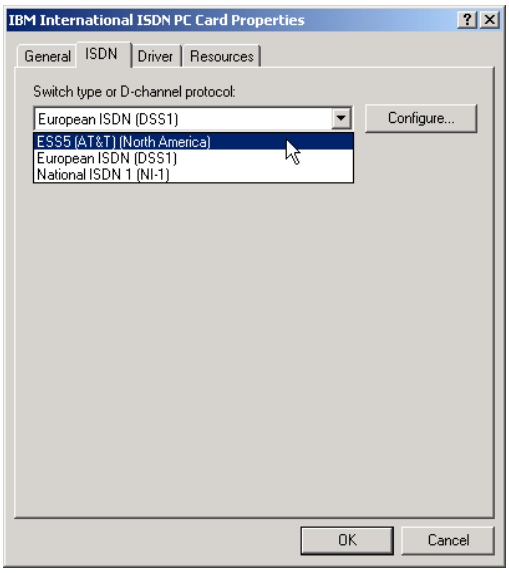
1. Click “Start / Settings / Control Panel” to open the Control Panel. Double-click the “System” icon.
2. Click the “Hardware” tab, then the “Device Manager” button.



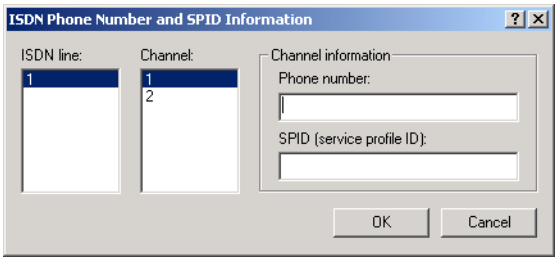
3. Click the plus sign to expand the “Network adapters” node, then right-click “IBM International ISDN PC Card”.
4. In the context menu, click the “Properties” command.



5. In the “IBM International ISDN PC Card Properties”, click the “ISDN” tab, then select the desired switch type.



If you activated either of the North American switch types NI-1 and 5ESS, you must configure the directory numbers and SPIDs separately. Do this by clicking "Configure" in the "IBM International ISDN PC Card Properties" dialog (see the illustration above). The following dialog appears in which you can select the ISDN line and where you enter both the directory number (in the "Phone number" field) and the SPID. When you have done so, click "OK" to save the settings. The directory numbers and SPIDs for your ISDN line must be obtained from your ISDN service provider (telephone company).



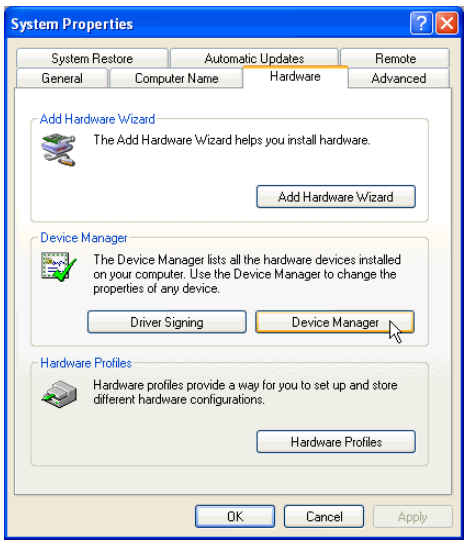
6. Click "OK" and then restart the computer.

10.1.3 Changing the Switch Type in Windows XP Home Edition and Professional

1. Click “Start / Control Panel” to open the Control Panel.

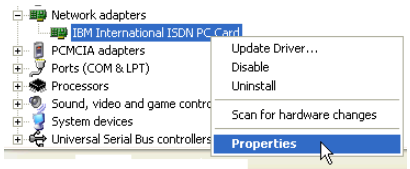
2. Double-click the icon labeled “Performance and Maintenance”.

   In the window that appears, double-click the “System” icon to open the “System Properties”. Click the “Hardware” tab, then the “Device Manager” button.

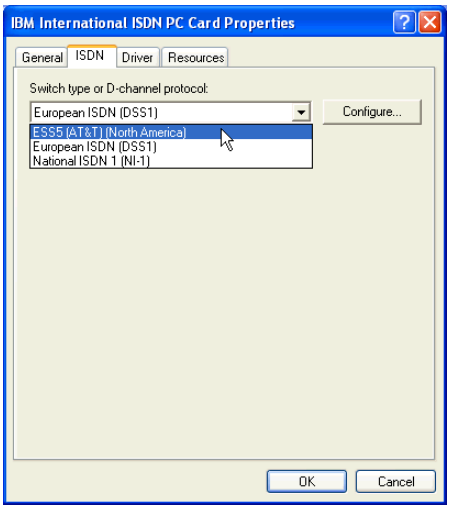


3. Click the plus sign to expand the “Network adapters” node, then right-click “IBM International ISDN PC Card”.

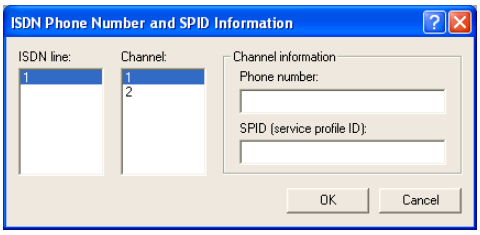
4. In the context menu, click the “Properties” command.



5. In the “IBM International ISDN PC Card Properties”, click the “ISDN” tab, then select the desired switch type.



If you activated either of the North American switch types NI-1 and 5ESS, you must configure the directory numbers and SPIDs separately. Do this by clicking “Configure” in the “IBM International ISDN PC Card Properties” dialog (see the illustration above). The following dialog appears in which you can select the ISDN line and where you enter both the directory number (in the “Phone number” field) and the SPID. When you have done so, click “OK” to save the settings. The directory numbers and SPIDs for your ISDN line must be obtained from your ISDN service provider (telephone company).



6. Click “OK” and then restart the computer.

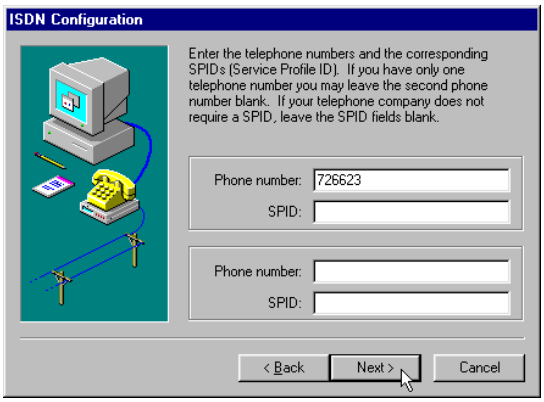
10.2 Configuring Multiple Subscriber Numbers (MSNs)

10.2.1 Windows 95, Windows 98, Windows Millennium Edition

The following section describes how to add or change the configuration of Multiple Subscriber Numbers in the NDIS WAN CAPI driver. Although MSNs can be configured in the driver, it is strongly recommended that you enter MSN settings only in applications that require them. You must have the NDIS CAPI WAN drivers installed in order to perform the following steps. Note that MSNs are a feature of the Euro-ISDN (DSS1) switch protocol only!

If you are using Windows 95, it is assumed that you have installed the Microsoft Dial-Up Networking 1.3 update on your computer. If not, please refer to the Windows 95 driver installation section of this User guide.

1. Click “Start / Programs / Accessories /Communications” and start the “ISDN Configuration Wizard” .
2. In the first ISDN Configuration Wizard dialog, click “Next”. In the next section, leave the “Switch protocol” set to “Automatic” by clicking “Next” again. In the next dialog, enter an MSN in either or both of the “Phone number” fields. When you have done so, click “Next”.



3. In the last dialog, click “Finish”. This completes the MSN configuration.

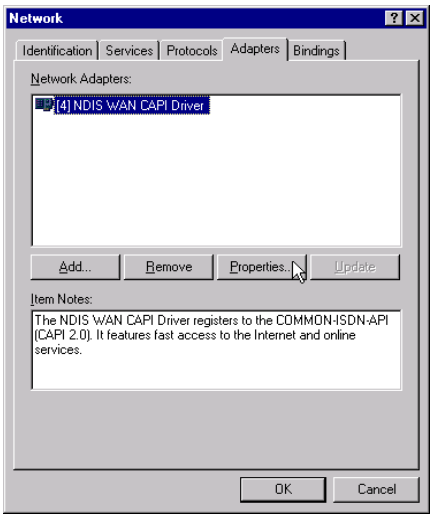
Since the Windows operating systems are a US software product, the ISDN Configuration Wizard is also tailored to the US market. When entering an MSN in the Wizard, you can ignore the SPID fields, which are only used in North America. If you encounter any problems with your application software after entering an MSN, remove the MSN settings in the same way as described above, then enter MSN settings in any application software that requires them!

10.2.2 Windows NT 4.0 Workstation

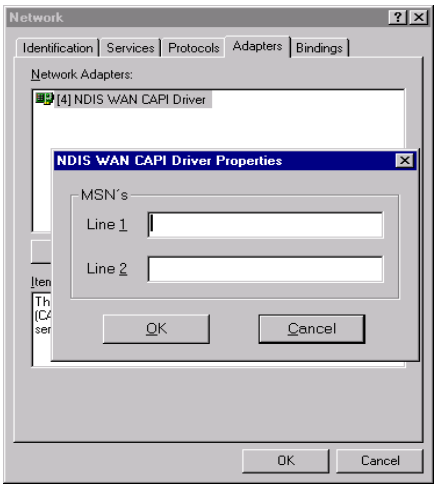
Throughout this chapter it is assumed that you are logged on to a Windows NT 4.0 Workstation system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

The following section describes how to add or change the configuration of Multiple Subscriber Numbers in the NDIS WAN CAPI driver. Although MSNs can be configured in the driver, it is strongly recommended that you enter MSN settings only in applications that require them. You must have the NDIS CAPI WAN drivers installed in order to perform the following steps. Note that MSNs are a feature of the Euro-ISDN (DSS1) switch protocol only!

1. Click “Start / Settings / Control Panel”. Double-click the “Network” icon.
2. In the Network Settings dialog, click the “Adapters” tab, select the “NDIS WAN CAPI Driver”, and then click “Properties”.



3. In the Properties dialog, enter the MSNs for each line and click “OK”, then “Close”.



4. When prompted to restart your computer, click “Yes”.

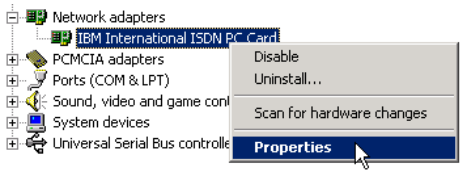
If you encounter any problems with your application software after entering an MSN, remove the MSN settings in the same way as described above, then enter MSN settings in any application software that requires them!

10.2.3 Windows 2000 Professional

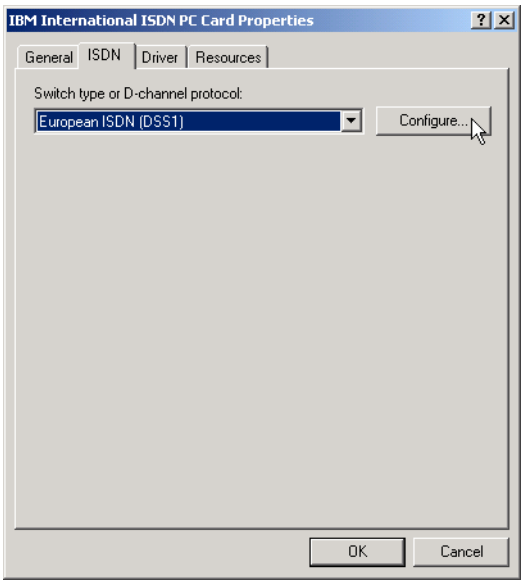
Throughout this chapter it is assumed that you are logged on to a Windows 2000 Professional system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

The following section describes how to add or change the configuration of Multiple Subscriber Numbers in the NDIS WAN CAPI driver. Although MSNs can be configured in the driver, it is strongly recommended that you enter MSN settings only in the applications that require them. You must have the NDIS CAPI WAN drivers installed in order to perform the following steps. Note that MSNs are a feature of the Euro-ISDN (DSS1) switch protocol only!

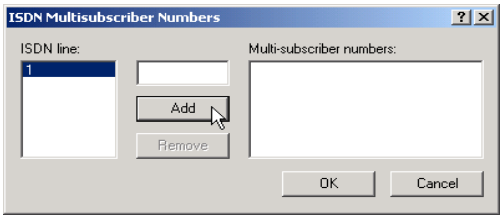
1. Click “Start / Settings / Control Panel”. Double-click the “System” icon. Click the “Hardware” tab, then the “Device Manager” button. Click the plus sign to expand the “Network adapters” node, then right-click the “IBM International ISDN PC Card”. In the context menu, select the “Properties” command.



2. In the “IBM International ISDN PC Card Properties”, click the “ISDN” tab, and then the “Configure” button.



3. In the dialog that appears, enter an MSN in the field above the “Add” button. Click the “Add” button. You can enter more than two MSNs in this dialog. You should not add more than eight MSNs, however, since the number of MSNs is limited in Euro ISDN.



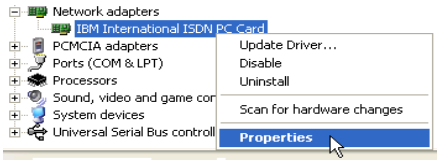
4. When you have finished, click “OK”.

If you encounter any problems with your application software after entering an MSN, remove the MSN settings by selecting each MSN individually in the “Multisubscriber number” list and clicking “Remove”. Then enter MSN settings in any application software that requires them!

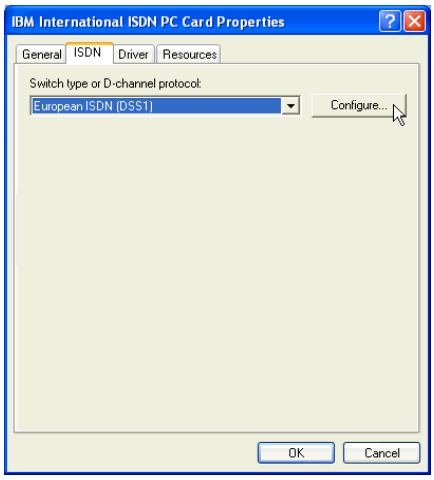
10.2.4 Windows XP Home Edition and Professional

The following section describes how to add or change the configuration of Multiple Subscriber Numbers in the NDIS WAN CAPI driver. Although MSNs can be configured in the driver, it is strongly recommended that you enter MSN settings only in the applications that require them. You must have the NDIS CAPI WAN drivers installed in order to perform the following steps. Note that MSNs are a feature of the Euro ISDN (DSS1) switch protocol only!

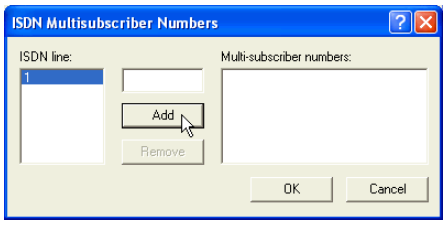
1. Click “Start / Control Panel”. Double-click the “Performance and Maintenance” icon. Double-click the “System” icon. In the “System Properties”, click the “Hardware” tab, then the “Device Manager” button. In the list of devices, scroll down to “Network adapters” and click the plus sign beside it to expand the node. Right-click the “IBM International ISDN PC Card”. In the context menu, select the “Properties” command.



2. In the “IBM International ISDN PC Card Properties”, click the “ISDN” tab, then the “Configure...” button.



3. In the dialog that appears, enter an MSN in the field above the “Add” button. Click the “Add” button. You can enter more than two MSNs in this dialog. You should not add more than eight MSNs, however, since the number of MSNs is limited in Euro ISDN.



4. When you have finished, click “OK”.

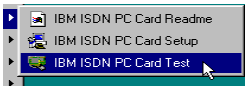
If you encounter any problems with your application software after entering an MSN, remove the MSN settings by selecting each MSN individually in the “Multisubscriber number” list and clicking “Remove”. Then enter MSN settings in any application software that requires them!

10.3 Running the Diagnostics in Windows 95/98/Millennium Edition und Windows NT 4.0 Workstation

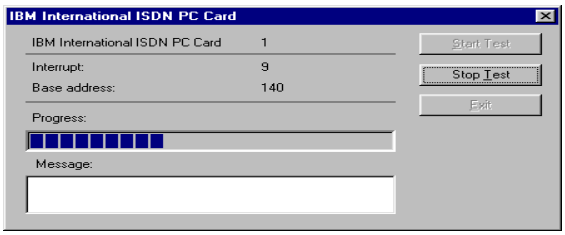
Windows NT 4.0 Workstation Users:
The following section assumes that you are logged on to a Windows NT 4.0 Workstation system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

There is no diagnostics tool available for Windows 2000 Professional or Windows XP!

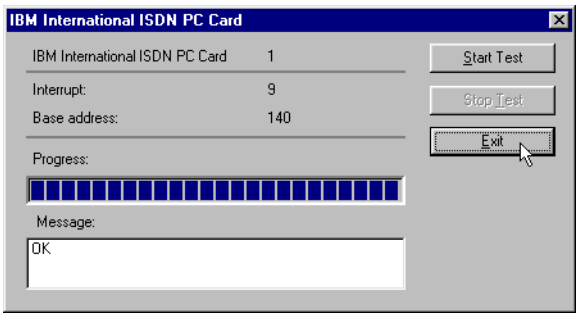
1. Click “Start / Programs / ISDN PC Card”, then click “ISDN PC Card Test”. If you are using Windows 95, Windows 98, or Windows Millennium Edition, a message informs you that CAPI will no longer be available after testing until you restart your computer. This is not the case in Windows NT 4.0, since services can automatically be restarted without restarting the system.



2. Click “Yes” perform the diagnostic tests.



3. The diagnostics program then reports that the tests were completed. Click “OK” again.
4. Click “Exit” to close the diagnostics program.



Windows 95, Windows 98, and Windows Millennium Edition users must complete the following steps in order to restart the IBM International ISDN PC Card's CAPI 2.0 driver.

5. A message informs you that CAPI is no longer available. Click "OK".
6. To reactivate CAPI, confirm that you want to restart your computer by clicking "Yes".

11 Implementations of the IBM International ISDN PC Card

This chapter contains instructions for using the IBM International ISDN PC Card with certain software products.

This chapter only outlines briefly how to use certain software products together with the IBM International ISDN PC Card. It cannot cover all possible situations. If you encounter problems of any kind, you should also consult the software product's manual.

You may notice that some of the screen shots in this chapter do not exactly match the dialogs displayed on your screen. This may be due to minor differences between Windows 95 and Windows 98, for example. The screen shots included here are only intended to illustrate the basic principles of the setup procedures.

In some sections of this chapter you may notice that screen shots are only included in English. This due to the fact that the software in question was only available in English at the time this guide was created.

This chapter is provided for your convenience only. It provides some examples of how to use the IBM International ISDN PC Card with certain software. IBM will not provide any assistance for this chapter, nor will IBM accept any responsibility for damages or losses of any kind related to the use of this chapter.

If not otherwise stated, the examples cover all versions of the Windows operating system: Windows 95, Windows 98, Windows Millennium Edition, Windows NT 4.0 Workstation, Windows 2000, and Windows XP.

11.1 Installing cFos

To use the IBM International ISDN PC Card with application software that is not CAPI 2.0-compliant, IBM recommends that you download, purchase and use cFos. For further assistance with cFos, please see one of the following web pages:

URL	Page content
http://www.cfos.com	cFos main entry page
http://www.cfos.com/index2.htm	cFos home page in German
http://www.cfos.com/index2_e.htm	cFos home page in English

11.1.1 Introduction: What is cFos?

If you have successfully installed the CAPI 2.0-compliant drivers for the IBM International ISDN PC Card, your system is now equipped with the CAPI 2.0 interface. This means you can use CAPI 2.0-compliant ISDN communications software directly, such as AVM's FRITZ!, Symantec's WinFax PRO 9.0, PC Anywhere 9.x, and many others. A list of CAPI 2.0-compliant software products can be found in the World Wide Web at

`http:www.capi.org/cgi/sinfo.pl`

However, many programs are not CAPI 2.0-compliant, including AOL 5.0, the CompuServe 4.0 dialer and other applications. By installing cFos you can equip your computer with a set of drivers that simulate analog modems, but communicate over the digital ISDN line. In other words, cFos installs a set of virtual modems which allow you to use practically any software designed to communicate with a modem.

In principle, cFos inserts an additional layer between the application you use and the CAPI 2.0 interface. It interprets the modem communication program's AT commands and converts them into CAPI 2.0-compliant API calls, thus allowing software which was not designed for ISDN communication to use your ISDN line.

The CAPI 2.0 interface is not restricted to Europe – it works all over the world!

11.1.2 Prerequisites for the cFos Installation and Additional Tips

Before you can install cFos, the device drivers for the IBM International ISDN PC Card must be installed in your system. Please read the corresponding chapters in this User's Guide to install the device drivers for the IBM International ISDN PC Card.

Tips

1. The following installation sections contain instructions for installing cFos. In the cFos Setup program, you may find that almost all COM ports have been selected by default. When configuring these settings, observe the following:

   – Avoid selecting COM1 and COM2 if possible. Selecting these ports may cause conflicts. The safest method is to select only COM ports above COM4, unless your application program only supports COM1 to COM4. If this is the case, try to use either COM4 (recommended) or COM3 (if you have no alternative).

   – Activating all COM ports will consume a considerable amount of system memory. Try to use cFos with only as many COM ports as you actually need. No more than two or three COM ports are recommended.

   – Using cFos with all the available COM ports results in a very large status window.

   – If you use both an analog modem and the IBM International ISDN PC Card, and you have selected all COM ports in the cFos Setup–that is, COM1 to COM9 are all configured for use by cFos–then your analog modem may be assigned the next free COM port available, such as COM10. It is strongly recommended that you install the analog modem first and assign it a free COM port between COM1 and COM4. Then install the IBM International ISDN PC Card, followed by cFos.

– You may be able to assign two different cFos modem emulations the same COM port–assigning both "cFos ISDN, FAX via CAPI" and "cFos ISDN, Internet, Sync PPP over HDLC" to COM5 for example–and then use the two virtual modems in alternation.

This practice is not recommended, however, since it may cause problems in cFos. If possible, avoid configurations with shared COM ports!

2. When using SystemSoft's CardWizard under Windows 95, the CardWizard software may not be able to detect the IBM International ISDN PC Card properly. Removing and reinserting the ISDN PC Card allows CardWizard to detect it. However, this may result in cFos becoming unavailable. For this reason it is therefore strongly recommended that you remove SystemSoft's CardWizard from your system before installing the IBM International ISDN PC Card.

3. During the installation you may enter an MSN, although this is not required. However, if your ISDN line is a PBX extension, cFos may be unable to dial. In this case, reconfigure cFos to use an MSN. This problem is due to a limitation of some currently available ISDN PBX systems.

4. In all versions of Windows, the cFos installer also automatically installs the modem emulations "cFos ISDN, Internet, Sync PPP over HDLC" and the "cFos ISDN, Internet, add. Sync PPP over HDLC" by default. Select at least two COM ports during the cFos installation.

5. You may find that some software applications install a set of drivers called the CAPI Port Driver. The CAPI Port Driver is similar to cFos, but offers fewer functions and features. This is not a problem: cFos and the CAPI Port Driver can coexist on a Windows computer.

11.1.3 Windows 95, Windows 98, Windows Millennium Edition

Before installing cFos, please read the chapter "Prerequisites for the cFos Installation and Additional Tips" on page 82 for additional information.

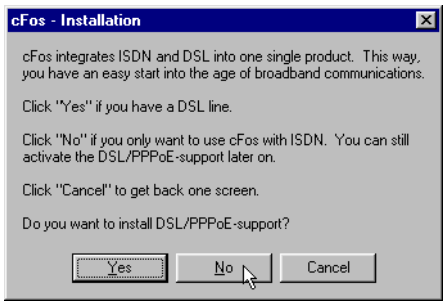
If you plan to use only CompuServe 2000 on your system, you may not need to install cFos at all. For further information please see the chapter "Using CompuServe" on page 127.

1. Download cFos for Windows. The current version 3.81 is contained in the file cfw_381.exe. Double-click the file "cfw_381" to start installing the software.

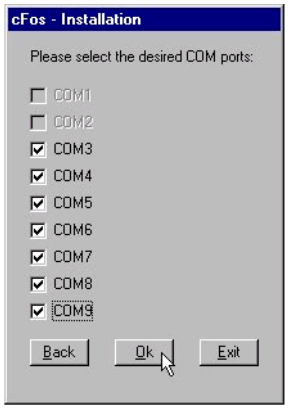
   If you download cFos in the file "cfw_381.zip", extract its contents and run the program SETUP32.EXE.

2. The first dialog asks whether you want to install, remove, or configure cFos. Click "Install cFos". Read the license agreement, select the option "I agree", and click "Next".
   The license agreement is presented in both German and English.

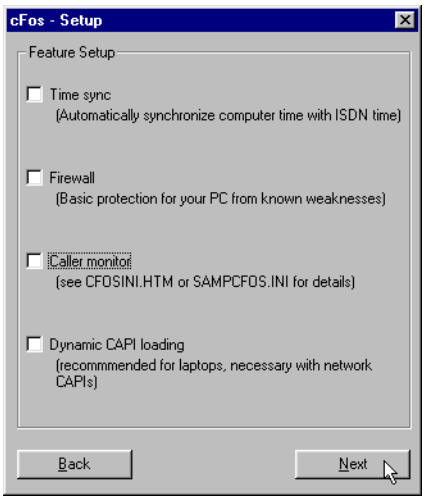
3. In the next dialog, click the "Continue cFos Installation" button. The following dialog informs you about the integration of ISDN and DSL. This feature works anywhere in the world, provided that you are using a PPPoE-controlled DSL modem. If you do not have an ADSL/ISDN connection, then this feature is not applicable, and you must click "No". For further assistance with this additional feature, please contact the cFos support team.



4. In the next dialog you may select the installation directory for cFos. To accept the default setting, click “OK”, then click “Yes” to create the installation directory if it does not exist. The next dialog allows you to select available COM ports for use with cFos. Select the ports you want to use.



5. Now you may decide whether you want to install some additional cFos features. When you have made your selections, click the “Next” button.



6. The next dialog appears only if you did not select the "Dynamic CAPI loading" option in the previous step. In this dialog you can enter a primary Multiple Subscriber Number (MSN) and additional installation parameters.

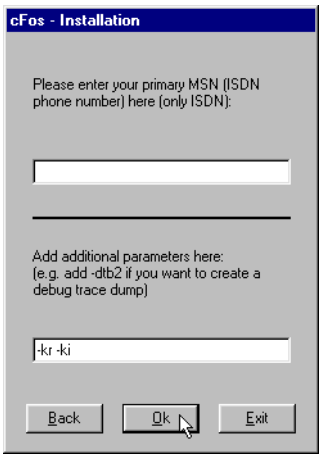
It is recommended that you leave the MSN field blank here and set the MSN in your application software, if possible.

The following parameters should be entered during the cFos installation:

- -ki
- -kr

The above information was obtained from the cFos support team.

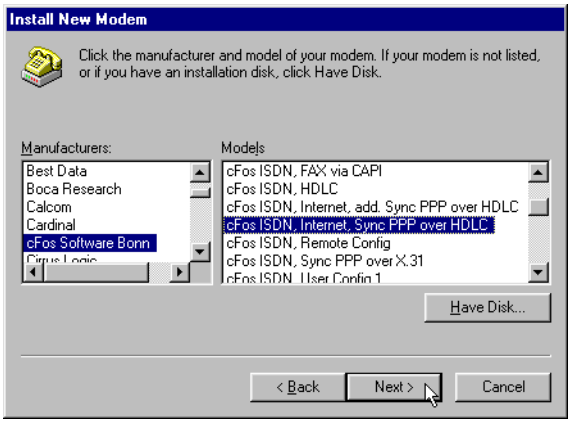
Click "OK" to continue the installation.



7. Finally, you are prompted to confirm that you want to start the software installation. Click “Yes”. In some versions of Windows you may be informed that an older version of HyperTerminal is installed. In this case, click “OK” to continue the installation. In the last two windows, click “OK”. Finally, click “Yes” when prompted to restart your computer.

8. After the system has restarted, you need to add cFos's emulated modems. Do this by clicking “Start / Settings / Control Panel”. Double-click the “Modems” icon. On the “General” page, click “Add”.

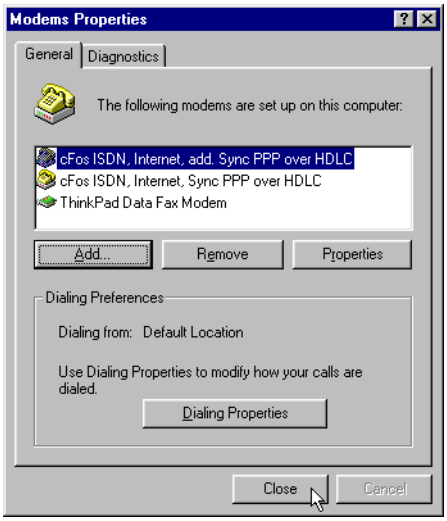
9. When the “Install New Modem” dialog appears, you are prompted to choose whether you want to install a PCMCIA modem card or another type of modem card. Click on “Other”. In the next dialog, select the option “Don't detect my modem; I will select it from a list”, then click “Next”. In the “Manufacturers” list, scroll down to “cFos Software Bonn”. In the “Models” list, select the modem emulation you want to use, then click “Next”.



10. In the next dialog, select the COM port you wish to use with the selected modem emulation.

Be careful when selecting the COM port to use. Some software packages require a COM port between 1 and 4.

Click “Next”, then “Finish”. In the modem properties dialog, click “Close”.



11. If you want to use other cFos emulated modems, repeat steps 8 through 10 until you have installed all the desired modem emulations.

    cFos is now ready to use with your IBM International ISDN PC Card.

11.1.4 Windows NT 4.0 Workstation

To use the IBM International ISDN PC Card with application software that is not CAPI 2.0-compliant, IBM recommends that you download, purchase and use cFos. For further assistance with cFos, see one of the following Web sites::

URL	Page content
http://www.cfos.com	cFos main entry page
http://www.cfos.com/index2.htm	cFos home page in German
http://www.cfos.com/index2_e.htm	cFos home page in English

Before installing the cFos drivers, please read the chapter "Prerequisites for the cFos Installation and Additional Tips" on page 82 for some additional information.

1. Download cFos for Windows NT/2000. The current version 3.81 is in the file cfnt381.exe. Double-click the file "cfnt381" to start installing the software.

   If you download cFos in the file cfnt381.zip, extract its contents and run the program SETUP32.EXE.

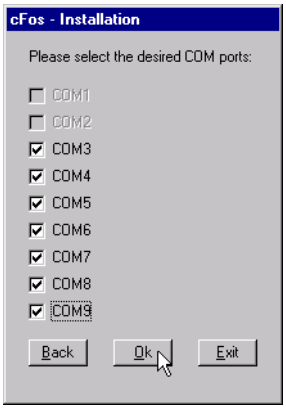
2. The first dialog box asks you whether you want to install, remove, or configure cFos. Click "Install cFos". Read the license agreement, select the option "I agree", and click "Next".

   Note: The license agreement is presented in both German and English.

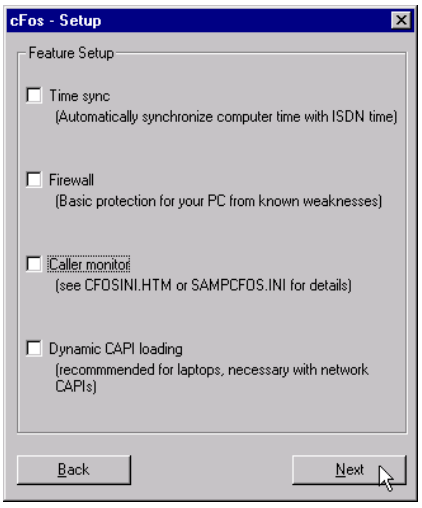
3. In the next dialog, click the "Continue cFos Installation" button. The following dialog informs you about the integration of ISDN and DSL. This feature works anywhere in the world, provided that you are using a PPPoE-controlled DSL modem. If you do not have an ADSL/ISDN

connection, then this feature is not applicable, and you must click “No”. For further assistance with this additional feature, please contact the cFos support team.

4. In the next dialog you may select the installation directory for cFos. To accept the default setting click “OK”, then click “Yes” to create the installation directory if it does not exist. The next dialog allows you to select available COM ports for use with cFos. Select the ports you want to use.



5. Now you can decide whether you want to install some additional cFos features. When you have made your selections, click “Next”.

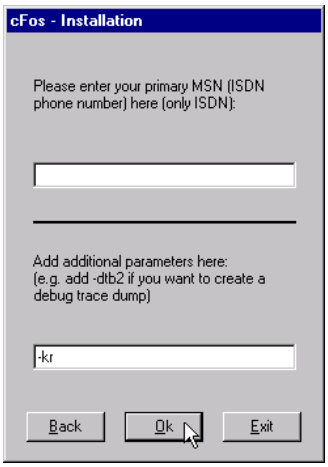


6. The next dialog appears only if you have not selected the “Dynamic CAPI loading” option in the previous step. In this dialog you can enter a primary Multiple Subscriber Number (MSN) and additional installation parameters.

It is recommended that you leave the MSN field blank and set the MSN to use in your application software, if possible.

The following parameters should be entered during the cFos installation:

– -kr

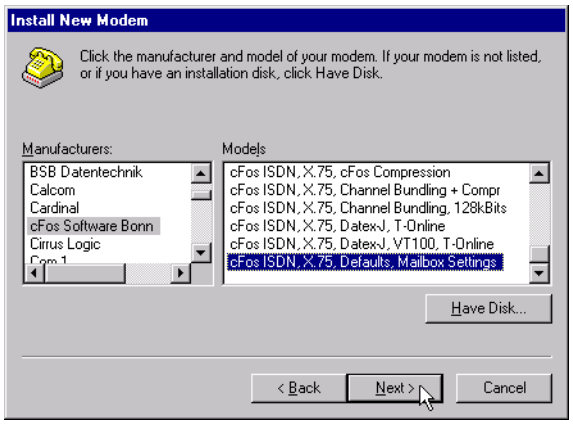


7. Finally you are prompted to confirm that you want to start the installation. Click “Yes”. cFos Setup informs you when the installation has been successfully completed. When prompted to restart your computer, click “Yes” in order to activate the changes.

8. After the system has restarted, click “Start / Settings / Control Panel”. In the Control Panel, double-click the “Modems” icon to begin installing cFos's emulated modems.

9. If you have a modem already installed in your notebook computer, then the “Modem Properties” dialog appears. Click “Add” to install the cFos emulated modems.

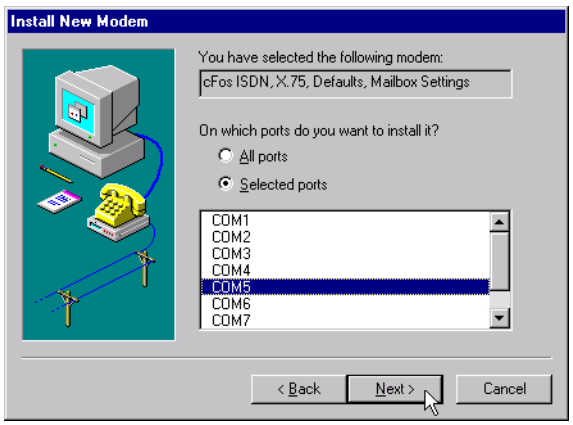
   When the “Install New Modem” dialog appears, choose the option “Don't detect my modem; I will select it from a list”, then click “Next”. In the “Manufacturers” list, scroll down to “cFos Software Bonn”. In the “Models” list, select the modem emulation you want to use, then click “Next”.



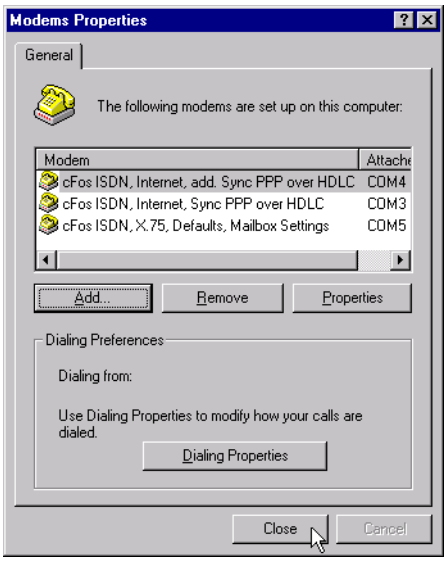
10. In the next dialog, select the COM ports you wish to use with the selected modem emulation.

Be careful when selecting the COM port to use. Some software packages require a COM port between 1 and 4. Selecting an unsupported COM port may cause serious problems.

Click the “Next” button, then click “Finish”.



11. In the modem properties dialog, click “Close”.



12. Next, Dial-up Networking needs to be reconfigured to use the new emulated modems. Click “Yes” to start the “Remote Access Setup”. Click “Add”. In the “Add RAS Device” dialog, click “OK”. Repeat the “add” procedure until no more devices can be added. Click “Continue” in the “Remote Access Setup”, and then confirm that you want to restart your computer by clicking “Yes”.

When your computer has restarted, cFos is ready to use with your IBM International ISDN PC Card.

11.1.5 Windows 2000 Professional

To use the IBM International ISDN PC Card with application software that is not CAPI 2.0-compliant, IBM recommends that you download, purchase and use cFos. For further assistance with cFos, see one of the following Web sites:

URL	Page content
http://www.cfos.com	cFos main entry page
http://www.cfos.com/index2.htm	cFos home page in German
http://www.cfos.com/index2_e.htm	cFos home page in English

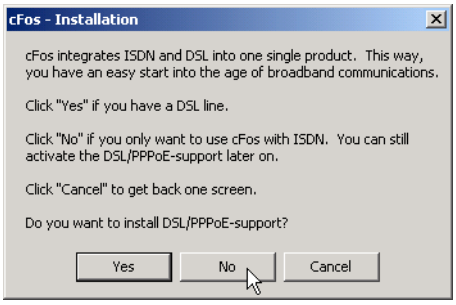
Before installing the cFos drivers, please read the chapter "Prerequisites for the cFos Installation and Additional Tips" on page 82 for some additional information.

1. Download cFos for Windows NT/2000. The current version 3.81 is in the file cfnt381.exe. Double-click the file "cfnt381" to start installing the software.

If you download cFos in the file cfnt381.zip, extract its contents and run the program SETUP32.EXE.

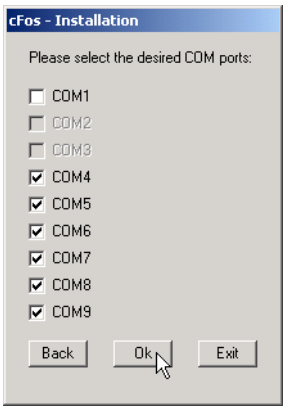
2. The first dialog box asks you whether you want to install, remove, or configure cFos. Click "Install cFos". Read the license agreement, select the option "I agree", and click the "Next" button.
The license agreement is presented in both German and English.

3. In the next dialog, click the "Continue cFos Installation" button. The following dialog informs you about the integration of ISDN and DSL. This feature works anywhere in the world provided that you are using a PPPoE-controlled DSL modem. If you do not have an ADSL/ISDN connection, then this feature is not applicable, and you must click "No". For further assistance with this additional feature, please contact the cFos support team.

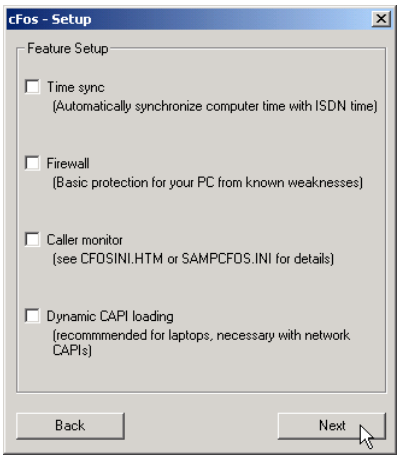


4. In the next dialog you may select the installation directory for cFos. To accept the default setting, click "OK", then click "Yes" to create the installation directory if it

does not exist. The next dialog allows you to select available COM ports for use with cFos. Select all the ports you want to use.



5. Now you can decide whether you want to install some additional features of cFos. When you have made your selections, click “Next”.

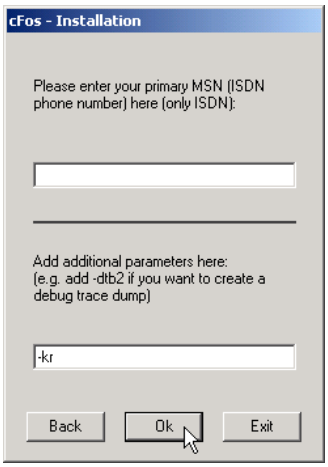


6. The next dialog appears only if you have not selected the “Dynamic CAPI loading” option in the previous step. In this dialog you can enter a primary Multiple Subscriber Number (MSN) and additional installation parameters.

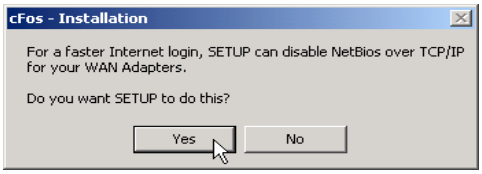
It is recommended that you leave the MSN field blank and set the MSN to use in your application software, if possible.

The following parameters should be entered during the cFos installation:

– -kr



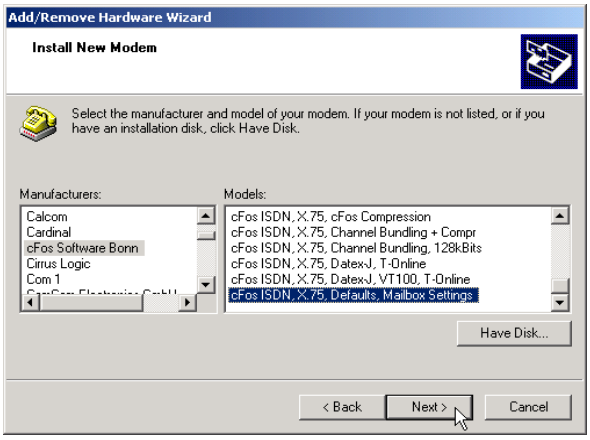
7. Finally you are prompted to confirm that you want to start the installation. Click “Yes”. The installation routine then informs you that NetBIOS over TCP/IP can be disabled for your WAN adapters. If you want the Setup program to do this for you, click “Yes”. If you need NetBIOS over TCP/IP on your Dial-Up Networking connections, click “No”.



8. After the installation of cFos has been completed, click “Start / Settings / Control Panel” to begin adding the cFos emulated modems. In the Control Panel, double-click the “Phone and Modem Options” icon in order to start the modem installer.

9. In the “Phone And Modem Options” dialog, click the “Modems” tab, then the “Add” button.

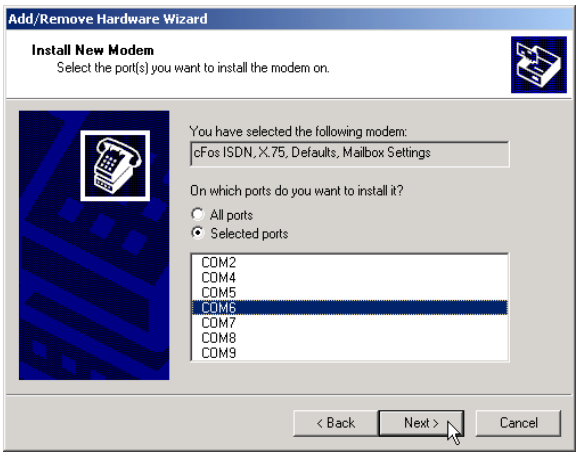
   When the “Install New Modem” dialog appears, choose the option “Don't detect my modem; I will select it from a list”, then click “Next”. In the “Manufacturers” list, scroll down to “cFos Software Bonn”. In the “Models” list, select the modem emulation you want to use, then click “Next”.



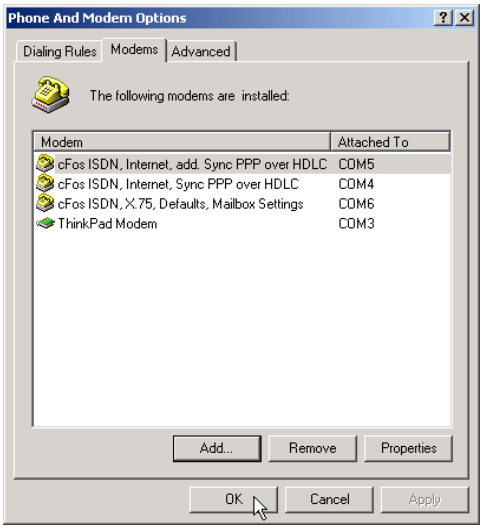
10. In the next dialog, select the COM ports you wish to use with the new modem emulation.

Be careful when selecting a COM port. Some software packages require a COM port between 1 and 4. Selecting an unsupported COM port may cause serious problems.

Now click “Next”.



11. Click “Add” again and repeat the steps outlined above for each modem emulation you want to add. Note that you cannot assign a COM port to more than one modem emulation. When you have finished adding modems, click “OK” in the “Phone And Modem Options” dialog to complete the installation.



cFos is now ready to use with your IBM International ISDN PC Card.

11.1.6 Windows XP Home Edition and Professional

To use the IBM International ISDN PC Card with application software that is not CAPI 2.0-compliant, IBM recommends that you download, purchase and use cFos. For further assistance with cFos, see one of the following Web sites:

URL	Page content
http://www.cfos.com	cFos main entry page
http://www.cfos.com/index2.htm	cFos home page in German
http://www.cfos.com/index2_e.htm	cFos home page in English

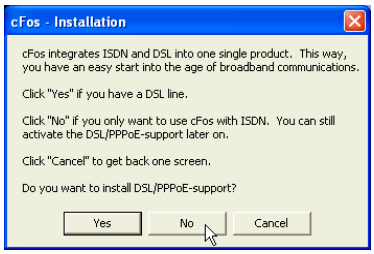
Before installing the cFos drivers, please read the chapter "Prerequisites for the cFos Installation and Additional Tips" on page 82 for some additional information.

1. Download cFos for Windows NT/2000. The current version 3.81 is contained in the file cfnt381.exe. Double-click the file "cfnt381" to start installing the software.

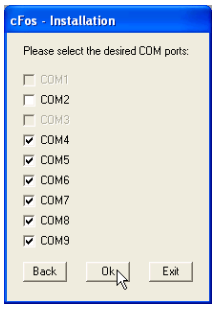
   If you download cFos in the file cfnt381.zip, extract its contents and run the program SETUP32.EXE.

2. The first dialog box asks you whether you want to install, remove, or configure cFos. Click "Install cFos". Read the license agreement, select the option "I agree", and click the "Next" button.
   The license agreement is presented in both German and English.

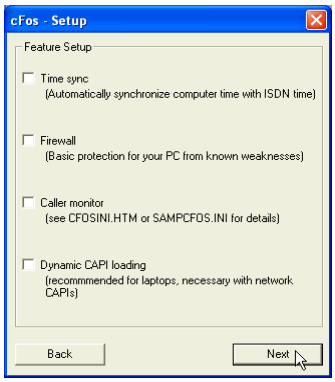
3. In the next dialog, click the "Continue cFos Installation" button. The following dialog informs you about the integration of ISDN and DSL. This feature works anywhere in the world provided that you are using a PPPoE-controlled DSL modem. If you do not have an ADSL/ISDN connection, then this feature is not applicable, and you must click "No". For further assistance with this additional feature, please contact the cFos support team.



4. In the next dialog you may select the installation directory for cFos. To accept the default setting, click “OK”, then click “Yes” to create the installation directory if it does not exist. The next dialog allows you to select available COM ports for use with cFos. Select all the ports you want to use.



5. Now you can decide whether you want to install some additional features of cFos. When you have made your selections, click “Next”.

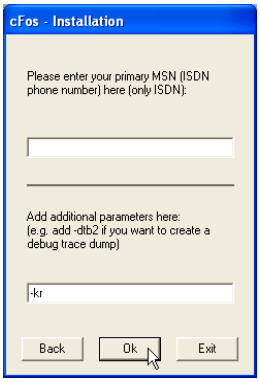


6. The next dialog appears only if you did not select the “Dynamic CAPI loading” option in the previous step. In this dialog you can enter a primary Multiple Subscriber Number (MSN) and additional installation parameters.

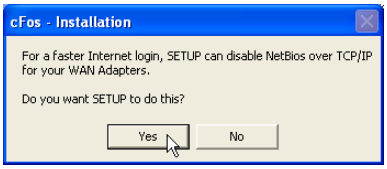
It is recommended that you leave the MSN field blank and set the MSN to use in your application software, if possible.

The following parameters should be entered during the cFos installation:

– kr



7. Finally you are prompted to confirm that you want to start the installation. Click “Yes”. The installation routine then informs you that NetBIOS over TCP/IP can be disabled for your WAN adapters. If you want the Setup program to do this for you, click “Yes”. If you need NetBIOS over TCP/IP on your Dial-Up Networking connections, click “No”.

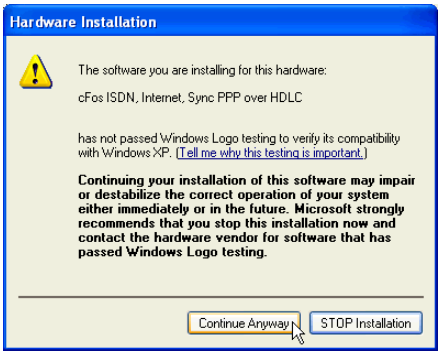


8. During the installation process, cFos tries to install the following modem emulations:

- cFos ISDN, Internet, Sync PPP over HDLC

- cFos ISDN, Internet, add. Sync PPP over HDLC

At this stage Windows XP notifies you that the modem emulation driver has not been digitally certified by Microsoft. In order to complete the cFos installation, click “Continue Anyway”.

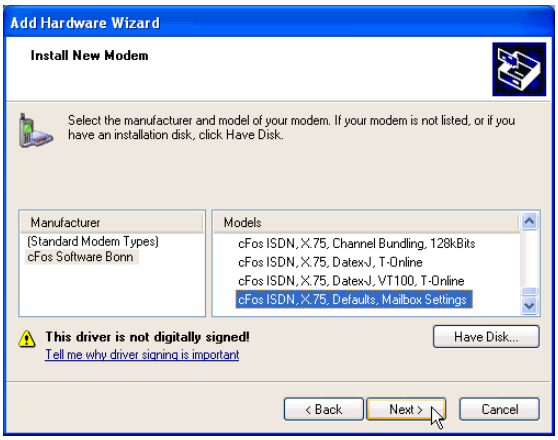


For information about updated versions of cFos that do not display this warning message, please contact the cFos support team.

9. You can add emulated modems after the installation of cFos has been completed. To launch the modem installer, click “Start / Control Panel”, double-click the “Printers and Other Hardware” icon, then the “Phone and Modem Options” icon.

10. In the “Phone And Modem Options” dialog, click the “Modems” tab, then the “Add” button.

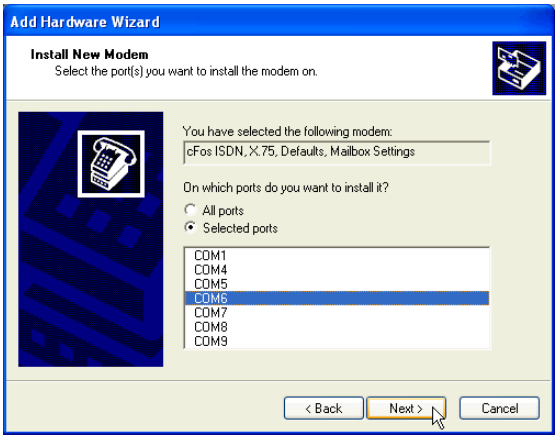
    When the “Install New Modem” dialog appears, choose the option “Don't detect my modem; I will select it from a list”, and click “Next”. In the “Manufacturers” list, scroll down to “cFos Software Bonn”. In the “Models” list, select the modem emulation you want to use, then click “Next”. Note that Windows XP informs you once again that the drivers have not been digitally signed.



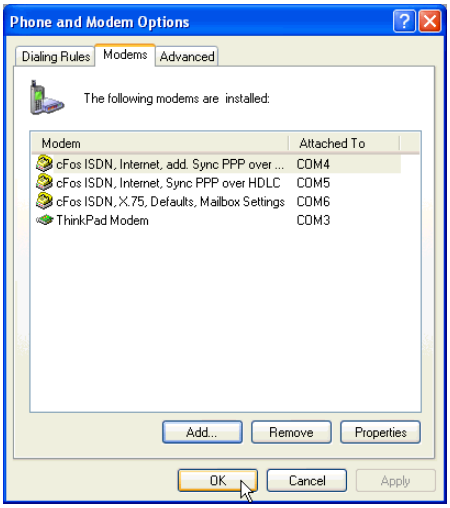
11. In the next dialog, select the COM ports you wish to use with the new modem emulation.

Be careful when selecting the a COM port. Some software packages require a COM port between 1 and 4. Selecting an unsupported COM port may cause severe problems.

Now click “Next”. Windows XP warns you once again that the drivers have not been digitally signed. See Step 8 above for more information.



12. Click “Add” again and repeat the steps outlined above for each modem emulation you want to add. Note that you cannot assign a COM port to more than one modem emulation. When you have finished adding modems, click “OK” in the “Phone And Modem Options” dialog to complete the installation.



cFos is now ready to use with your IBM International ISDN PC Card.

11.2 Setting Up Internet Access

This chapter explains briefly how to use one ISDN B channel for Internet access at 64 kbit/s or both B channels at 128 kbit/s.

Bear in mind that the IBM International ISDN PC Card is a basic-rate ISDN adapter, and permits the use of up to two ISDN B channels.

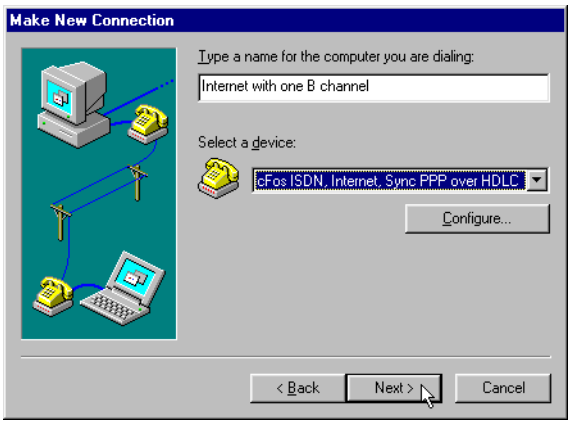
11.2.1 Internet Access in Windows 95 and Windows 98

In order to use Dial-Up Networking for connections to the Internet, you may need to install cFos. Please see the section on "Installing cFos" on page 81.

11.2.1.1 Creating a Connection Using One B Channel

1. Double-click the "My Computer" icon on the Windows 95/98 desktop. Double-click the "Dial-Up Networking" icon. In the sign-on window, click "Next".
2. In the "Make New Connection" dialog, enter the type and name of the computer to be dialed in the "Name" field. This is the name that will be used for the connection in Dial-Up Networking. Select any of the following devices to use for the connection to the Internet:
   - cFos ISDN, Internet, Sync PPP over HDLC
   - cFos ISDN, Internet, add. Sync PPP over HDLC
   - NDIS WAN Line 1
   - NDIS WAN Line 2

   Click "Next" to continue.



Since the NDIS WAN CAPI drivers are installed, you have the option of using "NDIS WAN Line 1" or the "NDIS WAN Line 2" for the Internet connection. However the choice depends on the Internet access software you want to use.

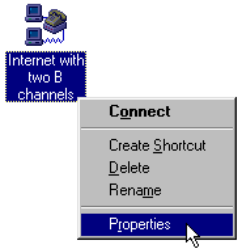
3. In the next dialog enter the area code and phone number to dial. If necessary, change the country code. Click "Next" again. Finally, click "Finish".

Now you can enter a user name and a password and dial up the connection to the server.

11.2.1.2 Creating a Connection Using Both B Channels

This technique is also referred to as "multilinking". Proceed as follows:

1. Create a new Dial-Up Networking connection as described in section "Creating a Connection Using One B Channel" on page 106 above. At the end of the procedure, click "Cancel" rather than "Dial".
2. In the "Dial-Up Networking" window, click the new entry with the right mouse button.
3. Click the "Properties" command in the pop-up menu.

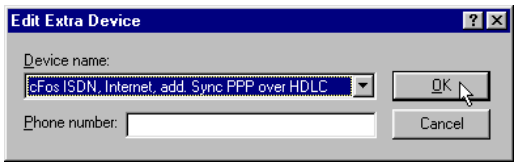


4. Click the “Multilink” tab. Select “Use additional devices”, and then click “Add”.

5. In the “Edit Extra Device” dialog, select one of the following devices in the drop-down list:

   – cFos ISDN, Internet, Sync PPP over HDLC
   – cFos ISDN, Internet, add. Sync PPP over HDLC
   – NDIS WAN Line 1
   – NDIS WAN Line 2

   Click “OK” to complete this operation.



To save your settings, click “OK” again.

Any of the four devices can be combined in a multilink connection!

Whether you use cFos or the NDIS WAN CAPI drivers in Dial-Up Networking depends on the Internet access software you want to use.

Note that you only can add one additional device to the dial-up connection. Adding more than one device in the “Multilink” page may cause the connection to fail!

Note too that you cannot form a multilink connection using the same device twice. Doing so will not increase transfer speed, and it may cause the connection to fail!

6. To save your settings, click “OK” again.

In Europe you do not need to specify an additional phone number for the second B channel. If you leave this field blank, the number originally specified for the Dial-Up Networking connection will be dialed.

11.2.2 Internet Access in Windows Millennium Edition

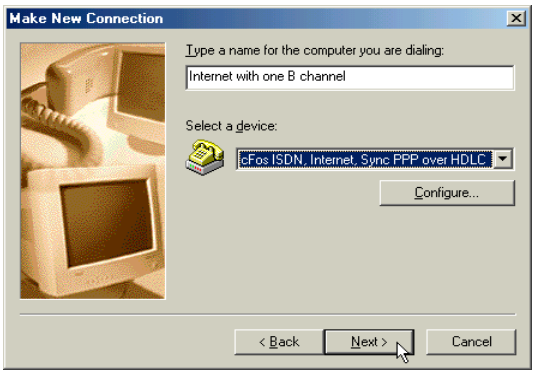
In order to use Dial-Up Networking for connections to the Internet, you may need to install cFos. Please see the section on "Installing cFos" on page 81.

Creating a Connection Using One B Channel

11.2.2.1 Creating a Connection Using One B Channel

1. Click the "Start / Settings / Dial-Up Networking" to open the "Network and Dial-up Connection" dialog. Double-click the "Make New Connection" icon.
2. In the Connection Wizard's first dialog, click "Next". If you have not yet entered any country-specific telephony information, the "Location Information" dialog is displayed, in which you can enter the pertinent dialing information.
3. In the "Make New Connection" dialog, enter the type and name of the computer to be dialed in the "Name" field. This is the name that will be used for the connection in Dial-Up Networking. Select any of the following devices to use for the connection to the Internet:
   - cFos ISDN, Internet, Sync PPP over HDLC
   - cFos ISDN, Internet, add. Sync PPP over HDLC
   - NDIS WAN Line 1
   - NDIS WAN Line 2

   Click "Next" to continue.



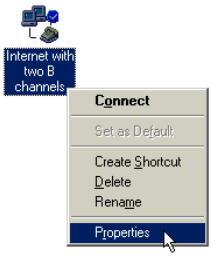
Whether you use cFos or the NDIS WAN lines in Dial-up Networking depends on the Internet access software you want to use.

4. In the next dialog, enter the phone number to dial for Internet access and then click “Next”. In the last dialog, click “Finish”. Your “Dial-Up Networking” window now contains an icon representing your dial-up connection to the Internet.

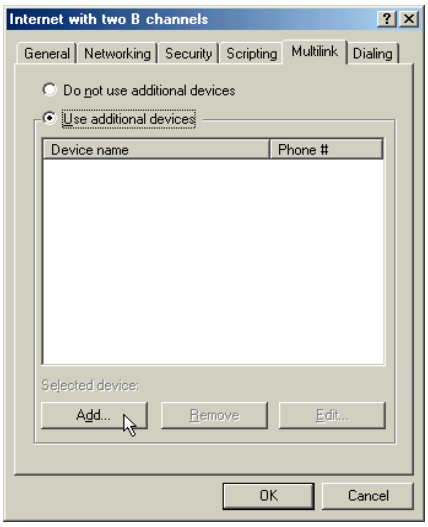
When you have finished the setup procedure, you are ready to connect to your Internet Service Provider.

11.2.2.2 Creating a Connection Using Both B Channels

1. Create an Internet connection as described in the section “Creating a Connection Using One B Channel” on page 110 above. In the Dial-Up Networking window, right-click the connection icon you want to use for a multilink connection, and select “Properties” in the context menu.



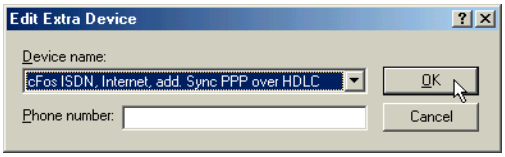
2. In the Properties window, select the “Multilink” tab. Select the “Use additional devices” option, then click “Add”.



3. In the “Edit Extra Device” dialog, select one of the following devices in the drop-down list:

   – cFos ISDN, Internet, Sync PPP over HDLC
   – cFos ISDN, Internet, add. Sync PPP over HDLC
   – NDIS WAN Line 1
   – NDIS WAN Line 2

   Click “OK” to complete this operation.



Any of the four devices can be combined in a multilink connection!

Whether you use cFos or the NDIS WAN CAPI drivers in Dial-Up Networking depends on the Internet access software you want to use.

Note that you can add only one additional device to the dial-up connection. Adding more than one device on the "Multilink" page may cause the connection to fail!

Note too that you cannot form a multilink connection using the same device twice. Doing so will not increase the transfer speed, and may cause the connection to fail!

4. To save your settings, click "OK" again.

You are now ready to connect to your Internet Service Provider over two ISDN B channels simultaneously.

11.2.3 Internet Access in Windows NT 4.0 Workstation

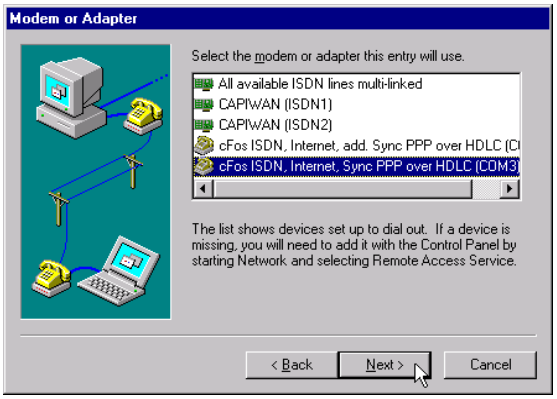
The following section assumes that you are logged on to a Windows NT 4.0 Workstation system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

In order to use Dial-Up Networking for connections to the Internet, you may need to install cFos. Please see the section on "Installing cFos" on page 81.

11.2.3.1 Creating a Connection Using One B Channel

1. Double-click the "My Computer" icon on the Windows NT 4.0 Workstation desktop.
2. Double-click the "Dial-Up Networking" icon. The "New Phonebook Entry Wizard" appears and prompts you to specify a name for the new phonebook entry. Enter a name for your Internet connection.
3. In the "Server" dialog, select the option "I am calling the Internet".

4. In the “Modem or Adapter” dialog, select one of the following entries:
   - cFos ISDN, Internet, Sync PPP over HDLC
   - cFos ISDN, Internet, add. Sync PPP over HDLC
   - NDIS WAN Line 1
   - NDIS WAN Line 2



Since the NDIS WAN CAPI drivers are installed, you have the option of using “CAPIWAN (ISDN1)” or “CAPIWAN (ISDN2)” for the Internet connection. However, the choice depends on the Internet access software you want to use.

5. In the next dialog, enter the phone number to dial your access provider.
6. Finally, click “Finish”.

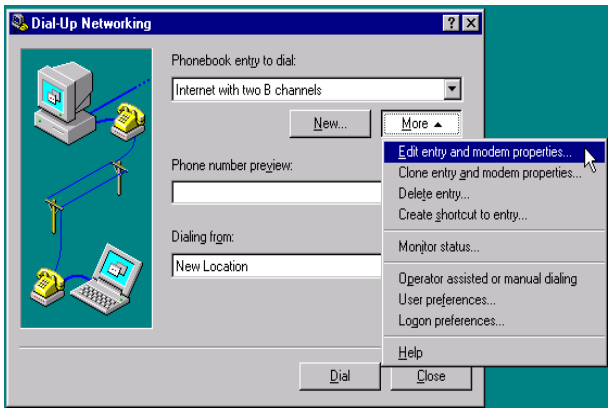
11.2.3.2 Creating a Connection Umsing Both B Channels

This technique is also referred to as “multilink”. Proceed as follows:

1. Create a new Dial-Up Networking connection as described in the section “Creating a Connection Using One B Channel” on page 113.

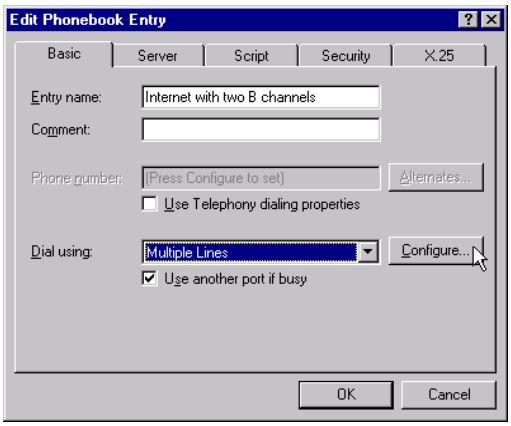
   If the option “Multilink all ISDN lines” appears during the setup, do not activate it. This option may result in malfunctions due to an improper configuration.

2. Once the new connection has been completed, click “More” and select “Edit entry and modem properties” in the drop-down menu.

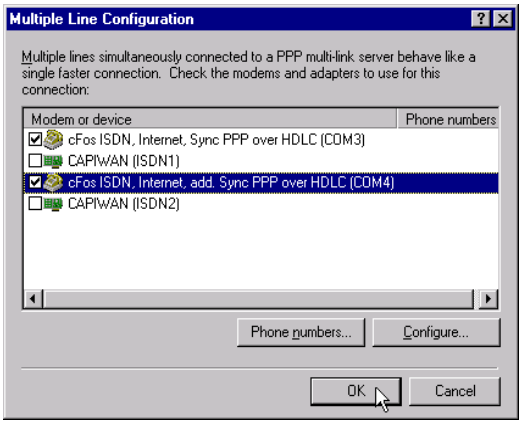


3. On the “Basic” page of the “Edit Phonebook Entry” dialog, click the arrow button to open the “Dial using” drop-down list.

4. Select “Multiple Lines”, then click “Configure”.



5. In the list of available devices, select the entry “cFos ISDN, Internet, additional PPP Modem”, then click “Phone numbers”.



Any of the four devices can be combined in a multilink connection!

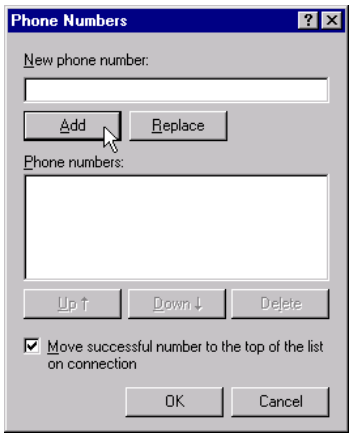
- cFos ISDN, Internet, Sync PPP over HDLC
- cFos ISDN, Internet, add. Sync PPP over HDLC
- NDIS WAN Line 1
- NDIS WAN Line 2

Whether you use cFos or the NDIS WAN CAPI drivers in Dial-Up Networking depends on the Internet access software you want to use.

Note that you can add only one additional device to the dial-up connection. Adding more than one device on the "Multilink" page may cause the connection to fail!

Note too that you cannot form a multilink connection using the same device twice. Doing so will not increase the transfer speed, and may cause the connection to fail!

6. In the "Phone Numbers" dialog, enter the phone number to be dialed on the second B channel, then click "Add". When the correct number appears in the list, click "OK".



7. Now click "OK" twice to close the remaining configuration dialogs.

You are ready to dial up a multilink connection to your Internet account using two ISDN B channels.

11.2.4 Internet Access in Windows 2000 Professional

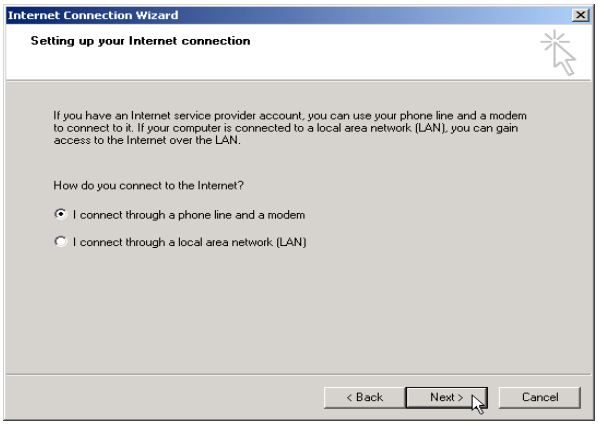
The following section assumes that you are logged on to a Windows 2000 Professional system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

In order to use Dial-Up Networking for connections to the Internet, you may need to install cFos. Please see the section on ”“Installing cFos” on page 81.

11.2.4.1 Creating a Connection Using One B Channel

1. Click “Start / Settings / Dial-Up Networking” to open the “Network and Dial-up Connections ” window. Double-click the “Make New Connection” icon.

2. In the Connection Wizard's first dialog, click the “Next” button. Select the option “Dial-up to the Internet”, then click “Next”. In the dialog labeled “Welcome to the Internet Connection Wizard”, select the option “I want to set up my Internet connection manually, or I want to connect through a local area network (LAN)”, then click “Next”. In the following dialog, select “I connect through a phone line and a modem”, and click “Next”.



3. In the “Choose Modem” dialog, select any of the following devices to use for the connection to the Internet:

- cFos ISDN, Internet, Sync PPP over HDLC
- cFos ISDN, Internet, add. Sync PPP over HDLC
- IBM NDIS WAN CAPI Driver

Whether you use cFos or the NDIS WAN CAPI drivers in Dial-Up Networking depends on the Internet access software you want to use. Note too, that there are two entries called "IBM NDIS WAN CAPI Driver". Each of these entries represents one B channel.

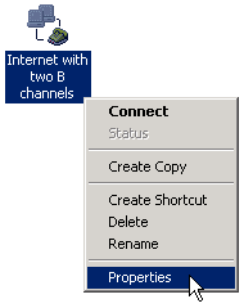
4. The next dialogs allow you to configure your Internet access. Perform the following steps:
   - Enter the complete telephone number including country information
   - Enter the User name and Password
   - Enter a Connection name
   - Configure an Internet Mail Account
5. In the last dialog, click "Finish" to complete Internet access configuration.

Once you have finished the configuration, you are ready to connect to your Internet Service Provider.

11.2.4.2 Creating a Connection Using Both B Channels

1. Create an Internet connection as described in section "Creating a Connection Using One B Channel" on page 118. Do not connect to your Internet Service Provider upon completion, however. Instead, close the "Dial-up Connection" dialog, and close Internet Explorer if it has been started.

   In the Dial-up Networking window, right-click the entry you want to use to create a multilink connection. In the context menu, select "Properties".



2. On the “General” page in the properties dialog for the selected connection, select the additional device you wish to use for the multilink Internet connection from the list labeled “Connect using”. You can combine the following devices to create a multilink connection:

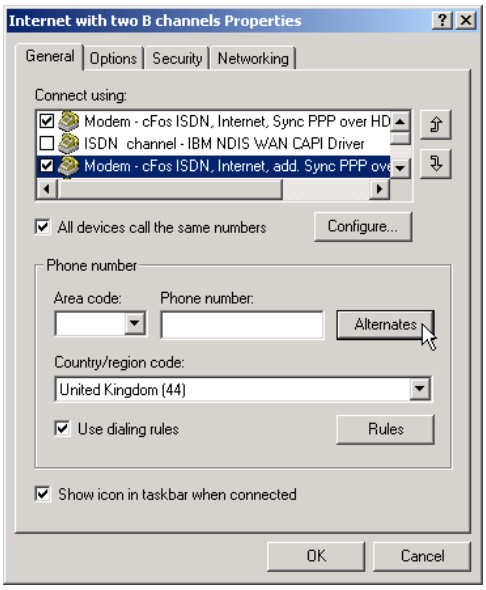
   – cFos ISDN, Internet, Sync PPP over HDLC

   – cFos ISDN, Internet, add. Sync PPP over HDLC

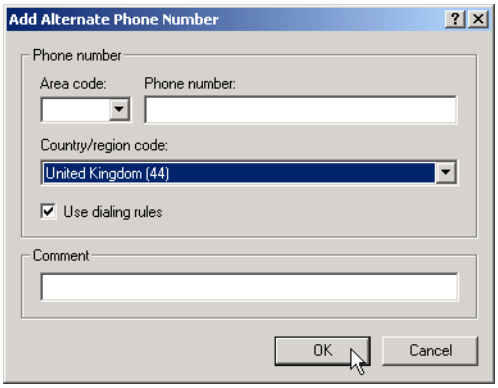
   – IBM NDIS WAN CAPI Driver

Note that you can add only one additional device to the dial-up connection. Adding more than one additional device may cause the connection to fail! Click the “Settings” button to the right of the connection.

3. Select the option “All devices call the same numbers” below the “Connect using” list. To make sure that the phone number to dial has been stored, click the “Alternates” button in the “Phone number” section.



4. If the field in the “Alternate Phone Numbers” dialog is empty, click the “Add” button. In the “Add Alternate Phone Number” dialog, select the option “Use dialing rules”, then enter the area code and phone number in the fields above it. Select the destination country if necessary. Then click “OK” to close each of the configuration dialogs.



You are now ready to connect to your Internet Service Provider over two ISDN B channels simultaneously.

11.2.5 Internet Access in Windows XP Home Edition and Professional

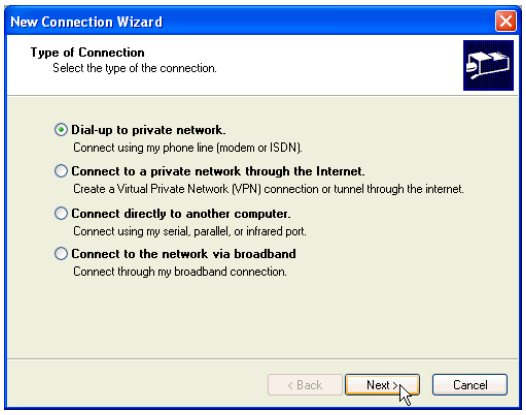
In order to use Dial-Up Networking for connections to the Internet, you may need to install cFos. Please see the section on ""Installing cFos" on page 81.

11.2.5.1 Creating a Connection Using One B Channel

1. Click "Start / Control Panel". Double-click the "Network and Internet Connections" icon.

   Click the menu command "Set up or change your Internet connection". In the "Internet Properties" dialog, click "Add" to launch the "New Connection Wizard".

2. In the Connection Wizard's first dialog, click "Dial-up to private network", then "Next".



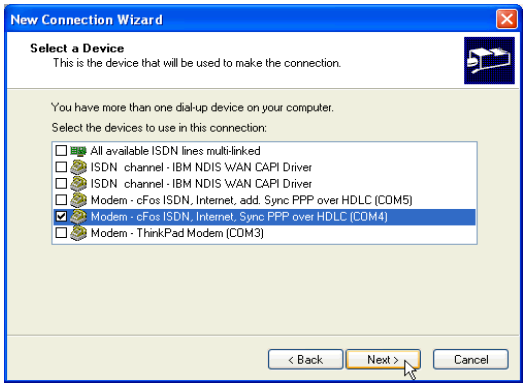
3. In the “Select a Device” dialog, first make sure that the option “All available ISDN lines multi-linked” is NOT activated. If necessary, deactivate the options for all devices that you do not want to use for dialing out. Then select any of the following devices to use for the connection to the Internet:

   – cFos ISDN, Internet, Sync PPP over HDLC

   – cFos ISDN, Internet, add. Sync PPP over HDLC

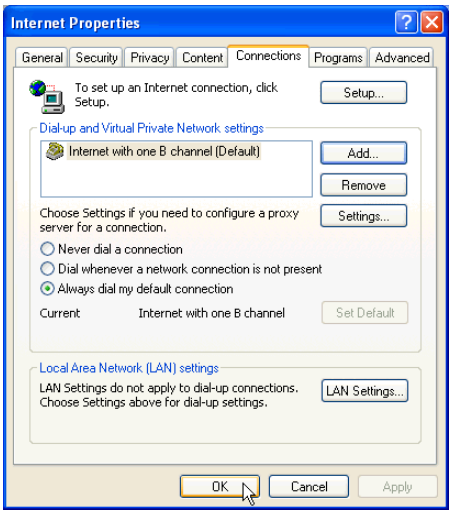
   – IBM NDIS WAN CAPI Driver

   When you have selected the desired devices, click “Next”.



Whether you use cFos or the NDIS WAN CAPI drivers in Dial-Up Networking depends on the Internet access software you want to use. Note too that there are two entries called "IBM NDIS WAN CAPI Driver". Each of these entries represents one B channel.

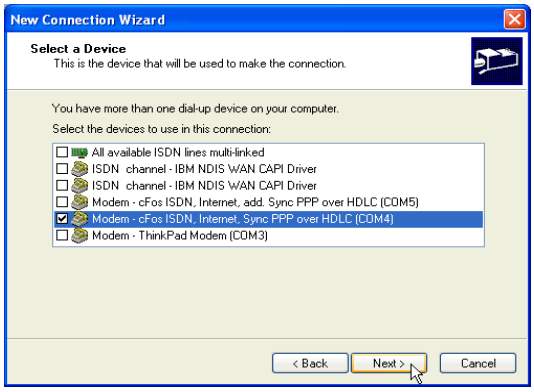
4. The next dialogs allow you to configure your Internet access. Perform the following steps:
   - Enter the complete telephone number
   - Enter a connection name
   - Enter the User name and Password
5. When you have finished these operations, click "OK" in the "Internet Properties" to complete your Internet access setup.



Once you have finished the configuration, you are ready to connect to your Internet Service Provider. Click "Start / Connect To", then select the connection you have created.

11.2.5.2 Creating a Connection Using Both B Channels

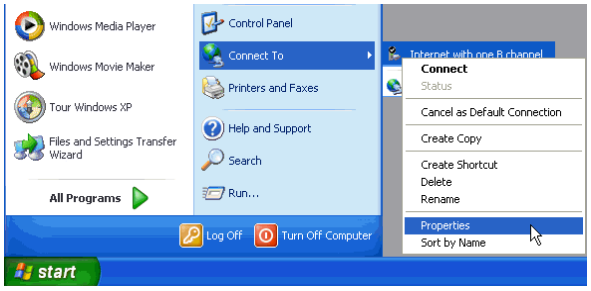
There are two ways to create a connection for multilink Internet access. The first is to create a new dial-up connection as described above in “Creating a Connection Using One B Channel” on page 122, but to select two devices to use for the connection rather than one as in Step 3.



Note that you only can use two ISDN devices for a multilink connection. Configuring more than two devices may cause the connection to fail!

The second method is to modify an existing dial-up connection as follows:

1. Click “Start / Connect To” and select the connection you want to modify. Right-click it and select “Properties” in the context menu.



2. On the “General” page in the properties dialog for the selected connection, select the additional device you wish to use for the multilink Internet connection from the list labeled “Connect using”. You can combine the following devices to create a multilink connection:

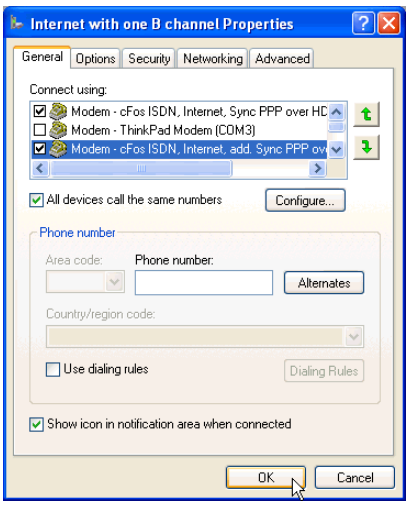
   – cFos ISDN, Internet, Sync PPP over HDLC

   – cFos ISDN, Internet, add. Sync PPP over HDLC

   – IBM NDIS WAN CAPI Driver

Note that you can add only one additional device to the dial-up connection. Adding more than one additional device may cause the connection to fail!

Select the option “All devices call the same numbers” below the “Connect using” list, then click on “OK”.



You can rename the modified connection if desired. You are now ready to connect to your Internet Service Provider over two ISDN B channels simultaneously.

11.3 Using CompuServe

In order to be able to use CompuServe with your IBM International ISDN PC Card, you must have cFos installed, unless you only plan to use CompuServe 2000 on your system. In this case, you may not need to install cFos at all.

Please ask your local CompuServe help desk what communication protocol is used for dial-in. In Europe the X.75 protocol is widely used.

IBM has tested the CompuServe 3.0 and higher access software under Windows 95, 98 and ME, and CompuServe 4.0.x and higher access software under Windows NT 4.0 and Windows 2000 Professional.

11.3.1 CompuServe 3.0 and non-CAPI 2.0-compliant CompuServe Dialers in Windows 9x, Me

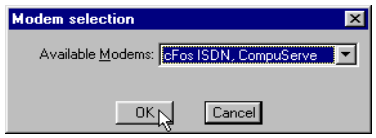
Note: The screen shots in this section may vary somewhat from the user interface you see on your screen.

Before you can use CompuServe 3.0 or any non-CAPI 2.0-compliant CompuServe access software, you must configure cFos for use with it by installing either the “cFos ISDN, X.75, Defaults, Mailbox Settings” or the “cFos ISDN, CompuServe” modem emulation on any available COM port.

When you perform a fresh installation of the CompuServe 3.0 or a non-CAPI 2.0-compliant CompuServe access software, you may be offered the option of entering or modifying the telephone number and modem properties.

Click the “Choose installed modem” button and select one of the following modem entries:

- cFos ISDN, CompuServe
- cFos ISDN, X.75, Defaults, Mailbox Settings



Note: You can also select the entry “cFos ISDN, Analog Modem Support”. Note, however, that this entry emulates an analog modem connection with a maximum speed of 14,400 bit/s (V.32bis). Only the two modem emulations named above allow you to connect to CompuServe at 64 kbit/s.

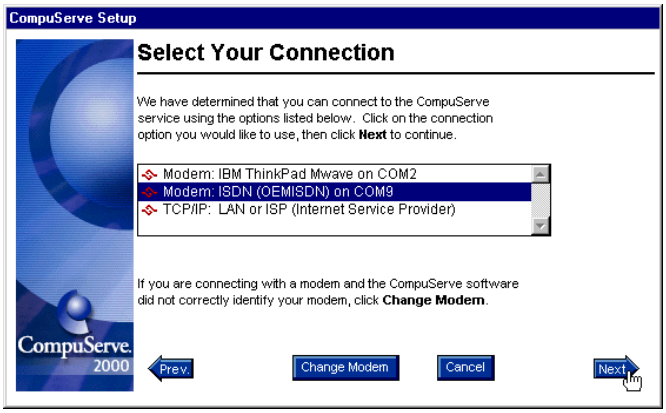
If you encounter any problems in selecting the modem, please contact your local CompuServe help desk for further assistance.

11.3.2 CAPI 2.0-compliant CompuServe 2000 in Windows 9x, Me

11.3.2.1 CAPI 2.0-compliant CompuServe 2000 in Windows 9x, Me without cFos Installed

In some countries, such as Germany and the UK, CompuServe ships its access software as “CompuServe 2000”. Unlike earlier versions, this software is designed to handle CAPI 2.0-compliant ISDN hardware. When you install CompuServe 2000, it automatically installs an OEM version of cFos which is then used only by CompuServe 2000.

When the CompuServe 2000 access software searches for a modem, it detects the IBM International ISDN PC Card as illustrated below.



Click “Next” to set up CompuServe 2000 with the selected modem emulation, and follow all further instructions displayed on your screen.

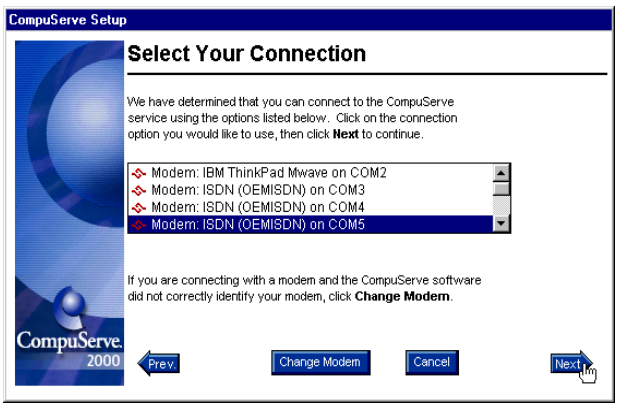
11.3.2.2 CAPI 2.0-compliant CompuServe 2000 in Windows 9x, ME with cFos Installed

In some countries such as Germany and the UK, CompuServe ships its access software as “CompuServe 2000”. Unlike earlier versions, this software is designed to handle CAPI 2.0-compliant ISDN hardware.

1. After you have installed the CompuServe 2000 software, check the cFos configuration. To do so, click “Start / Programs / cFos ISDN & DSL Driver / Configure cFos”. In the cFos Configuration program, click “Configure MSN and parameters”. If the parameter -kv appears in the additional parameters field, remove it. Then click “OK”. Select “Save changes”, click “OK” and then confirm that you want to restart your computer by clicking “Yes”.

2. After the system has restarted, verify that you have installed either the “cFos ISDN, CompuServe” or the “cFos ISDN, X.75, Defaults, Mailbox Settings” modem emulation. Make a note of the COM ports on which these modem emulations are installed.

3. Now you can start CompuServe 2000 and let it search for modems. The software detects your IBM International ISDN PC Card as illustrated below. Select the modem entry that corresponds to your cFos modem emulation.



Click “Next” and follow all further instructions displayed on your screen to set up CompuServe 2000 with the selected modem.

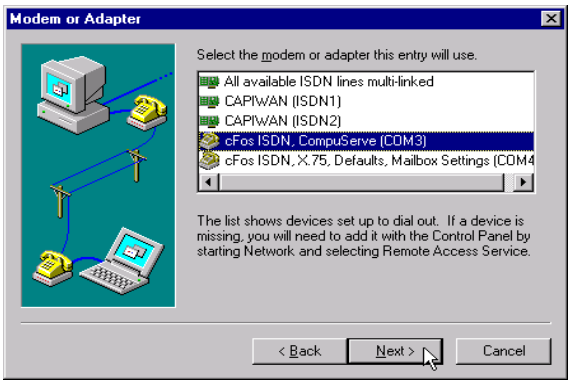
11.3.3 CompuServe 4.02 and Higher in Windows NT 4.0

The following installation instructions are based on the CompuServe 4.0.2 installation Help file for Windows NT 4.0. If you experience problems of any kind during this procedure, please contact your local CompuServe help desk for further assistance.

During this procedure, retain the default settings for all options except where otherwise instructed.

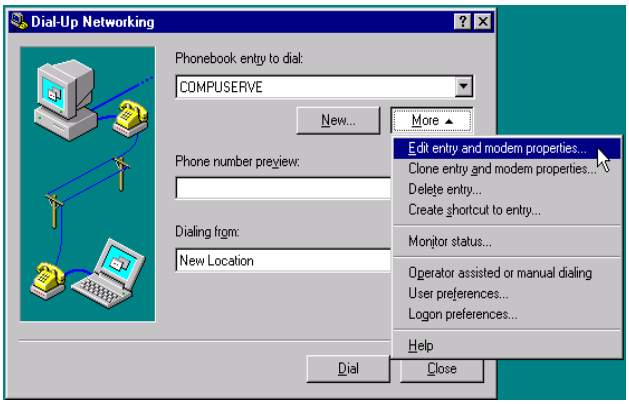
You must install and configure the CompuServe access software before carrying out the steps below.

1. Double-click the “My Computer” icon on the Windows NT desktop, then double-click the “Dial-Up Networking” icon.
2. In the dialog that tells you the phonebook is empty, click “OK”.
3. In the “New Phonebook Entry Wizard” dialog, enter COMPUSERVE as the name and click “Next”.
4. In the “Server” dialog, select the options “I am calling the Internet” and “Send my password as plain text if that's the only way to connect”. Click “Next”. Now select the modem you want use. This may be one of the following:
   - cFos ISDN, CompuServe
   - cFos ISDN, X.75, Defaults, Mailbox Settings



5. Click “Next”.
6. In the “Phone Number” dialog, enter the local phone number that you dial to connect to CompuServe. If you want to define any alternate numbers, click “Alternate” and enter those numbers in the appropriate fields.
7. Click “Next”.
8. In the “New Phonebook Entry Wizard” window, click “Finish”.

   Note: If this is the first time you have created a Dial-Up Networking entry, a few more dialogs are displayed. Simply click “Next” in each dialog.
9. In the “Dial-Up Networking” dialog, click “More”.
10. You can review or modify basic properties of the connection on the “Basic” page in the “Edit Phonebook Entry” dialog.
11. To place a shortcut on your desktop, click “Create shortcut to entry” in this menu.

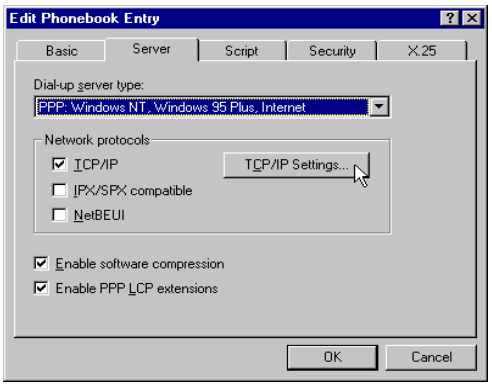


12. To add alternate phone numbers to dial, click the “Alternates” button on the “Basic” dialog page, then enter the phone numbers.

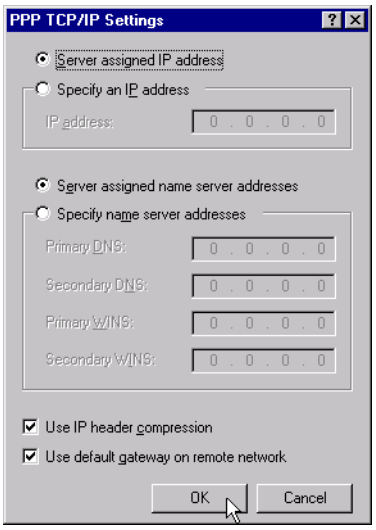
13. To modify the modem settings, click the “Configure” button on the “Basic” page, then edit the modem properties as necessary.

14. Click the “Server” tab in the “Edit Phonebook Entry” dialog and make sure that “TCP/IP” is the only network protocol selected. (If any other option in the “Network protocols” group is checked, click it to remove the check mark.)

    Note: The option “Enable software compression” may also be selected. Note that in rare cases this option can cause connection problems, however.

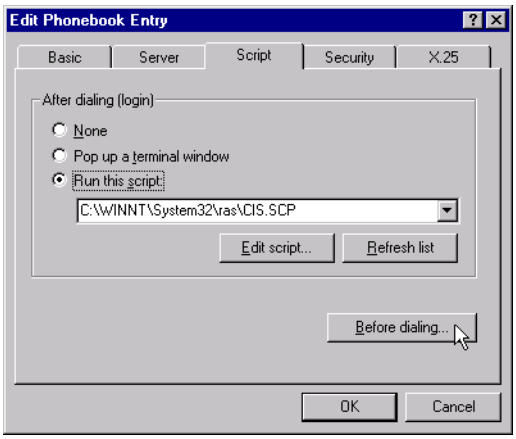


15. On the “Server” dialog page, click the “TCP/IP Settings” button.
16. In the “PPP TCP/IP Settings” dialog, select the option “Server assigned IP address”.
17. Select the option “Server assigned name server addresses”.
18. Leave zeroes in the WINS server entries, activate both of the options at the bottom of the dialog, and click “OK”.



19. Click the “Script” tab in the “Edit Phonebook Entry” dialog, and select CIS.SCP in the drop-down list.

    Note: You may also edit the script to speed up the logon process. Change the statement **`/go:pppconnect^m`** in the script to **`/noint/go:pppconnect^m`**



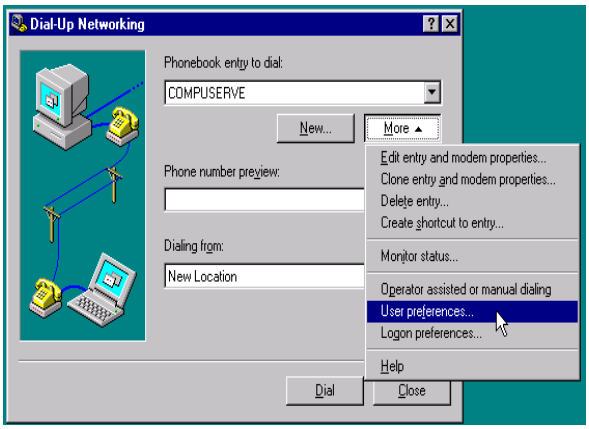
20. Click “Before dialing”, make sure that the “None” option is activated, then click “OK”.

21. In the “Edit Phonebook Entry” dialog, click the “Security” tab, then select the option “Accept any authentication including clear text”.

    Note: Depending on your security settings, you may also have the option of preventing your password from being saved, so that you can enter it again if necessary (see Step 34).

22. Click the “X.25” tab and make sure that all the settings are blank, then click ”OK”.

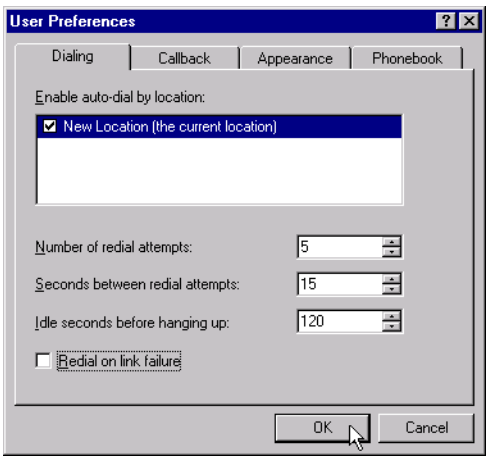
23. In the “Dial-Up Networking” dialog, click “More” again and select “User Preferences” in the menu that appears.



24. On the “Dialing” page in the “User Preferences” dialog, set the number of redial attempts, and activate the “Redial on link failure” option if you want Dial-Up Networking to redial if the connection is lost.

25. Set the “Idle seconds before hanging up” option so that Dial-Up Networking automatically disconnects if the line is idle for a certain period.

26. In the “Enable auto-dial by location” list, make sure the checkbox for your current location is activated.

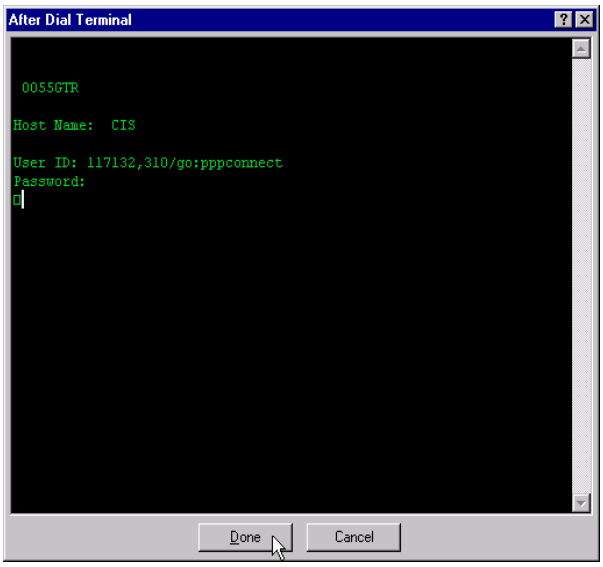


27. Click the “Callback” tab, then select the option “No, skip callback”.
28. Click the “Appearance” tab and make sure that all of the options are activated.
29. Click the “Phonebook” tab and select the option “The System Phonebook”.
30. Click “OK”.
31. In the “Dial-up Networking” dialog, select “Dial”.
32. In the dialog “Connect to CompuServe”, enter your CompuServe member ID number in the “User name” field and your password in the “Password” field.

33. If you want to save your password on your computer, activate the “Save password” option. (This option may not be available if your security settings prohibit saving passwords.) If you need to change your password later, you must also click the “Unsave password” on the “Security” page in the phonebook entry properties (see Step 22).
34. Click “OK” to dial up the connection. Do not make any changes in the “After Dial Terminal” window, but observe the logon process. Your password is incorrect if you see the following after the password prompt:

    ?? LOGINE - Invalid entry - try again

35. Once the logon has succeeded, click “Done” to close the terminal window and activate the connection to CompuServe.



After you have successfully logged on, the Dial-up Networking icon appears in the system tray on the task bar. Click this icon to hang up the connection, or select “Open Dial-up Monitor” to get information about your connection, including the DCE connection speed (bps) and your IP address (“Details” button).

11.3.4 CompuServe 4.02 and Higher in Windows 2000 Professional

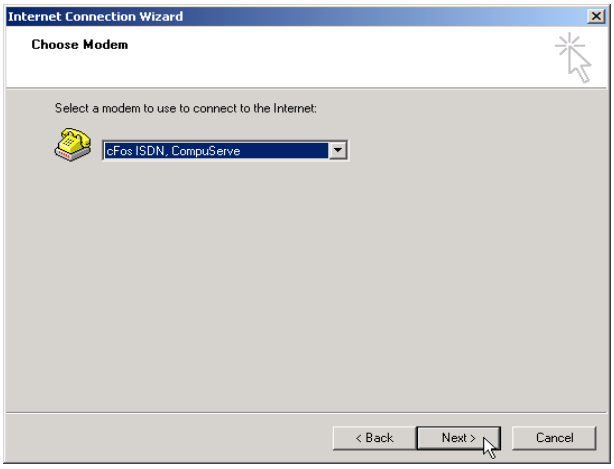
The following installation instructions are based on the CompuServe 4.0.2 installation Help file for Windows NT 4.0 and modified for use in Windows 2000 Professional. If you experience problems of any kind with these instructions, please contact your local CompuServe help desk for further assistance.

Unless otherwise noted, all settings or selections should be left at their default values.

You must install and configure the CompuServe access software before performing the steps described below.

1. Click “Start / Settings / Network and Dial-Up Connections“. Double-click “Make New Connection” to start the “Network Connection Wizard”.
2. In the first dialog, click “Next”. In the following dialog, select the option “Dial-up to the Internet”, then click “Next”. Now select “I want to set up my Internet connection manually, or I want to connect through a local area network (LAN)” and click “Next”. In the next dialog, choose the option “I connect through a phone line and a modem”, then click “Next”.
3. In the “Choose Modem” dialog, select one of the following modem entries:
   - cFos ISDN, CompuServe
   - cFos ISDN, X.75, Defaults, Mailbox Settings

   Then click “Next”.

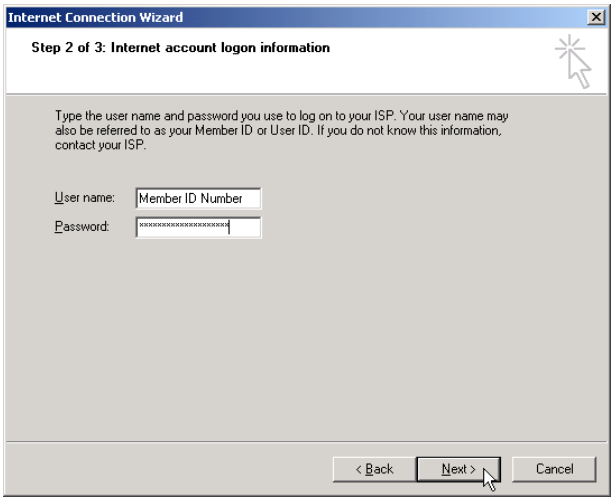


4. In the “Internet account logon information” dialogs that follow, do the following:

   – Enter the phone number to dial for CompuServe access and click “Next”.

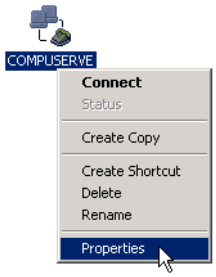
   – Enter your CompuServe User ID and password and click “Next”.

   – Enter “COMPUSERVE” as the connection name and click “Next”.



5. In the dialog “Set Up Your Internet Mail Account”, select “No” then click “Next”. Deactivate the option “To connect to the Internet immediately, select this box and then click Finish”. Now click the “Finish” button to complete the dial-up configuration.

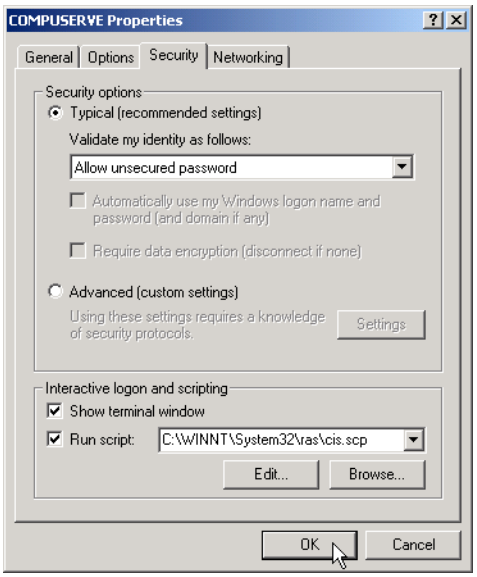
6. In the “Network and Dial-Up Connections” window, select the new “COMPUSERVE” icon, right-click it and select “Properties” in the context menu.



7. In the “COMPUSERVE Properties” dialog, click the “Options” tab. In the “Dialing options” group, select the options “Display progress while connecting” and “Prompt for name and password, certificate, etc.” In the “Redial attempts” group, set the desired number of attempts, the delay between redial attempts, and the delay before an idle connection should be hung up. If desired, you may enable the option “Redial if line is dropped”. Click the “X.25” button and make sure the settings are blank, then click “OK”.

8. Click the “Security” tab. Select the option “Typical (recommended settings)” and make sure that the option “Validate my identity as follows:” is set to “Allow unsecured password”. In the “Interactive logon and scripting” group, select the options “Show terminal window” and “Run script”, and select the script “cis.scp” in the list.

   Note: You may also edit the script to speed up the logon process. Change the statement **`/go:pppconnect^m`** in the script to **`/noint/go:pppconnect^m`**



9. Now click the “Networking” tab. In the list labeled “Type of dial-up server I am calling”, choose the entry “PPP: Windows 95/98/NT4/2000/Internet”. In the option group “Components checked are used by this connection”, make sure that only “Internet Protocol (TCP/IP)” is selected. Then click “OK”.

10. Double-click the “COMPUSERVE” icon in the dial-up window to test your settings. If the dial-in succeeds, the terminal window will appear as illustrated below:

    Click “Done” to complete the connection procedure.

After you have successfully logged on, the Dial-up Networking icon appears in the system tray on the task bar. Click this icon to hang up the connection, or select “Open Dial-up Monitor” to get information about your connection, including the DCE connection speed (bps) and your IP address (“Details” button).

11.4 Using AOL

In order to be able to use AOL with your IBM International ISDN PC Card, you must have cFos installed, unless you plan to use only the CAPI 2.0-compliant AOL 5.0 or higher access software on your system. In this case you may not need to install cFos.

This section is based on Windows 9x. At the time of writing, there was no AOL access software available for Windows NT 4.0 or Windows 2000, so that AOL use could not be tested.

Please ask your local AOL help desk what communication protocol is used for dial-in. In Europe the X.75 protocol is widely used.

IBM has tested the AOL 4.0 and higher access software.

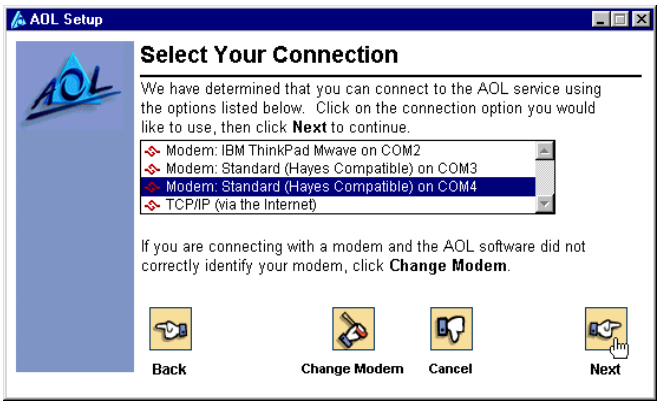
11.4.1 AOL 4.0 and Other non-CAPI 2.0-compliant AOL Access Software

AOL 4.0 or a non-CAPI 2.0-compliant AOL access software version may only detect modems assigned to COM ports 1 to 4. It is strongly recommended that you configure cFos to use COM4.

Note: The screen shots in this section may vary somewhat from the user interface you see on your screen.

Before you can use AOL 4.0 or any non-CAPI 2.0-compliant AOL access software, you must configure cFos for use with it by installing either the "cFos ISDN, X.75, Defaults, Mailbox Settings" or the "cFos ISDN, CompuServe" modem emulation on either COM3 or COM4.

When you perform a fresh installation of the AOL 4.0 access software or a non-CAPI 2.0-compliant AOL dialer software, or when you reconfigure the already installed AOL dialer, select the option to "Begin automatic setup". The AOL software then searches for an installed modem. When the search is completed, AOL announces it has found a modem as illustrated below.



Click the “Next” button to use AOL with the selected modem.

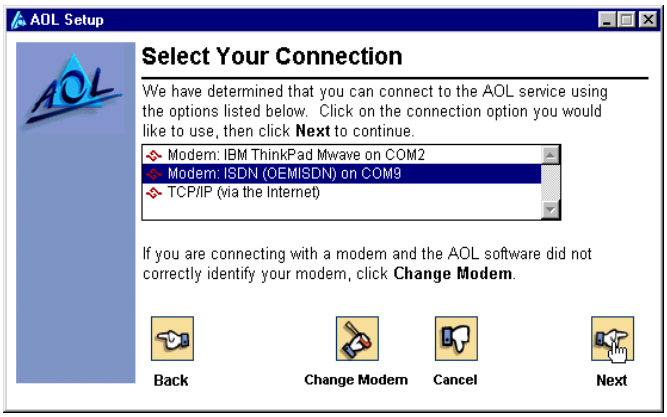
Please contact your local AOL help desk if AOL does not detect your modem correctly.

11.4.2 CAPI 2.0-compliant AOL 5.0 and Higher

11.4.2.1 CAPI 2.0-compliant AOL 5.0 and Higher without cFos Installed

In some countries, such as Germany and the UK, AOL ships its AOL 5.0 access software in a version designed for CAPI 2.0. When you install AOL 5.0, it automatically installs an OEM version of cFos which is then used only by AOL 5.0.

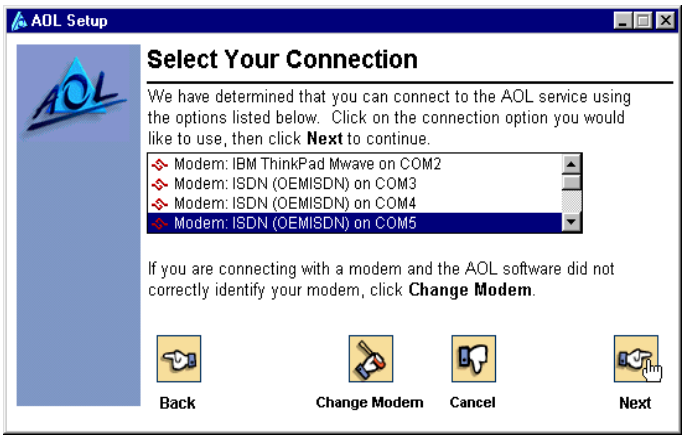
When the AOL 5.0 access software searches for a modem, it detects the IBM International ISDN PC Card as illustrated below.



Click “Next” to set up AOL 5.0 with the selected modem emulation, and follow all further instructions displayed on your screen.

11.4.2.2 CAPI 2.0-compliant AOL 5.0 and Higher with cFos Installed

1. After you have installed the CAPI 2.0-compliant AOL 5.0 or higher software, check the cFos configuration. To do so, click “Start / Programs / cFos ISDN & DSL Driver / Configure cFos”. In the cFos configuration program, select “Configure MSN and parameters”. If the parameter -kv appears in the additional parameters field, remove it. Then click “OK”. Select “Save changes”, click “OK” and then confirm that you want to restart your computer by clicking “Yes”.
2. After the system has restarted, verify that you have installed either the “cFos ISDN, CompuServe” or the “cFos ISDN, X.75, Defaults, Mailbox Settings” modem emulation. Make a note of the COM ports on which these modem emulations are installed.
3. Now you can start AOL 5.0 or higher and let it search for a modem. The software detects your IBM International ISDN PC Card as illustrated below. Select the modem entry that corresponds to your cFos modem emulation.



4. Click “Next” and follow all further instructions displayed on your screen to set up AOL 5.0 or higher with the selected modem.

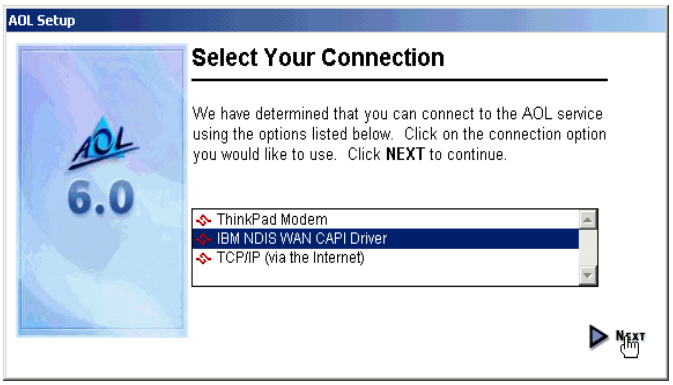
11.4.3 CAPI 2.0-compliant AOL 6.0 and Higher

11.4.3.1 CAPI 2.0-compliant AOL 6.0 and Higher for Windows 9x and Windows Millennium Edition

Obtain the correct version of AOL 6.0 for your operating system. AOL maintains separate versions for Windows 9x and Windows Millennium Edition. The installation instructions for AOL 6.0 in these operating systems are exactly the same as those outlined in the chapter “CAPI 2.0-compliant AOL 5.0 and Higher” on page 144.

11.4.3.2 CAPI 2.0-compliant AOL 6.0 and Higher for Windows 2000

Obtain the AOL 6.0 software for Windows 2000. Note that AOL does not support Windows NT 4.0. AOL 6.0 for Windows 2000 does not require that you install cFos for Windows NT / 2000. When AOL 6.0 for Windows 2000 searches for communication devices, it detects the IBM International ISDN PC Card and displays it as “IBM NDIS WAN CAPI DRIVER”, alongside any analog modems found.



AOL 6.0 for Windows 2000 uses the NDIS WAN Miniport driver to connect over ISDN.

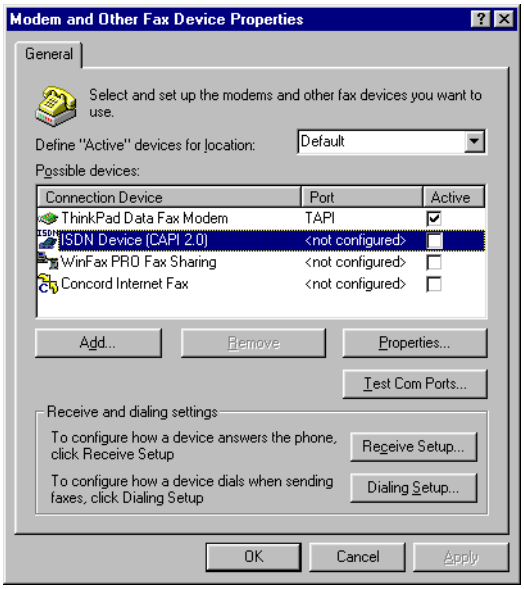
If you encounter problems of any kind, please contact your local AOL help desk and tell the support personnel that you are using a fully CAPI 2.0-compliant ISDN device to connect to AOL.

11.5 Using Symantec's WinFax PRO

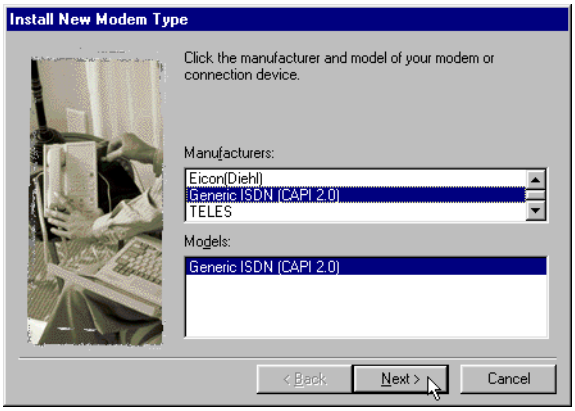
This section briefly describes the use of the IBM International ISDN PC Card with WinFax PRO 9.0 and higher. Please refer to the WinFax PRO User's guide or get in touch with your local Symantec help desk for further assistance.

11.5.1 WinFax PRO 9.x

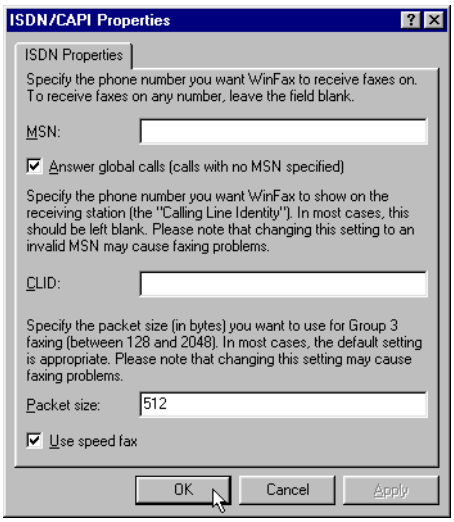
1. Start WinFax PRO 9.x. Select the menu command "Tools / Setup / Guided Setup". In the "Guided Setup" dialog, select "Modem/Other Device Setup". In the "Possible devices" list, select "ISDN Device (CAPI 2.0)". Click the "Properties" button.



2. If a message appears informing you that the ISDN device has not been configured, click “Yes” to configure it. In the “Install New Modem Type” dialog, scroll down to “Generic ISDN (CAPI 2.0)” in the “Manufacturers” list, then select the corresponding entry in the “Models” list. Click “Next”.

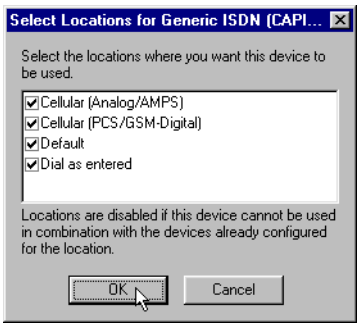


3. In the “ISDN/CAPI Properties” dialog, enter an MSN (Multiple Subscriber Number) and a CLID (Calling Line Identification). In the “Packet size” field, enter 512.



4. If you did not enter an MSN in the previous step, WinFax PRO displays a warning that you must enter an MSN in order to receive faxes. At this point you must enter an MSN.

5. When you have done so, click “Finish” in the last dialog. Now the “Select Locations for Generic ISDN (CAPI 2.0)” dialog appears. Usually all the options in this dialog are enabled. Leave these settings as they are and click “OK”.



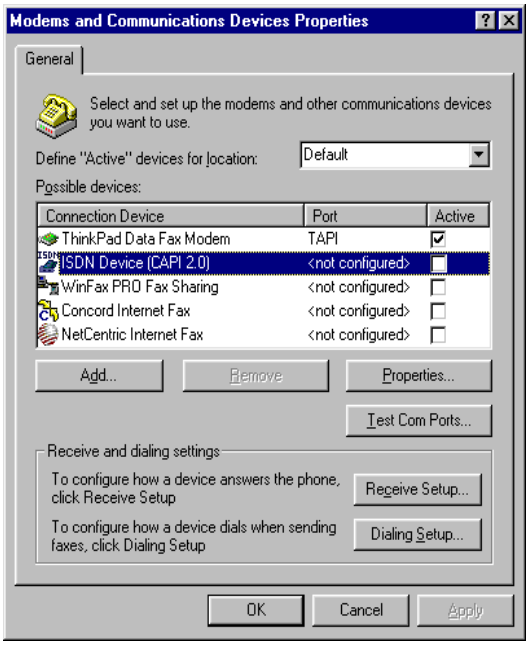
6. If you have not yet configured your country information for modem dialing, a message appears asking whether you want to configure how this device dials when sending faxes. Click “Yes”.

7. On the “Location” page in the “Dialing Properties” dialog, select the country you are in and add your area code and phone number. Then click “OK”.

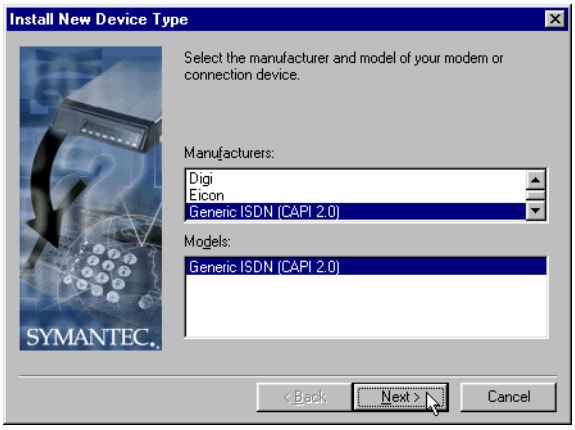
8. In the “Modem and Other Fax Device Properties” dialog, click “OK”. This completes the configuration of WinFax PRO 9.x.

11.5.2 WinFax PRO 10.0

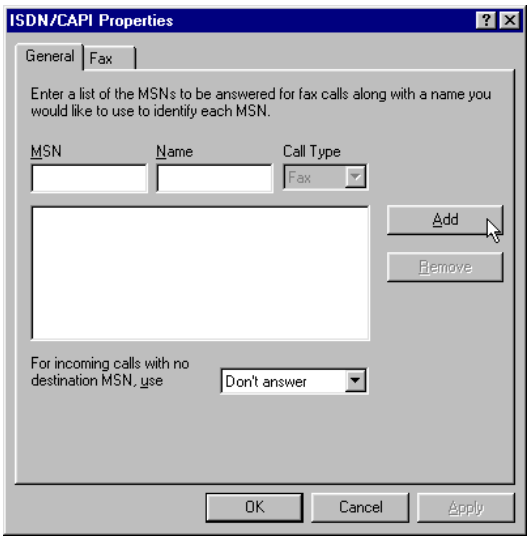
1. Start WinFax PRO 10.x. Select the menu command “Tools / Program Setup”. In the “WinFax PRO Program Setup” dialog, select “Modems and Communications Devices”. In the “Possible devices” list, select “ISDN Device (CAPI 2.0)” and click the “Properties” button.



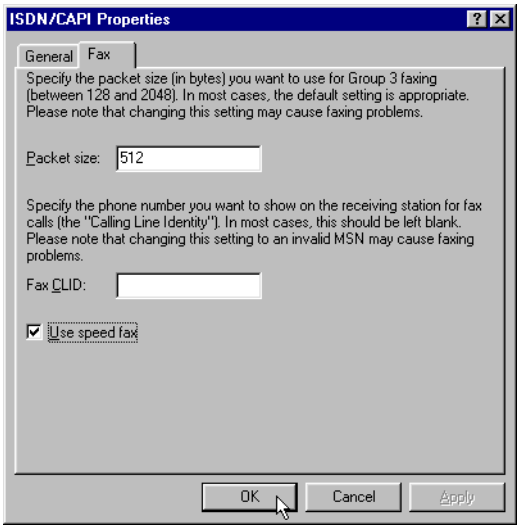
2. If a message appears informing you that the ISDN device has not been configured, click “Yes” to configure it. In the “Install New Device Type” dialog, scroll down to “Generic ISDN (CAPI 2.0)” in the “Manufacturers” list, then select the corresponding entry in the “Models” list. Click “Next”.



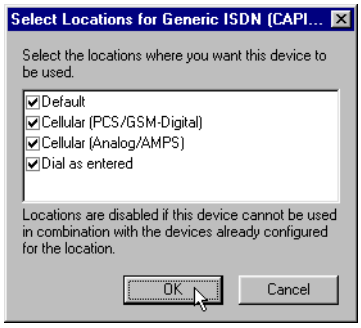
3. If a warning appears informing you that the CAPI driver has not been verified by Symantec, simply acknowledge it by clicking “OK”. In the “ISDN/CAPI Properties” dialog, you can now enter MSNs and assign them names. Click “Add” after entering each MSN and its name to make them available in WinFax PRO 10.0. When you have finished adding MSNs, click the “Fax” tab.



4. Now enter 512 in the “Packet size” field, and enter one of your ISDN line's MSNs as a fax CLID (Calling Line Identification). Click “OK” to complete the configuration process.



5. In the “Install New Device Type” dialog, click “Finish”. Now the “Select Locations for Generic ISDN (CAPI 2.0)” dialog appears. Usually all the options in this dialog are enabled. Leave these settings as they are and click “OK”.



6. If you have not yet configured your country information for modem dialing, a message appears asking whether you want to configure how this device dials when sending faxes. Click “Yes”.

7. On the “Location” page in the “Dialing Properties” dialog, select the country you are in and add your area code and phone number. Then click “OK”.

8. In the “Modem and Communications Devices Properties” dialog, click “OK”. In the ”WinFax PRO Program Setup” dialog, click “OK” again. This completes the configuration of WinFax PRO 10.0.

11.6 IBM DIALs Client

This section explains the basic use of the IBM DIALs Client in Windows 95 and Windows 98. The client software should work with the following IBM products:

- 8235 DIALs Server
- 2210 Nways Multiprotocol Router and Multiprotocol Routing Services (MRS)
- 2212 Access Utility (AIS)
- 2216 Nways Multiaccess Connector

Support for the use of the IBM DIALs client is available at the following web site:

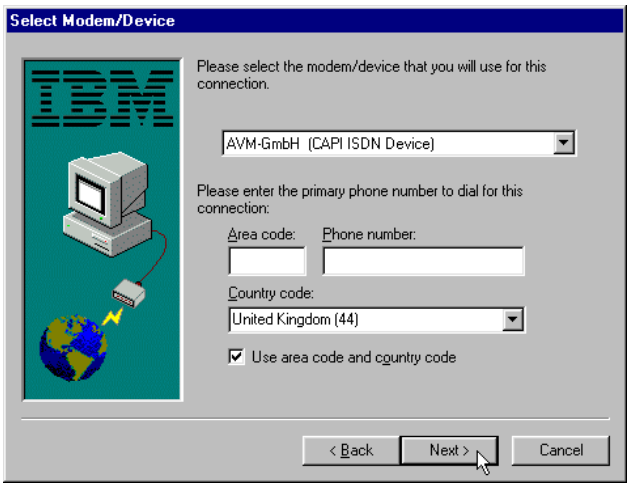
http://www.networking.ibm.com/support

This section only describes the use of the Dial-In client.

The latest DIALs Client can be obtained from the download section of the 2210 support page located at http://www.networking.ibm.com/support/code.nsf/2210dial?OpenView. This client works with the 8235, 2210, 2212, and 2216.

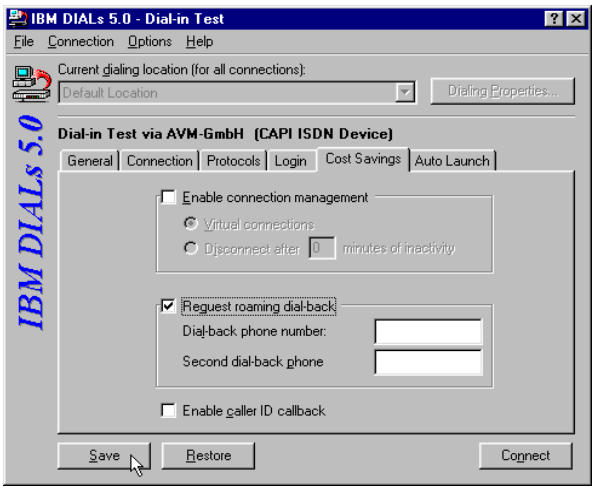
1. After installing the IBM DIALs client on your notebook, double-click the “My Computer” icon. The “Dial-In Networking” icon which now appears represents the DIALs client. Double-click this icon.

2. In the “Dial-In Networking” window, double-click the “Make New Connection” icon.
3. The “New Connection Wizard” starts. Enter a name for the connection in the “New connection name” field. In the “Select Modem/Device” dialog, select “AVM-GmbH (CAPI ISDN Device)” in the drop-down list. Enter any phone number and select the country code if necessary. Click “Next”. In the last dialog, click “Finish”.



4. To require the router to call back, select the connection in the “Dial-In Networking” window, right-click it, and select “Properties” in the context menu as shown in the example below.

5. In the “Properties” dialog, click the “Cost Savings” tab. Fill in the appropriate fields, then click “Save”. You may now dial up the connection immediately, or simply close the dialog.



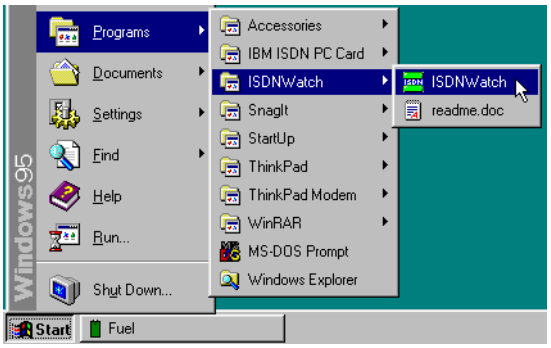
11.7 Using ISDNWatch

ISDNWatch is a small utility for Windows 9x, Millennium Edition, NT 4.0, 2000, and XP for use with any CAPI 2.0-compliant ISDN adapter. It displays the status of the B channels and related information.

In order to install and use ISDNWatch, you must have a CAPI 2.0-compliant ISDN adapter installed!

1. Open the folder “\TOOLS\ISDNWATCH” on the device driver CD. Double-click the file “Setup” to start the installation.
2. Select the installation language and click “OK”. In the next dialog you may choose the installation directory. The default path is “C:\Program Files\ISDNWatch”. To select a different installation directory, click “Browse”; otherwise, click “Next” to install ISDN Watch in the default path.

3. When the installation has been completed, click “Finish”. A shortcut to the ISDNWatch utility is installed by default in the Start menu under “Programs / ISDNWatch”. To start the program, click the “ISDNWatch” shortcut.



4. After starting ISDNWatch, dial up a connection. An icon in the system tray on the task bar indicates that one or both of the B channels are in use. Each B channel in use is represented by a green bar. If both B channels are active, then the ISDNWatch icon displays two green bars.

5. To configure the ISDNWatch settings, right-click the ISDNWatch icon in the system tray on the task bar.

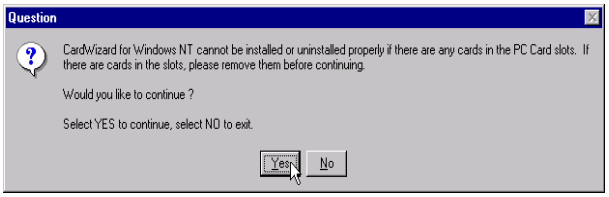
11.8 Installing CardWizard(TM) 5.20 for Windows NT 4.0 Trial Version

Before installing any version of SystemSoft's ® CardWizard(TM) software, make sure that no adapter is currently inserted in any PC Card (PCMCIA)slot,and verify that you have removed any older versions of CardWizard. For more information on how to remove CardWizard from your Windows NT 4.0 Workstation system please see page 42.

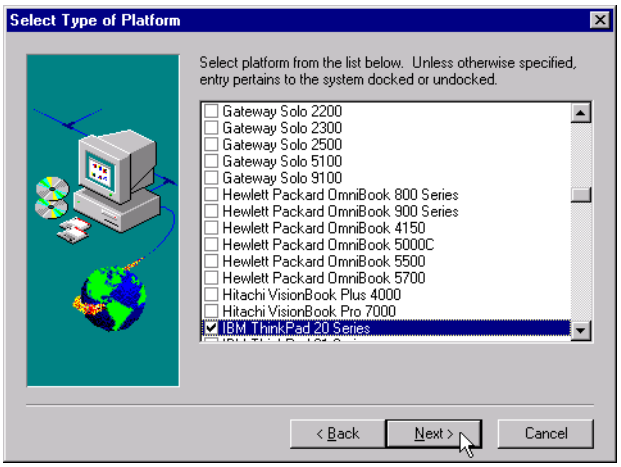
For details on ordering or upgrading SystemSoft's® CardWizard(TM) Software, please visit the following web site:

`http://www.systemsoft.com`

1. Download the evaluation version from the IBM International ISDN PC Card web page and read the accompanying Readme file. Start the setup program as instructed in the Readme file.
2. In the first two dialogs, click the “Next” button. In the “Software License Agreement” window, read the End-User License agreement. If you agree to the license conditions, click “Yes”.
3. The “Question” message reminds you that you must remove all PC Cards from all of your computer's PCMCIA slots. If you have done so, click “Yes” to continue the installation.



4. In the next dialog, you must select the type of notebook you are using. Select the appropriate model in the list, then click “Next”.



5. In the next dialog you can select a “Power Management Utility”:

   – SystemSoft PowerProfiler/PPSE

   – IBM Power Management System

   – None

   For IBM notebooks, select the “IBM Power Management System”. For any other notebook you may select either the “SystemSoft PowerProfiler” or “None”. If you are not sure what to choose, please contact either the manufacturer of your notebook computer or SystemSoft for further assistance.

   On Toshiba notebooks you can also select the Toshiba Power management during the CardWizard(TM) installation. If you have further questions about this feature, please refer to the SystemSoft web site.

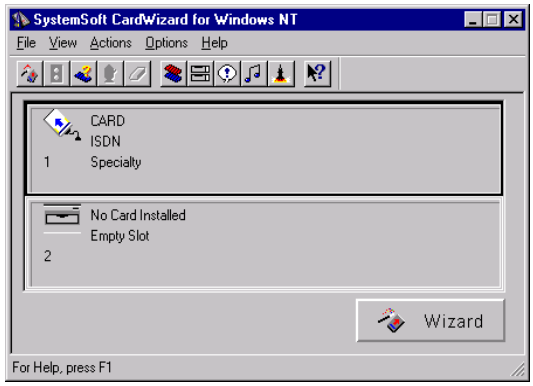
6. In the next dialog you can choose the installation directory for the software. If you want to accept the default path, “C:\Program Files\SystemSoft\CardWizard\”, click “Next”. Otherwise, click “Browse” and open the desired installation directory.

7. After the setup has been completed, click “Yes” to read the CardWizard(TM) Readme file.

8. After you have completed the installation and read the Readme file, confirm that you want to restart your computer by selecting the option “Yes, I want to restart my computer now”, then clicking “Finish”. You must restart the system in order for the changes to take effect.

9. If you are using the trial version of SystemSoft's® CardWizard(TM) 5.20, the following window appears after the system restart.

10. After you have completed the installation of the IBM International ISDN PC Card, the adapter will be listed in the CardWizard(TM) Window as a specialty card.



12 Removing the IBM International ISDN PC Card

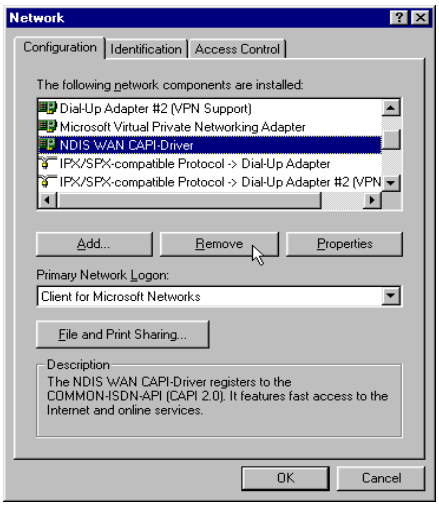
The IBM International ISDN PC Card is removed in two steps from your Windowsbased computer:

- Remove any NDIS WAN CAPI Drivers installed
- Remove the CAPI 2.0-compliant drivers

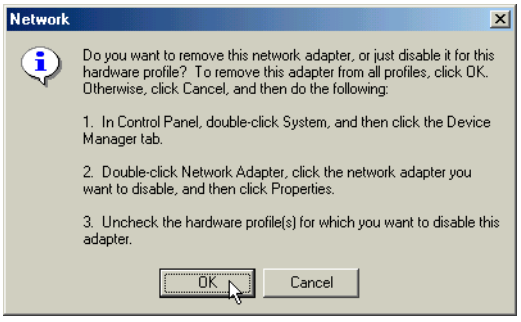
12.1 Removing the IBM ISDN PC Card from Windows 95, Windows 98 and Windows Millennium Edition

1. Leave the IBM International ISDN PC Card in the PCMCIA slot. Disconnect the card's ISDN cable from the ISDN Line.

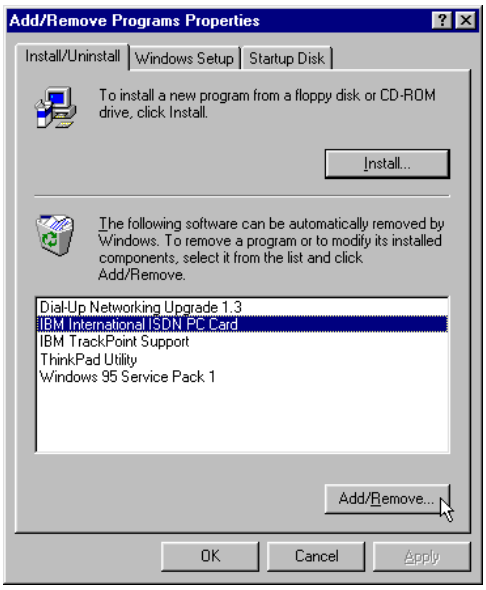
2. Click "Start / Settings / Control Panel" to open the Control Panel.
3. Double-click the "Network" icon.
4. On the "Configuration" dialog page, select the "NDIS WAN CAPI Driver" in the list of network components.
5. Click "Remove" button, then "OK". Confirm that you want to restart your computer.



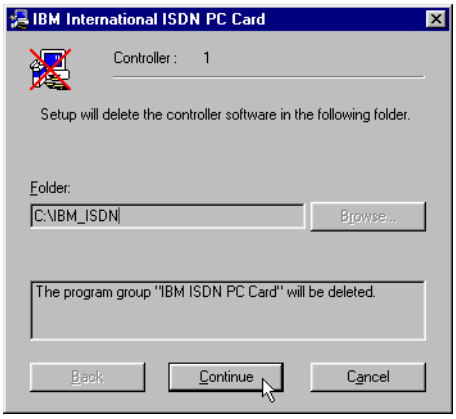
In Windows Millennium Edition, the following dialog prompts you to confirm that you want to remove the driver from all hardware profiles. Click "OK" to confirm that you want to remove the NDIS WAN CAPI driver.



6. Once your computer has restarted, open the Control Panel again. Double-click the "Add/Remove Programs" icon.
7. On the "Install/Uninstall" dialog page, select the "IBM International ISDN PC Card" in the list of programs.



8. In the “IBM International ISDN PC Card” dialog, click “Continue”.



9. Wenn the card has been completely removed, click “OK”. When prompted to restart the computer click “No”.

10. Shut down Windows and turn it off the computer if necessary.

11. Remove the IBM International ISDN PC Card from the PCMCIA slot.

This completes the removal of the adapter.

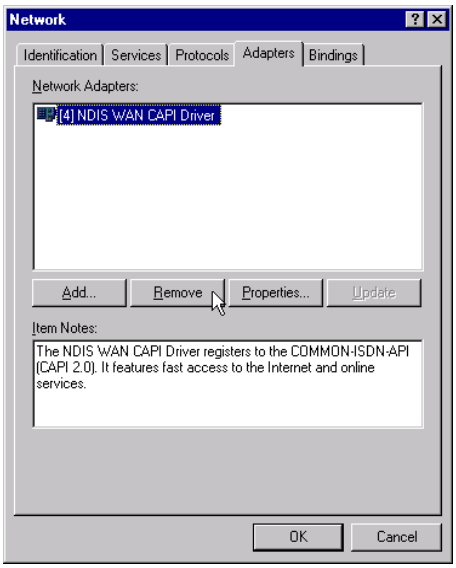
12.2 Removing the IBM ISDN PC Card from Windows NT 4.0 Workstation

The following section assumes that you are logged on to a Windows NT 4.0 Workstation system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

1. Leave the IBM International ISDN PC Card in the PCMCIA slot. Disconnect the card's ISDN cable from the ISDN line.

2. Click"Start / Settings / Control Panel" to open the Control Panel. Double-click the "Network" icon. Click the "Adapters" tab and then "NDIS WAN CAPI Driver".

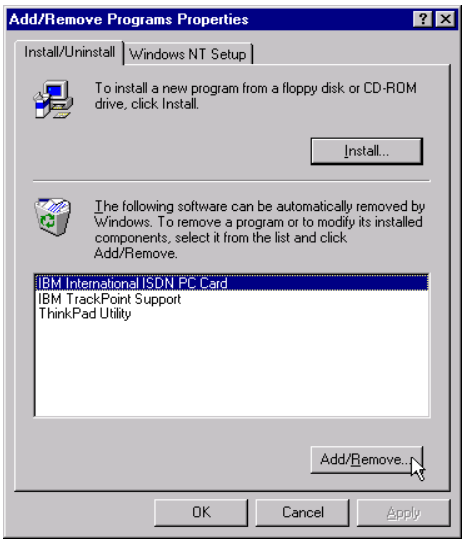
3. Click the "Remove" button and confirm that you want to remove this device.



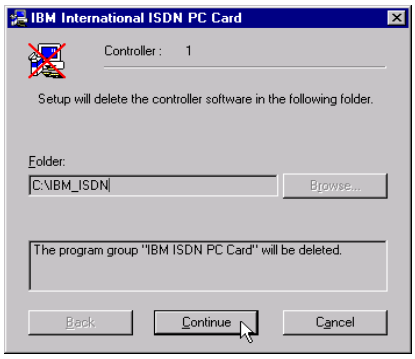
4. Click “Close”. After Windows NT 4.0 Workstation has finished updating the network configuration, restart your system.

5. Wenn your computer has restarted, open the Control Panel again. Double-click the “Add/Remove Programs” icon.

6. On the “Install/Uninstall” dialog page, select the “ISDN CAPI Port” in the list of programs.



7. In the “IBM International ISDN PC Card” dialog, click “Continue”.



When the card has been completely removed, click “OK”.

8. When prompted to restart the computer, click “No”. Shut down Windows and turn off the computer if necessary. Remove the IBM International ISDN PC Card from the PCMCIA slot.

This completes the removal of the adapter.

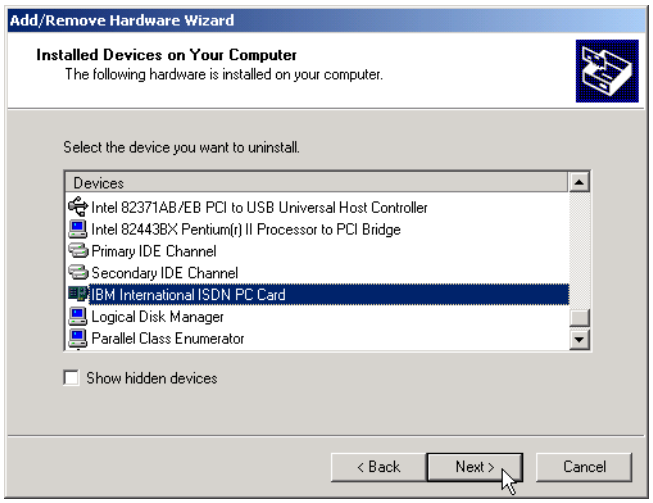
12.3 Removing the ISDN PC Card from Windows 2000 Professional

The following section assumes that you are logged on to a Windows 2000 Professional system as Administrator. If you are not logged on as Administrator, you may not be able to perform all the steps outlined in this chapter.

1. Leave the IBM International ISDN PC Card in the PCMCIA slot. Disconnect the card’s ISDN cable from the ISDN line.
2. Click “Start / Settings / Control Panel” to open the Control Panel.

3. Double-click the ”Add/Remove Hardware” icon.
4. When the ”Add/Remove Hardware Wizard” starts, click “Next”.
5. In the “Choose a Hardware Task” dialog, select the option “Uninstall/Unplug a device”, then click “Next”.

   In the subsequent window click “Uninstall a device” and then “Next”.

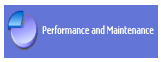


6. In the device list, select the entry for the “IBM International ISDN PC Card”, then click “Next”.
7. In the “Uninstall a device” dialog, confirm that you want to remove the IBM International ISDN PC Card. Click “Next”.
8. Click “Finish” and then shut down Windows. Switch off your computer if necessary.
9. Remove the IBM International ISDN PC Card from the PCMCIA slot.

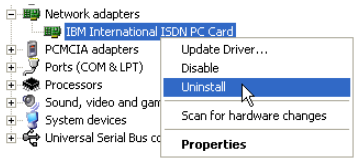
This completes the removal of the adapter.

12.4 Removing the ISDN PC Card from Windows XP Home Edition and Professional

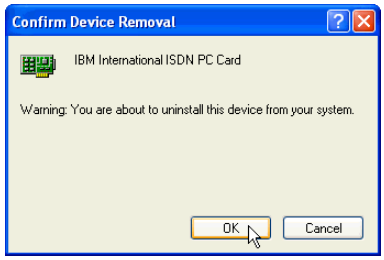
1. Leave the IBM International ISDN PC Card in the PCMCIA slot. Disconnect the card's ISDN cable from the ISDN line.



2. Click "Start / Control Panel" to open the Control Panel.
3. Double-click the "Performance and Maintenance" icon.
4. In "System Properties" dialog, click the "Hardware" tab, then the "Device Manager" button. In the Device Manager, scroll down to "Network adapters" in the device list and click the plus beside it to expand the node. Select the "IBM International ISDN PC Card". Right-click it and select the command "Uninstall" in the context menu.



5. The next dialog prompts you to confirm that you want to remove the IBM International ISDN PC Card. Click "OK".



When windows announces that the IBM International ISDN PC Card has been removed, close all the remaining windows. This completes the removal procedure.

13 Using NDIS

This section contains instructions for using NDIS.

13.1 Using NDIS in Windows 95, Windows 98 and Windows Me

13.1.1 The NDIS WAN CAPI Driver

The NDIS WAN CAPI Driver for Windows 95 provides the capability for dial-up networking (RAS) over ISDN. The NDIS WAN CAPI driver is based upon the standardized CAPI 2.0 application interface, and can be used with all CAPI 2.0-compliant ISDN adapters.

To install the driver into MS Windows 95, you will need either the Microsoft ISDN Accelerator Pack v1.1 or its successor, Microsoft Dial-Up Networking 1.3 Upgrade.

Do not install both of these programs at the same time!

Both programs extend the functionality of Windows 95 Dial-Up Networking, and form the basis for installation of the NDIS WAN CAPI Driver for Windows 95. This software can be found in the “Tools” directory on the CD-ROM.

Both products contain a WAN architecture for Windows 95, identical to that of Windows NT, with features beyond simple modem support. This software allows Windows 95 to support media such as X.25, Frame Relay and ISDN.

Please note that this architecture allows you to set up only ISDN connections based on the Point-to-Point-Protocol (PPP) over ISDN and HDLC using Dial-Up Networking, unlike the ISDN CAPI Port Driver, which provides a UNIMODEM/VCOMM driver. HyperTerminal, CompuServe client software and similar packages cannot be used with the ISDN Accelerator Pack. For these packages, please use the ISDN CAPI Port Driver or cFos.

NDIS is an abbreviation for Network Device Interface Specification and defines a standard for binding network adapters (hardware) to network protocols (software). NDIS WAN is a Microsoft extension of this standard for Wide-Area Networking (WAN). The NDIS WAN CAPI driver thus allows the ISDN adapter to be used as a WAN adapter, addressed through the Common ISDN API (CAPI) 2.0 applications interface.

13.1.2 Installation

13.1.2.1 Installing the ISDN Adapter

Install the ISDN adapter as instructed in the manual. Always use the latest CAPI 2.0 driver.

13.1.2.2 Installing Windows 95 Dial-Up Networking 1.3

If Dial-Up Networking has not yet been installed, install it now:

1. Click “Start / Settings / Control Panel / Add/Remove Programs / “Windows Setup” tab / Communications / Details / Dial-Up Networking / OK” .
2. You are prompted to confirm that you want to install Microsoft Dial-Up Networking. Click “Yes”.
3. Accept the terms of the license agreement by clicking “Yes”.
4. If the TCP/IP protocol is not yet installed on your computer, start the installation by clicking “Yes”.
5. After having restarted your computer, Windows updates several files. During this process, you must insert the Windows 95 CD-ROM when prompted. To complete the installation of Microsoft Dial-Up Networking 1.3, restart your computer.

13.1.2.3 Installing the Microsoft ISDN Accelerator Pack v1.1

You can obtain this software directly from Microsoft, or download it over the Internet:

http://www.microsoft.com/windows/getisdn/

Copy the file a temporary directory on your hard drive, then start the installation by double-clicking the file "msisdn11.exe" After you have accepted the Microsoft license agreement, the ISDN Accelerator Pack v1.1 is installed. At the end of the installation procedure, the following message is displayed:

"If you are installing an ISDN adapter, you should now refer to the setup directions provided by the manufacturer."

Acknowledge this message, then restart Windows to complete the installation of the Microsoft ISDN Accelerator Pack v1.1. After successful installation, the program group "ISDN Programs" appears in the "Accessories" folder.

13.1.2.4 Installing the NDIS WAN CAPI Driver for Windows 95

You can now install the NDIS WAN CAPI Driver for Windows 95.

1. Open the Windows 95 Control Panel and click the "Network" icon.
2. Select "Add / Adapter / Add". In the next dialog, click the "Have disk" button. In the "Install from Disk" dialog, enter the path to the directory containing the NDIS WAN CAPI Driver files. Confirm this by clicking "OK".
3. A driver with the name "NDIS WAN CAPI Driver" is displayed. Confirm this by clicking "OK".
4. The required files are then copied to your hard disk. Afterward, the network configuration dialog should display at least the following components:

   - Network Adapter: NDIS WAN CAPI Driver

- Network Adapter: Dial-Up Adapter

- Protocol: NDISWAN / NDIS WAN CAPI Driver

5. Now add any network protocols you require, such as TCP/IP, IPX/SPX or NetBIOS (you will need TCP/IP for the test connection described below). Check the bindings of the protocol to the dial-up adapter. Remove any unnecessary protocol bindings. Such changes can also be carried out later.

6. To continue the installation, confirm the settings in the network configuration dialog by clicking “OK”. The ISDN Accelerator Pack's “ISDN Configuration Wizard” starts automatically to assist you with the further configuration of the driver. Click “Next”.

7. In the next window, select the setting “Switch Protocol: Automatic“, since the D channel protocol was already selected during the installation of the ISDN adapter's driver software, and does not need to be entered again here. Click “Next”.

8. The next dialog allows you to assign Multiple Subscriber Numbers (MSNs) for both “Modem Entries” of the NDIS WAN CAPI Driver, if required, in the “Phone Number” field. Confirm your entries by clicking “Next”.

   You must assign MSNs if the ISDN adapter is to be used in RAS Server mode, and other CAPI applications which answer data calls (with the service indicator DATA64K) are present on your PC. This is necessary in order to direct incoming calls to the correct application. The Multiple Subscriber Number entered is used for both incoming and outgoing calls: you cannot configure separate incoming and outgoing MSNs. If you need a separate MSN for outgoing calls, then you should use the ISDN CAPI Port Driver or cFos. Subsequent changes to the MSN setting will only become active after Windows is restarted.

9. When the ISDN Configuration Wizard has finished, you are prompted to insert the Windows 95 CD-ROM. If a version conflict is reported for the file “NDIS.VXD” (Windows NDIS 3.1 Wrapper) when copying files from the

CD-ROM, then answer “Yes” to the question “Do you want to keep this file?” The file “NDIS.VXD” that was copied on to your system by the ISDN Accelerator Pack v1.1 setup is more recent than the version on the Windows 95 CD-ROM.

10. The installation is then complete. After restarting the computer, the ISDN Accelerator Pack v1.1 is ready to use in conjunction with the NDIS WAN CAPI Driver for Windows 95.

13.1.3 Connections to Internet Service Providers (ISPs)

There are no binding standards for ISDN dial-up access to ISPs. PPP and SLIP protocol variants, fixed and dynamically assigned IP addresses, static or dynamic name server addresses and a variety of authentication procedures are all possible.

For TCP/IP connections with the NDIS WAN driver, you must use 32-bit client software (such as web browsers and FTP clients), and not 16-bit software for Windows 3.x. Otherwise, no IP connection can be established with Windows 95's 32-bit TCP/IP protocol stack.

13.1.3.1 ISDN B Channel Protocols and PPP Variants

Many Internet providers use HDLC or the X.75 protocol on the ISDN B channel. Two protocol variants are used for PPP connections: “PPP over ISDN“, based on RFC 1618 and also known as synchronous PPP; and “modem-style PPP“, based on RFC 1162 and also called asynchronous PPP.

Your Internet Service Provider can tell you which protocol combinations and authentication procedures you need for ISDN access.

Incorrect protocol settings will result in either immediate termination of the connection, or failure to establish a connection at all, with the Dial-Up Networking error message: “The computer you are dialing in to is not answering.”

Unlike the ISDN CAPI Port Driver, the NDIS WAN CAPI Driver works only with the following protocol combinations:

- ISDN B2 protocol: HDLC Transparent
- PPP variant: “PPP over ISDN” in accordance with RFC 1618 (“synchronous PPP”)

These settings are fixed in the Microsoft NDIS specification, and cannot be modified by the user. If you require other protocols or PPP variants, you should use the ISDN CAPI Port Driver or cFos.

13.1.4 Connecting PCs Using Remote Access Service (RAS)

This section provides information on connecting your Windows 95 PC with another PC (Windows 95 or Windows NT) for the purpose of accessing remote files. For assistance with RAS configuration, please refer to the Windows 95 manual or on-line Help.

In this section, “Server” refers to the PC waiting to answer an incoming call, while “Client” refers to the PC that dials up the ISDN connection. The RAS configuration procedures for Windows 95 and Windows NT are different. Windows NT 3.51/4.0 allows you to operate RAS in server mode using the appropriate NDIS WAN CAPI Driver for Windows NT.

13.1.4.1 Remote Access Service (RAS) in Windows 95

To use RAS, you need the following components:

- An ISDN adapter with current CAPI 2.0-compliant driver software
- The NDIS WAN CAPI Driver for Windows 95
- Dial-Up Networking (with the Dial-Up Server module for the server PC)
- A network protocol (such as NetBEUI) with suitable client software, bound to the dial-up adapter

Make sure that all of these components are installed, and determine the correct configuration options for the client software. Windows 95 only allows one Dial-Up Networking connection to be active at a time. In the following configura-

tion example, the NetBEUI protocol from Microsoft is used to map a folder on the remote server's hard drive to a network drive on the client computer, allowing the client to access the remote folder over ISDN as if it were a local disk drive.

13.1.4.2 RAS Configuration Example

(Local Site: Windows 95 computer; Remote Site: Windows 95 computer; both equipped with ISDN adapters)

Preparations (Client and Server)

1. Install the Dial-Up Server (on the server only)

   For a Windows 95 computer to operate as a RAS server, the file "RNASERV.DLL" must be present in the \WINDOWS\SYSTEM directory. This file is usually installed with the MS ISDN Accelerator Pack 1.1, but can also be installed from the Windows 95 Plus Pack. If this DLL is present, then the command "Dial-Up Server" appears in the "Connections" menu of the Dial-Up Networking window.

2. Install the NetBEUI protocol

   Click "Control Panel / Network / Add... / Protocol / Add... / Manufacturer: "Microsoft" / NetBEUI"

3. Check the protocol binding

   "Control Panel / Network / select Dial-Up Adapter / Properties / "Bindings" tab / NetBEUI" must be active.

4. Install the client

   "Control Panel / Network / Add... / Client / Add... / Manufacturer: "Microsoft" / Client for Microsoft Networks"

5. Install File and Print Sharing (on the server only)

   "Control Panel / Network / Add... / Service / Add... / Manufacturer: select "Microsoft"/ File and print sharing for Microsoft Networks"

Configuring the Windows 95 Server

1. Define the computer name

   "Control Panel / Network / Identification / Computer name"

   Example: SERVER

2. Activate File and Print Sharing:

   "Control Panel / Network File and Print Sharing... / "I want to be able to give others access to my files"

3. Share a directory

   Start the Explorer / select the directory to be shared, such as "C:\TEST" / right-click it to open the context menu / Sharing / Select "Shared as:" / Enter a share name, such as "TEST" / Access type: "Full" / OK

4. Activate the server

   My Computer / Dial-Up Networking / Connections / Dial-Up Server / select "NDIS WAN Line 1" or "Line 2" / activate "Allow call access"

Configuring the Windows 95 Client

1. Create a new Dial-Up Networking connection

   "My Computer / Dial-Up Networking / Make new connection / Enter connection name / Select modem: "NDIS WAN Line 1" or "Line 2" / Continue / Enter phone number (including outside dialing prefix for a PBX extension line if necessary) / Continue / Finish"

2. Configure the Dial-Up Networking connection

   Select the newly created Dial-Up Networking connection / Click with the right mouse button and select "Properties" / Deactivate the option "Use country codes and area codes" / Server Type / Set "Type of Dial-Up Server" to "PPP: Windows 95, Windows NT 3.5, Internet" / Further Options: activate the "Log on to network" and "Enable software compression" options / select "NetBEUI" as the allowed network protocol / OK / OK

3. Activate the Dial-Up Networking connection

   Double-click on the newly created connection in the Dial-Up Networking window and verify the phone number

4. Map a drive to the shared folder on the remote computer

5. Start Explorer / “Tools” menu / “Map Network Drive” / Select an available drive letter / Enter the path in UNC format as follows: “\\‹Computer name›\‹Shared folder name›” / OK

Important: You must use the exact notation for the remote computer’s shared folder!

For example: \\SERVER\TEST

13.1.4.1 Remote Access Service (RAS) in Windows NT 4.0

To use RAS with Windows NT, you must first install the “NDIS WAN CAPI Driver for ISDN/CAPI 2.0” in Windows NT. This driver works with both Windows NT 3.51 and 4.0. Installation of the driver is fully described in the accompanying documentation. You can set up connections to a Windows 95 computer as the RAS server. The Windows 95 server may use the modem “NDIS WAN Line 1” or “Line 2” in its Dial-Up Server configuration. Please make certain that

- the same network protocols are installed on both computers and configured for RAS connections
- the necessary rights have been granted (RAS dial-in access, access rights for resources, etc.)

Please see the Windows NT documentation for details.

If you are using third-party products as RAS servers, determine the required configuration for the PPP protocols being used (synchronous or asynchronous), and for the ISDN B-channel protocols.

13.1.5 Multilink PPP Connections

The capabilities of Windows 95 Dial-Up Networking are considerably extended by installing the MS ISDN Accelerator Pack. This extension allows you to set up "Multilink PPP" connections, in which both ISDN B channels are bundled in a single network connection to one destination. This doubles the available bandwidth. Before you set up a multilink PPP connection, please note the following:

- Connection charges will be incurred for both ISDN B channels.
- The remote site, e.g. your Internet Service Provider (ISP), must also support multilink connections.
- RAS connections (see Section 4) can also use multilink PPP. This is done by configuring the second "modem", "NDIS WAN Line 2", to answer incoming calls on the RAS server.

To set up a multilink PPP connection, proceed as follows:

1. Create a new connection in the Dial-Up Networking window.
2. Click the connection with the right mouse button and select "Properties".
3. Click "Settings" in the "Set additional devices" field.
4. Activate the option "Use additional devices", then click "Add".
5. In the "Device Name" list, select the modem entry not yet used, e.g. "NDIS WAN Line 2" In the "Phone number" field, enter the same number you entered when creating the connection in Step 1 above.
6. Click "OK" to close the dialog.

Now when you activate this dial-up connection, the system will automatically attempt to connect to the destination ISDN number using both ISDN B channels. If only one ISDN B channel can be used –if your ISP does not support multilink PPP for example– no message will appear to indicate the fact. You can see how many B channels have actually been

connected, however, by double-clicking on the Dial-Up Networking icon in the Windows 95 task bar. Click the “Details” button to manually connect and disconnect the second B channel as desired. This technique allows you to double the connection bandwidth as needed for such tasks as downloading large files from the Internet, and to reduce it again afterwards to avoid excessive charges.

13.1.6 Legal Notice

The AVM NDIS WAN CAPI Driver is commercial software owned by AVM Computersysteme Vertriebs GmbH Berlin.

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13.1.7 Possible Faults and Remedies

- **Fault condition:** RAS (Dial-Up) Error “Connection has gone down”:

  Possible cause: This common error message can have many causes, such as a busy remote terminal, faulty cabling, an incorrect D channel protocol, no CAPI available (ISDN adapter driver not loaded), B channel already in use, etc.

  Solution: Check the following:

  – Examine whether another CAPI application has access to the ISDN adapter and the ISDN line. If not, refer to the trouble-shooting section in the ISDN adapter manual.

- **Fault condition:** CAPI applications that answer incoming data calls (with the service indicator DATA64K) are not functioning alongside the NDIS WAN CAPI Driver in RAS server mode.

  Possible cause: Both the CAPI data application and RAS with the NDIS WAN CAPI driver are trying to answer the same calls.

  Solution: Assign a different Multiple Subscriber Number (MSN) to each application so that incoming calls can be differentiated.

- **Fault condition:** Unable to establish PPP connection

  Possible cause: The Windows 95 ISDN Accelerator Pack v1.1 uses the Point-to-Point Protocol (PPP) over ISDN as specified in RFC 1618. This protocol is also referred to as synchronous PPP, and is a standard in ISDN internetworking.

  Solution: The remote site, i.e. your Internet Service Provider must also support this standard.

- **Fault condition:** Multilink PPP connections are not possible.

  Possible cause: Your Internet Service Provider (ISP) does not support multilink PPP connections, or you have not configured the RAS server with a second modem entry for incoming calls.

  Solution: Ask your ISP whether multilink connections are supported, and whether they areenabled for your account. On your RAS server, configure a second ISDN B channel for incoming calls.

- **Fault condition:** Multilink PPP connections to a RAS server are extremely slow.

  Possible cause: You are using the ISDN CAPI Port driver at one end of the RAS connection, and the NDIS WAN driver at the other end.

  Solution: Use the same driver at both ends of the connection, i.e. either the ISDN CAPI Port driver or the NDIS WAN driver. Avoid mixed operation of the two drivers.

- **Fault condition:** The modem entries “NDIS WAN Line 1” and “Line 2” are not displayed in Dial-Up Networking, or a message appears upon starting Dial-Up Networking prompting you to install a modem.

  Possible cause: You have not followed the installation sequence exactly (see Section13.1.2).

  Solution: Remove all components already installed (Dial-Up Networking, NDIS WAN CAPI driver) and begin the installation again with Dial-Up Networking (see Section 13.1.2.2).

13.2 Using NDIS in Windows NT 4.0

The NDIS WAN CAPI Driver for Windows NT enables the use of Remote Access Services (RAS) over ISDN. NDIS is an abbreviation for Network Device Interface Specification, and represents a standard for binding network adapters (hardware) to network protocols (software). NDIS WAN is a Microsoft extension of this standard for Wide Area Networking (WAN). The NDIS WAN CAPI Driver for Windows NT thus allows the ISDN adapter to be used as a WAN adapter, addressed through the Common ISDN API (CAPI) 2.0 applications interface.

Please install the software according to these instructions. You should also refer to the Windows NT documentation pertaining to Remote Access Services (RAS).

13.2.1 Installation

You will need system administrator access privileges to install the NDIS WAN CAPI Driver for Windows NT.

Copy the NDIS WAN CAPI Driver software onto a floppy disk and label it accordingly.

The following components are necessary to use RAS services over ISDN:

- A PC with the Windows NT 4.0 operating system
- A fully installed ISDN adapter with CAPI 2.0 driver (see the installation instructions in the ISDN adapter manual)
- A diskette (or CD) with the NDIS WAN CAPI Driver for Windows NT

The exact procedure for installing the NDIS WAN CAPI Driver depends on the network components already installed on your computer. To illustrate some of the different requirements possible, two basic configuration examples are presented here:

1. You have not yet installed a network, and must therefore perform a complete network installation including the NDIS WAN CAPI Driver and RAS (see Section 13.2.1.1 on page 185).
2. You have already installed a network, and need to add only the NDIS WAN CAPI Driver and RAS components (see Section 13.2.1.2on page 185).

13.2.1.1 Complete Network Installation

- Open the Start menu and click “Settings”, then “Control Panel” Double-click the “Network” icon. If no network has been installed, you are prompted to do so now. Click “Yes” to start the installation.
- Select the option “Wired to the Network”, then click “Next”.
- Now you must install a network adapter. The NDIS WAN CAPI Driver for Windows NT makes your ISDN adapter funtion as a network adapter! In the next dialog, click “Select from list” The dialog “Select Network Adapter” opens. Click “Have disk”.
- Insert the diskette containing the NDIS WAN CAPI Driver for Windows NT into the disk drive, and confirm the path to this drive.

- The “Select OEM Option” dialog appears. Select the entry “NDIS WAN CAPI Driver for Windows NT” and confirm by clicking “OK”.
- Once the adapter has been installed, click “Next”.
- Now you must specify the network protocols for the network adapter. Select the desired protocols and confirm your selection by clicking “Next”.
- You have now installed all the required network components. To confirm your settings, click “Next”.
- Windows NT now copies the files required for the selected components onto your hard drive. Specify the path to the Windows NT CD or to the installation files and confirm by clicking “Next”.
- The dialog “NDIS WAN CAPI Driver Properties” appears.
- You have the option of specifying two MSNs. If you have not installed any other CAPI application, or if you only want to use the NDIS WAN CAPI Driver for Windows NT for outgoing calls, then you may simply click “OK” without entering an MSN.
- MSNs (Multiple Subscriber Numbers, only on ISDN lines using DSS1) are used to route incoming and outgoing calls. If you have other CAPI applications installed on your computer that accept data calls (with the ISDN service indicator DATA64K), then enter one of your ISDN line’s numbers here under which the NDIS WAN CAPI Driver for Windows NT will accept incoming calls.
- A setup message appears. Acknowledge it by clicking “OK”.
- Windows NT then informs you that RAS needs to be installed. Insert the Windows NT CD and enter the corresponding path. Now you must select a RAS device. The “Add RAS Device” dialog appears. Select either of the devices “ISDN1 - WAN” (ISDN B channel 1) or “ISDN2 - WAN” (ISDN B channel 2) and confirm this by clicking “OK”.

- The “Remote Access Setup” dialog appears. Select one of the entries “ISDN1 - WAN” or “ISDN2 - WAN” and click “Configure”. The “Configure Port Usage” dialog opens. Specify here whether you want to receive calls, dial out, or both.
- Set the port usage to “Dial out only”.
- If you intend to use both ISDN B channels for RAS, you can configure the second B channel as a RAS device now by clicking “Add”. Confirm your port usage settings by clicking “OK”.
- Now click the “Network” button in the “Remote Access Setup” dialog. In the “Network Configuration” dialog which appears, select only TCP/IP as “Dial-out protocol”, then click “OK”.
- If you also want to receive calls, and you have selected the corresponding option in the “Configure Port Usage” dialog, then select the desired network protocol here under “Server Settings”, as well as the options for authentication of incoming calls. To obtain maximum compatibility with other products, activate the option “Allow any authentication including clear text”.
- Windows NT now copies the files for the selected components. During this process, Setup displays the message “TCP/IP Version 4.0 is already installed on the system”. Acknowledge this message by clicking “OK“, and do the same for other protocols if necessary. Windows NT now displays a summary of the network installation. Check your bindings!
- A message appears saying that Windows NT can now start the network. Click “Next” to complete the network installation.
- In the following window, enter names for the computer and the domain, and confirm them by clicking “Next”.
- A message appears reporting that the network has been installed. Click “Finish” You must now restart your computer in order for the new settings to take effect. Confirm the corresponding prompt by clicking “Yes”.
- Restarting the computer completes the installation of the network components.

13.2.1.2 Installation in an Existing Network

Installing the NDIS WAN CAPI driver for Windows NT

- Open the Start menu and move the pointer to “Settings”. Open the Control Panel and double-click the “Network” icon.
- In the network configuration dialog, click the “Adapters” tab.
- Now you must install a network adapter. The NDIS WAN CAPI Driver for Windows NT makes your ISDN adapter function as a network adapter! In the next dialog, click “Add”, then in the “Select Network Adapter” dialog, click “Have Disk”.
- Insert the NDIS WAN CAPI Driver for Windows NT installation disk into the floppy disk drive and enter the path to the files. Confirm the path by clicking “OK”.
- The “Select OEM Option” dialog appears. Select the entry “NDIS WAN CAPI Driver for Windows NT” and click “OK”. Windows NT now copies the driver from the floppy disk onto your hard drive.
- The “NDIS WAN CAPI Driver for Windows NT Properties” dialog then appears.
- You have the option of defining two MSNs for each ISDN B channel. If you have not installed any other CAPI application or if you only want to use the NDIS WAN CAPI Driver for Windows NT for outgoing calls, then you may simply click “OK”.
- MSNs (Multiple Subscriber Numbers, only on ISDN lines using DSS1) are used to route incoming and outgoing calls. If you have other CAPI applications installed on your computer that accept data calls (with the ISDN service indicator DATA64K), then enter one of your ISDN line’s numbers here under which the NDIS WAN CAPI Driver for Windows NT will accept incoming calls.

- A message appears saying that the NDIS WAN CAPI Driver for Windows NT setup is complete, and that RAS (Remote Access Service) will now be installed or configured.
- Acknowledge the message by clicking “OK”.

Installing Remote Access Services (RAS) and the Network Protocol (TCP/IP)

- The Windows NT RAS installation now starts automatically. Since the RAS service has not yet been installed on your system, the “Windows NT Setup” dialog appears first. Specify the path to the installation files or to the Windows NT CD, and confirm by clicking “Next”. Windows NT now copies the necessary files for the RAS service. Now you must select a RAS device. The “Add RAS Device” dialog appears. Choose one of the devices “ISDN1 - WAN” or “ISDN2 - WAN” and confirm by clicking “OK”.
- Next, click “Configure”. The “Configure Port Usage” dialog opens. Specify here whether you want to receive calls, dial out, or both.
- If you intend to use both ISDN B channels for RAS, you can configure the second B channel as a RAS device now by clicking “Add”. Windows NT Workstation can only use one channel for incoming calls.
- Confirm your port usage settings by clicking “OK”.
- Now click “Network” in the “Remote Access Setup” dialog.
- In the “Network Configuration” dialog which then appears, select only TCP/IP as “Dial out protocol”, then click “OK”.
- If you have configured the RAS ports to receive or to dial and receive calls, then an additional network configuration dialog appears in which you can provide information on TCP/IP address pools, etc. In this case, select the desired network protocols under “Server Settings” and configure them as required for your network envi-

ronment, then set the authentication options for incoming calls. To obtain maximum compatibility with other product, activate the option “Allow any authentication including clear text”.

- Close the “Remote Access Setup” dialog by clicking “Next”. Windows NT prompts you for additional files from the installation CD.
- Click “Close” in the “Network” dialog. Windows NT now updates the protocol bindings. If you have also installed an internal network adapter, the “Microsoft TCP/IP Properties” dialog starts. Set the necessary options here as required for your network environment.
- You are then prompted to restart the computer. Confirm this by clicking “Yes”.

This completes the installation of the network components.

13.2.2 Notes on RAS Server Configuration in Windows NT Server 4.0

13.2.2.1 General

This section contains details about certain possible RAS configurations of in Windows NT and Windows 95. It does not contain details specific to ISDN. If you have any further questions, please refer to your Windows NT documentation. These notes are based on the assumption that a Windows 95 remote client (referred to here as “the remote“) is dialing up a Windows NT server network (referred to here as “the central site”) over ISDN.

Windows NT Server (Central Site)

The remote client must be able to log on to the LAN. In addition, an NT server must be installed in the LAN as a Primary Domain Controller (PDC). The remote client must be registered in the domain as a user (User Manager for Domains). Extra dial-up rights must be configured for RAS.

The RAS server is installed on an Windows NT server equipped with an ISDN adapter. If necessary, the PDC and RAS can be configured on the same machine. The RAS port ISDN1 or ISDN2 is installed as described in Section 13.2.1, and configured to accept incoming calls in Remote Access Setup.

RAS Client with Windows 95 (Remote)

The ISDN CAPI Port Driver for Windows 95 can be installed along with Dial-Up Networking according to the instructions in the on-line Help. Enter the following settings in the Control Panel:

Network/Identification:

- Workgroup = domain name.

Network/Configuration:

- Client for Microsoft Networks
- Properties: Log on to Windows NT domain; enter the name of the NT domain.
- Network log-on options: Quick log-on
- Dial-Up Networking adapter
- Network protocol TCP/IP or NetBEUI bound to the Dial-Up Adapter (see further details in Sections 13.2.2.2 and 13.2.2.3).

Use the “ISDN RAS” or “ISDN Internet” modem entry for the Dial-Up Networking connection, and select the server type “PPP: Windows 95, Windows NT 3.5, Internet”.

13.2.2.1 Notes on Using the Network Protocol TCP/IP

TCP/IP is a routable network protocol. The public Internet is based on this protocol. It is also commonly used in LANs and WANs.

Windows NT Server (Central Site)

If the Internet protocol (TCP/IP) is used as the transport protocol for Microsoft networking, WINS and DHCP services can be installed on the Windows NT server. These services manage and assign of NetBIOS names and IP addresses where necessary. Neither service is absolutely essential, and both can be replaced by using LMHOSTS files and fixed IP address configuration on the workstations. Important WINS and DHCP configuration parameters are listed below:

- Install the WINS service on the RAS server or another server in the network via “Network/Properties / Services / Add / WINS Service”.

  Install WINS Service with WINS Manager.

- Install the DHCP service on the RAS server or another server in the network.

  “Network / Properties / Services / Add / DHCP server”

  Install DHCP Service with DHCP Manager:

  “Add Domain / Option Add Domain / 003 router, 044 WINS/NBNS servers, 046 WINS/NBT node type”

The following configuration permits both DHCP and fixed IP addressing for RAS clients:

- “Network / Services/ Remote Access Service / Properties... / Port ISDN1 / Network / TCP/IP / Configure: Use DHCP, Allow remote clients to request a predetermined IP address”

RAS Client with Windows 95 (Remote)

- Bind TCP/IP to Dial-Up Adapter:

  Obtain an IP address automatically

Bindings / Client for Microsoft Networks

WINS Configuration: Use DHCP for WINS Resolution

- Dial-Up Networking: Server Type / Allowed Network Protocols: TCP/IP; Server-assigned IP address"

13.2.2.1 Notes on Using the Network Protocol NetBEUI

NetBEUI is a broadcast-oriented network protocol which is not routable. This means that its use in LANs and WANs is limited, but it is easy to configure in Microsoft networks.

Windows NT Server (Central Site)

The following configuration installs NetBEUI for RAS clients:

- "Network / Services / Remote Access Service / Properties... / Port ISDN1 / Network / NetBEUI"

RAS Client with Windows 95 (Remote)

- Network Setup: bind NetBEUI protocol (from Microsoft) to the Dial-Up Adapter
- Dial-Up Networking: "Server type / Allowed network protocols: NetBEUI"

13.2.3 Problem Solving

This section describes the remedies for a few errors which could occur while operating the NDIS WAN CAPI Driver for Windows NT.

- **Symptom:** CAPI applications which accept incoming data calls (with the ISDN service indicator DATA64K) do not work alongside the NDIS WAN CAPI Driver for Windows NT and the RAS Server mode.

  Cause: Both the NDIS WAN CAPI Driver for Windows NT and the other CAPI applications are attempting to answer the same incoming calls.

Remedy: Because the incoming calls for the CAPI applications and the RAS both have the same service indicator, they can only be distinguished by assigning them different Multiple Subscriber Numbers (MSNs, on DSS1 lines). To assign an MSN, proceed as follows:

Configure an MSN (on a DSS1 line) for the NDIS WAN CAPI Driver for Windows NT. To do this, open the Network Settings (Start / Settings / Control Panel / Network) and click the "Network Adapter" tab. Select the NDIS WAN CAPI Driver in the list and click "Properties" The "NDIS WAN CAPI Driver for Windows NT" properties dialog appears, and you can enter one of your ISDN line's MSNs.

- **Symptom:** PPP connections fail.

  Cause: The Windows NT RAS Service uses PPP over ISDN in accordance with RFC 1618. This protocol is also referred to as "synchronous PPP", and is a widely-used standard for network connections over ISDN.

  Remedy: The remote computer or Internet provider must also support this standard. You will find further information in the Word document STRUCTUR.DOC, which contains the specifications for the NDIS WAN CAPI Driver for Windows NT.

- **Symptom:** A connection to CompuServe fails.

  Cause: CompuServe does not use the standard PPP over ISDN (RFC 1618).

  Remedy: Use a fossil driver (such as cFos/NT) that provides a suitable modem emulation.

13.2.4 Legal Notice

The AVM NDIS WAN CAPI Driver for Windows NT is commercial software owned by AVM Computersysteme Vertriebs GmbH, which provides the software free of charge for use by its customers.

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14 The Tools Folder

The “Tools” folder on the “IBM International ISDN PC Card Drivers” CD contains a number of tools and utilities to assist you in operation of the IBM International ISDN PC Card.

The tools in this folder are supplied by IBM “as is”. IBM cannot held be responsible for any damages to your system incurred through their use, and provides no support for these components.

The “ISDNWATCH” Folder

The “ISDNWATCH” folder contains the utility “ISDN Watch”. This utility works only in conjunction with CAPI 2.0-compliant devices. It allows you to see whether one or both B channels are in use, displays your ISDN connection costs, and much more. Run the SETUP.EXE program in this folder to install this tool.

The “MSDUN13” Folder

The “MSDUN13” folder contains updates for Microsoft Dial-Up Networking. These Microsoft Dial-Up Networking 1.3 Updates are included in English, French, German, Italian, and Spanish.

The “NDISWAN” Folder

The “NDISWAN” folder contains on-line Help for the NDIS WAN Drivers in the Windows NT and Windows 95 operating systems.

The corresponding on-line Help for the CAPI Port Driver is located in the “PORT” directory on the IBM International ISDN PC Card CD.

15 Appendix A: Package Contents

The IBM International ISDN PC Card is a passive ISDN adapter in PCMCIA (credit card size) format that works with any basic-rate ISDN line. The card can be used with one B channel at 64 kbit/s, or for multilink connections with two B channels simultaneously at 128 kbit/s.

Package Contents

In addition to this manual, your option package includes:

- 1 IBM Warranty Statement (multilingual)
- 1 International Program License Agreement (multilingual)
- 1 Safety Information manual (multilingual)
- 1 CE approval flyer (English only)
- 1 Product Support Guide (PSG) (English only)
- 1 International ISDN PC Card Installation Software CD
- 1 ISDN cable for the PC Card - 4 m (13 ft)

If any of these items is missing or damaged, contact your vendor.

Replacement Information

Replacements can be ordered in case any of the following parts breaks. Use the FRU numbers listed in the following table to refer to the part that needs replacing.

Hardware item	FRU p/n
ISDN PC Card	09N3607
ISDN cable	09N9823

16 Appendix B: Product Features

The current driver software supports all ISDN services.

The following B-channel protocols are provided:

- X.75
- HDLC transparent
- X.25
- ISO 8208 (X.25 DTE-DTE)
- X.31 case a/b
- T.70
- T.90
- Fax G3/G4
- V.110
- V.120
- V.32bis

Fax protocols:

- V.17
- V.29
- V.27ter

Additional features:

- Fully CAPI 2.0-compliant
- CAPI SoftFax G3: analog fax emulation in accordance with G3/T.30 at up to 14,400 baud
- Half-duplex fax communication
- Auto-dial, auto-answer
- Automatic call detection
- CAPI SoftModem V.32bis: connections to analog modems at up to 14,400 baud
- Hayes AT command set when cFos and/or the CAPI Port Driver are installed

- CAPI SoftCompression X.75/V.42bis: data compression in accordance with the CAPI 2.0 standard
- Support for dial-in and call-back with the IBM DIALs client for IBM 8235, 2210, 2212, and 2216 hubs
- Multilink PPP

Operating system support:

- Microsoft® Windows® 95
- Microsoft® Windows® 98
- Microsoft® Windows® Millennium Edition
- Microsoft® Windows® NT 4.0 Workstation
- Microsoft® Windows® 2000

D-channel protocols:

- Windows 95, Windows 98, Windows Millennium Edition, Windows NT 4.0 Workstation: DSS1 (Euro ISDN), 1TR6, NI-1 and AT&T 5ESS
- Windows 2000 Professional: DSS1 (Euro-ISDN), NI-1 and AT&T 5ESS

Physical specifications:

- Approximate length: 85.6 mm (3.37 in)
- Approximate width: 54.0 mm (2.30 in)
- Approximate height: 5.0 mm (0.20 in)

Operating environment:

- Temperature: 0° C to 70° C (32° F to 155° F)
- Relative humidity: 80 % (non-condensing)

Agency approvals:

- CE Mark
- EN41003

17 Appendix C: A Brief ISDN Glossary

Some of the information provided in this chapter has been retrieved from http://whatis.techtarget.com. IBM fully recognizes and acknowledges that these articles are copyrighted by TechTarget.com, Inc.

This chapter gives a brief overview of technical terms used in the world of ISDN as well as a few computer-related terms.

Historical Survey

The first steps in the development of ISDN –the Integrated Services Digital Network– took place in the early 1980s in France. Many other European countries soon joined in the development work, however. ISDN was considered the logical successor to the analog telephony technology commonly used in Europe at that time. ISDN offered the potential for high speed bi-directional data communications at 64 kbit/s or 128 kbit/s. The ISDN specifications were submitted to the ITU and have since been standardized. However, ITU standards are only recommendations, and some countries have implemented their own versions of ISDN. Thus ISDN protocols are not exactly the same in every country. However, the IBM International ISDN PC Card supports all major D-channel switching protocols, so that this adapter can be used in a great number of countries throughout the world.

Today ISDN is very easily implemented, since telephone companies in most countries use only digital interfaces within their networks. The difference between an analog telephone line and an ISDN line today lies in the wire used from the telephone company's exchange to the subscriber's access interface, the type of signals traveling on these lines, and the voltage. Hence you cannot connect an analog device to an ISDN line, nor vice versa.

Glossary

a/b interface Copper interface of the analog telephone network for use of analog telephones or other equipment such as modems or fax machines. The term a/b interface is derived from the designation of the two wires in the analog subscriber line.

Adapter types There are three categories of ISDN adapters available for use in computers:

- **Passive** adapters are the cheapest and generally the best choice among today's ISDN adapters. Passive ISDN adapters work primarily on OSI Layer 1. The IBM International ISDN PC Card is a passive ISDN device. semi-active These adapters support protocols on OSI Layer 2.
- **Semi-active** adapters have a DSP (digital signal processor) on board that is primarily used to provide fax capabilities over ISDN. However, in most cases this capability can also be implemented in the device drivers of passive ISDN adapters. active Active ISDN adapters are top-of-the-line ISDN cards, and the most expensive.
- **Active** ISDN adapters handle all ISDN protocols on OSI Layers 1, 2 and 3. These cards have one or more on-board microprocessors and a certain amount of RAM. Active ISDN adapters relieve the host system's CPU of all ISDN communication processing. Their primary area of application is in RAS servers, for which many manufacturers offer a special line of active adapters.

Note: ISDN adapters cover OSI Layer 1, but differ in the higher-layer protocols that they provide!

Glossary

AO/DI	Always On/Dynamic ISDN. This is an ISDN technology that was originally developed by IBM and is now an open ISDN standard. This technology is currently only used in the USA and Canada. AO/DI allows the user to connect to an ISP (Internet Service Provider) for example, then drop the idle B-channel connection after a delay. A D-channel connection is maintained, however, and permits a quicker reconnection when data is queued.
B channel	One of the two channel types available in ISDN. The B channel is primarily used for data transfer at 64 kbit/s in each direction.
Basic-rate interface (BRI)	Access to the ISDN network comes in two different flavors, known as basic-rate and primary-rate access. The basic-rate interface defines the use of two B channels for bidirectional data transfer and one D channel for signaling to control the communication over the B channels. The IBM International ISDN PC Card is a BRI adapter.
BRI	See basic-rate interface.
CAPI	Common ISDN API. This is a programming interface for ISDN that has been developed in Germany and is today a de facto standard for European ISDN cards. CAPI allows software developers to write ISDN-capable applications without having to deal with specific ISDN adapter implementations– as long as the adapter is equipped with CAPI drivers. Thus any CAPI-compliant application software works out of the box on any CAPI-compliant ISDN device. The CAPI interface is independent both from the telephone company's implementation of ISDN and from the hardware manufacturer's implementation of the ISDN adapter. CAPI is thus universal. The CAPI interface has been defined for a broad range of operating systems, including DOS, Windows 3.x, Windows 95, Windows NT, Linux, etc. More information can be obtained from http://www.capi.org. • CAPI 1.1 was the original CAPI specification for the German ISDN implementation.

Glossary	
	• CAPI 2.0 is the current CAPI specification for Euro-ISDN. The IBM International ISDN PC Card is fully CAPI 2.0-compliant.
cFos	CAPI Fossil driver. This driver package emulates an analog modem over a CAPI-compliant ISDN adapter. Many communications applications today still expect to talk to an analog modem through a COM port. cFos gives such software the impression of talking to an analog modem, even though the underlying hardware is in fact an ISDN adapter. cFos only works with CAPI-compliant devices such as the IBM International ISDN PC Card.
Cold insertion / removal	Denotes the installation or removal of a peripheral device when the computer system is powered off and/or disconnected from the wall sockets.
D channel	The second type of channel in ISDN BRI line. It carries 16 kbit/s and is mainly limited to signaling functions to control the B channels.
D-channel switching protocol	Describes the telephone company's particular implementation of ISDN. The switching protocol is one of the key elements that determines whether a given ISDN adapter can be used in a given country. D channel switching protocols in use include: • DSS1: Digital Subscriber System No. 1, commonly used in Europe where it is also called E-DSS1 or Euro ISDN • NI-1: National ISDN 1, used in the USA and Canada • 5ESS: AT&T switching protocol, used in the USA and Canada • G3 PBX Custom: AT&T switching protocol, used in the USA and Canada • DMS-100 Custom: Nortel protocol, used in the USA and Canada • NTT INS Net 64: NTT Docomo, used in Japan • TPH 1962: obsolete D-channel switching protocol used in Australia; replaced by DSS1

Glossary

	• 1TR6: obsolete D-channel switching protocol used in Germany; replaced by DSS1. The IBM International ISDN PC Card supports DSS1, NI-1, and 5ESS, the most widespread D channel switching protocols. The other protocols less widely used.
DCE	Data communication equipment
dpi	Dots per inch: a measurement unit for image resolution.
DTE	Data terminal equipment
E carrier system	E1 (or E-1) is a European digital transmission format devised by the ITU-TS and given its name by the Conference of European Postal and Telecommunication Administrations (CEPT). It is the European equivalent of the North American T carrier system format. E2 through E5 are carrier signals in increasing multiples of the E1 format. The E1 signal format carries data at a rate of 2,048 Mbit/s and thus can carry 32 channels of 64 kbit/s each. E1 carries at a somewhat higher data rate than T1 (1.544 Mbit/s) because, unlike T1, it does not use bit-robbing, so that all eight bits per channel are used for signal encoding. E1 and T1 can be interconnected for international use. E2 (or E-2) is a frame that carries four multiplexed E1 signals at a data rate of 8,448 Mbit/s. E3 carries 16 E1 signals for a data rate of 34,368 Mbit/s. E4 carries four E3 channels at a data rate of 139,264 Mbit/s. E5 carries four E4 channels at a data rate of 565,148 Mbit/s.
ETSI	European Telecommunications Standards Institute.
Euro ISDN	The D-channel switching protocol adopted throughout Europe. In 1989, 18 telephone companies from different European states signed a "Memorandum of Understanding" which led to the implementation of Euro ISDN in 1993. Euro ISDN is documented in the ETSI Net-3 standard.

Glossary

Fax standards	There are two important fax standards for ISDN: • G3 (Group 3, ITU standard T.4) which comes from the analog telephony world and allows a maximum resolution of 200 dpi by 200 dpi. Transfer speeds usually are 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps, and 14.4 kbps. The IBM International ISDN PC Card supports the fax G3 standard. • G4 (Group 4, ITU standard T.6) is a digital fax standard which is only available in ISDN. It allows a maximum resolution of 400 dpi by 400 dpi. Transfer speeds are 2,400 bps, 4,800 bps, 9,600 bps, 48 kbps, and 64 kbps. However there are hardly any G4 fax devices on the market, and they are prohibitively expensive. G4 stands for Group 4 (ITU standard T.6).
Fossil	Fido Opus Seadog Standard Interface Layer. This is a modem emulation standard developed for analog BBS communications. A FOSSIL driver supports most of the AT commands set used by analog modems.
Hot insertion / removal	Denotes the installation or removal of a peripheral device when the system is powered on and running.
ISDN voltage	The ISDN network voltage at the subscriber interface, where the ISDN terminal equipment is connected, is 40 VDC.
ITU	International Telecommunication Union. A United Nations body which develops recommendations for international telecommunication standards.
kbps, kbit/s	Kilobits per second. The data speed over an ISDN B channel is 64 kbit/s, i.e. 64,000 bits per seconds or 8,000 bytes per second.
Mbps, Mbit/s	megabits per seconds One Mbit/s is 1,000,000 bits per second, or 125,000 bytes per second, or roughly 122 kilobytes per second.

Glossary

MSN	Multiple Subscriber Number. A feature that is only available in Euro ISDN. Some telephone companies assign multiple numbers to each ISDN subscriber line ordered. These MSNs are usually (but not necessarily) in sequence starting with the ISDN line's primary number. Each MSN is an independent telephone number. Each ISDN terminal device connected to the line can be assigned one of the line's MSNs to permit internal call routing. Ask your ISDN service provider whether your line will be equipped with MSNs, and how many. **Note:** MSNs can be assigned to terminal equipment without regard to specific ISDN services.
Multilink	A multilink connection is one that uses two or more B channels as a single communication link. The two B channels of a BRI can be bundled to yield a data rate of 2 x 64 kbit/s. Multilink connections generally result in a higher connection charges.
NT-1	Network Terminator 1. This is the endpoint of the ISDN network at the customer premises. The term also denotes a device which is connected to the U interface and provides the S/T interface to subscriber equipment.
OSI reference model	The Open Systems Interconnection model is a standard description or "reference model" of data transmission between any two points in a communication network. Its purpose is to guide product developers and maximize interoperability among different products. The reference model defines seven layers of communication functions that take place at each end of a communications link. Although the OSI model is not always strictly adhered to, and related functions are not always clearly organized in the same well-defined layers, many if not most products involved in telecommunication can be described in relation to the OSI model. It is also valuable as a uniform reference that furnishes a common ground for education and discussion in the communications field. Its seven layers are:

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Layer 7: The application layer. This is the layer at which communication partners are identified, quality of service is identified, user authentication and privacy are considered, and any constraints on data syntax are identified. (This layer is not the application itself, although some applications may perform application layer functions.)

Layer 6: The presentation layer. This is a layer, usually part of an operating system, that converts incoming and outgoing data from one presentation format to another (for example, from a text stream into a popup window with the newly arrived text). Sometimes called the syntax layer.

Layer 5: The session layer. This layer sets up, coordinates, and terminates conversations, exchanges, and dialogs between the applications at each end. It deals with session and connection coordination.

Layer 4: The transport layer. This layer manages the end-to-end control (for example, determining whether all packets have arrived) and error-checking. It ensures complete data transfer.

Layer 3: The network layer. This layer handles the routing of the data (sending outgoing transmissions in the right direction to the right destination and receiving incoming transmissions at the packet level). The network layer performs routing and forwarding.

Layer 2: The data link layer. This layer provides synchronization for the lower physical layer, performing bit-stuffing for strings of 1's in excess of 5, for example. It furnishes transmission protocol knowledge and management.

Layer 1: The physical layer. This layer conveys a bit stream through the network at the electrical and mechanical level. It provides the hardware a means of sending and receiving data on a carrier.

Glossary

PPP	The Point-to-Point Protocol. A TCP/IP protocol used in the dial-up networking environment. PPP works on the OSI layers 1 and 2. It is a full-duplex protocol that can be used on various physical media, including twisted pair or fiber optic lines, or satellite links. It uses a variant of High Speed Data Link Control (HDLC) for packet encapsulation.
PPTP	Point-to-Point Tunneling Protocol. A variation of the PPP protocol. It is a protocol (set of communication rules) that allows corporations to extend their own corporate network through private "tunnels" over the public Internet. In effect, a corporation uses a wide-area network as a single large local-area network. Companies no longer need to lease their own lines for wide-area communication, but can securely use the public Internet. This kind of interconnection is known as a virtual private network (VPN).
PRI	See Primary rate interface.
Primary-ate interface (PRI)	Access to the ISDN network comes in two different flavors, known as basic-rate and primary-rate access. The primary-rate interface is similar to an E1 line. The total data rate is 2.048 Mbit/s. However, the PRI provides 30 ISDN B channels and one D channel, all operating at 64 kbit/s. PRIs can be used in large RAS environments.
S_0 interface	Another name for the BRI interface in Europe, where the telephone company generally provides the NT device. For BRIs in point-to-multipoint configuration, the S_0 interface is a four-wire data bus.
S_{2M} interface	Another name for the PRI in Europe.
S/T interface	The European reference point for connecting an ISDN terminal equipment to the ISDN network. This interface is provided by the NT-1, which in Europe is furnished by the telephone company.

Glossary	
SLIP	Serial Line Internet Protocol. A TCP/IP protocol used for communication between two machines that have been previously configured for communication with each other. Your Internet server provider may provide you with a SLIP connection for example, so that the provider's server can respond to your requests, pass them on to the Internet, and forward your responses from the Internet back to you. Your dial-up connection to the server is typically on a slower serial line, rather than on the parallel or multiplex lines such those of a provider's network. SLIP only works with static IP addresses and is considered obsolete. SLIP works on OSI Layer 2.
SPID	The Service Profile Identifier (SPID) is a number assigned by the phone company to a terminal on an ISDN B channel. A SPID tells equipment at the phone company's central office about the capabilities of each terminal (computer, phone etc.) on the B channels. A basic-rate home or business user may divide service on the two B channels using one for normal telephone service and the other for data. The SPID tells the phone company whether the terminal accepts voice or data information. Technically, the SPID is a numeric string from 3 to 20 digits in length. One or more SPIDs are assigned when you order the ISDN basic-rate interface (BRI) from the phone company. Beginning in 1998, most phone companies began to use a generic SPID format. In this format, the SPID is a 14-digit number that includes your 10-digit telephone number (which in turn includes the 3-digit Numbering Plan Area [NPA] or area code), a 2-digit Sharing Terminal Identifier, and a 2-digit Terminal Identifier (TID). The generic SPID format makes it easier to tell users what to specify when installing ISDN equipment, and simplifies corporate installation procedures. SPIDs are used only in the USA and Canada.

Glossary

Supplementary Services	Additional ISDN capabilities that are only available in Euro ISDN. Some of them are standard convenience features, others are only are available upon request. Supplementary Services include Calling Line Identification (CLI), Call Forwarding (CF), Closed User Group (CUG), etc. Your telephone company can provide more information on Supplementary Services.
T carrier system	The T carrier system, introduced by the Bell System in the U.S. in the 1960s, was the first successful system that supported digitized voice transmission. The original transmission rate (1,544 Mbit/s) of the T1 line is in widespread use today in enterprise connections to the Internet. A higher multiplex level, the T-3 line, providing 44,736 Mbit/s, is also commonly used by Internet service providers. Another commonly installed service is fractional T1, which is the rental of some portion of the 24 channels in a T1 line, with the other channels going unused. The T carrier system is entirely digital. The T1 (or T-1) carrier is the most commonly used digital line in the United States, Canada, and Japan. The T1 digital stream consists of twenty-four 64-kbit/s channels. The T1 system also uses 8,000 framing bits.
U interface	The reference point for connecting ISDN subscriber equipment to the ISDN network in the USA, Canada, Australia, and New Zealand. In these countries, users may have to buy an NT-1 and supply it with power. The NT-1 is necessary in order to connect European ISDN terminal equipment, such as the IBM International ISDN PC Card, in these countries. Note: Although the U interface also exists in Europe, it is not available to the subscriber. The U interface has not been standardized in Europe and varies from one telephone company to another. Thus North American ISDN devices cannot be connected to the S/T interface of European ISDN lines. Furthermore, European ISDN terminal equipment cannot be directly connected to the U interface, only to an NT-1.

Glossary

Warm insertion / removal	Denotes the installation or removal of a peripheral device when the system is in suspend or hibernation mode (also called "sleep mode").

18 Appendix D: Troubleshooting and Frequently Asked Questions

General

What driver version is supplied on the CD?

The driver level on the IBM International ISDN PC Card Installation Software CD for all Windows operating systems is 3.08.10.

Where on the Internet is the IBM International ISDN PC Card support web page located?
For driver updates, tips, etc. please consult the PCD support web page at

http://www.pc.ibm.com/support

In the drop-down list labeled “Browse the support site”, select “Options”. In the “Category” list, select “Communication Adapters”. In the “Subcategory” list, choose “ISDN”, then select the option “09N3606 International ISDN PC Card”.

No Connection to ISDN

If a problem is reported in the connection to ISDN (when using Dial-Up Networking or any other software), make sure the ISDN connection cable is connected correctly to both the IBM International ISDN PC Card and the ISDN line socket. Then try the dial or connect command again.

No connection to an Internet Service Provider

If the IBM International ISDN PC Card fails to connect to your Internet Service Provider (ISP), verify the following:

1. Your ISP supports ISDN connections.
2. The telephone number that you are dialing is correct for dial-in access to your service provider over ISDN.

3. You are using the correct Dial-Up Networking connection that configured for use with with the PC Card.

4. Your ISP supports the appropriate protocols. The ISP may conceivably recommend any protocol, such as V.120, asynchronous PPP, X.75, or any other protocol. Contact your ISP and find out the protocol to use. Install cFos and create a Dial-Up Networking connection according to the procedures in this guide and your ISP's instructions.

No connection to your ISP at 128 kbit/s

If you suspect that the IBM International ISDN PC Card is only operating using one ISDN B channel (64 kbit/s) although you have configured the system to use both B channels, please verify the following:

1. Your ISP supports multilink connections, a 128 kbit/s connection over two ISDN B channels simultaneously.

2. If you are using Windows 95, make sure you have installed the Microsoft Dial-Up Networking Update 1.3. Various language versions are available on the CD. Installation instructions can be found in Section "Upgrading Dial-Up Networking for Windows 95" on page 18.

3. You have followed the instructions in Section "Setting Up Internet Access" on page 106.

cFos was installed with all COM ports selected. Now my modem takes COM port 10 or higher. How can this be solved?

If you select all available COM ports during the cFos installation, then cFos will occupy all COM ports, up to COM9. This may cause problems later when you install an analog modem. There are two ways to circumvent this problem:

1. Try to use as few COM ports as possible. Three to four COM ports should be enough for day-to-day use of cFos with the IBM International ISDN PC Card.

2. If possible, install the analog modem before you install the IBM International ISDN PC Card and cFos.

3. If you have already installed the IBM International ISDN PC Card, then click “Start / Programs / cFos ISDN & DSL Driver” and select “Configure cFos”. In the cFos configuration program, select the menu command “Configure COM ports”. In the list of available COM ports, deactivate the one you want to use for your analog modem. Click “OK”, then “Exit”. When asked whether you want to save the changes, click “Yes”. In the last dialog, click “OK”. Restart your computer if necessary.

When following the instructions above to make a certain COM port available for your analog modem, make sure that the COM port you release is not currently used by one of cFos’s emulated modems. You can verify this by clicking “Start / Settings / Control Panel / Modems”. Furthermore, make sure that your Dial-Up Network connections are not using this COM port.

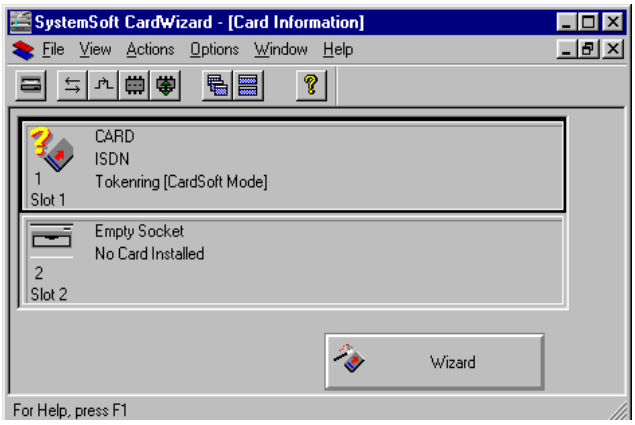
Windows 9x, Windows Millennium Edition

After I installed the IBM International ISDN PC Card in Windows 95, I reinstalled CardWizard(TM) for Windows 95. Now the adapter is not properly recognized any more. What can I do?

The device driver installation instructions for Windows 95 state:

Some notebook manufacturers install PCMCIA support software such as SystemSoft's® CardWizard(TM) as part of the Windows 95 package. IBM includes this program with its ThinkPad notebook series. This section briefly describes how to remove CardWizard(TM) from the system. This software must be removed to ensure correct operation of the IBM International ISDN PC Card.

When you reinstall CardWizard(TM) for Windows 95 –even the latest version available– you may see a message from CardWizard(TM) like the one illustrated below:



You may get the adapter to work by stopping it in CardWizard(TM), removing the adapter from the PCMCIA slot, and then reinserting it. However, you may have to do this every time you want to use the IBM International ISDN PC Card, regardless of whether you hot-insert the card or cold-start your system. The best solution is to completely remove SystemSoft's® CardWizard(TM) software from Windows 95 and use the adapter without it.

I have followed the instructions for installing the IBM International ISDN PC Card in Windows 95. I am using Windows 95 OSR 2.x. Whenever I try to hot-plug the adapter, the system freezes. What can be done to solve this?

It appears that there is a problem with the PCMCIA support in Windows 95 OSR 2.x. This problem was not seen in the initial release of Windows 95 and Service Pack 1. If you experience this problem, then the only solution is to cold-insert or cold-remove the adapter, i. e. shut down and turn off your notebook computer, insert or remove the IBM International ISDN PC Card in any PCMCIA slot, and then restart your computer.

I have installed the IBM International ISDN PC Card under Windows 98 Second Edition. When I try to shut down or restart the system, it hangs.

This a known problem in Windows 98 Second Edition and is independent from of PC Card or other hardware device in use. Microsoft has confirmed this to be a problem with Windows 98 Second Edition. In the directory \EXTRAS\WIN98\SHUTSE on the CD you will find the official Microsoft patch for this problem in various languages. For more information, see the file 01INFO.TXT. Install this patch. If this problem still persists after you have done so, then contact Microsoft support for further assistance.

Windows NT 4.0 Workstation

SystemSoft's® CardWizard(TM) 5.10 for Windows NT is installed and the IBM International ISDN PC Card is still not recognized.

In order to get the IBM International ISDN PC Card to work in Windows NT 4.0 Workstation with SystemSoft's® CardWizard(TM) 5.10, you must add an entry to the Windows NT 4.0 Registry. This Registry patch is provided on the CD in the directory \EXTRAS\CW52NT\REG. Open this directory in the Windows NT 4.0 Explorer and double-click the file IBMISDN.REG to merge it into the Windows NT 4.0 Workstation Registry. Shut down and restart your computer. The card will then be recognized by SystemSoft's® CardWizard(TM) and will function properly.

SystemSoft's® CardWizard(TM) has been installed in Windows NT 4.0 Workstation, and after the installation of a Windows NT 4.0 Service Pack the CardWizard(TM) does not work anymore.

When installing a Service Pack for Windows NT 4.0 you may see the message that a different PCMCIA.SYS exists in your Windows NT 4.0 Workstation software. The Service Pack installation program may ask you whether it should replace this OEM version of the file. In this case, you should click “No”. However, if the PCMCIA.SYS from SystemSoft's® CardWizard(TM) has already been replaced with the version from

the Service Pack then CardWizard(TM) may no longer work. In this case, remove CardWizard(TM), restart your system, and reinstall CardWizard(TM).

What features are supported by CardWizard(TM) for Windows NT 4.0?

The IBM International ISDN PC Card is fully supported out of the box by SystemSoft's® CardWizard(TM) 5.20 and higher for Windows NT 4.0. This means that after you have installed CardWizard(TM) 5.20 or higher, the IBM International ISDN PC Card will work properly with CardWizard(TM). The IBM International ISDN PC Card will be supported with hot insertion, but only with cold removal. These features are also available with SystemSoft's® CardWizard(TM) 5.10 for Windows NT 4.0 after you apply the Windows NT 4.0 Registry patch described above.

Windows 2000 Professional

When connecting to CompuServe the message "?? LOGINE - Invalid entry - try again" appears in the "After Dial Terminal" window, even though the password entered is correct.

This seems to be due to a bug in Microsoft Windows 2000. Windows 2000 does not properly store the password that is entered in Dial-Up Networking. For further assistance, please contact either your local CompuServe help desk or the Microsoft support desk.

19 Appendix E: Help and Service Information

This section contains information on how to obtain technical support on-line and by telephone .

Technical Support

Technical support is available during the life of your product. Assistance can be obtained through the Personal Computing Support Web site. During the warranty period, assistance is available for the replacement or exchange of defective components. In addition, if your IBM option is installed in an IBM computer, you may be entitled to service at your location. Your technical support representative can help you determine the best alternative.

Technical Support Web Page

IBM Personal Computing Support Web Site Language	URL
English	http://www.ibm.com/pc/support
German	http://www.ibm.com/pc/support/de
French	http://www.ibm.com/pc/support/fr
Italian	http://www.ibm.com/pc/support/it
Spanish	http://www.ibm.com/pc/support/es

Note:

If the national language version of the IBM Personal Computing Web Site is not available or not working, you can use the English language version at http://www.ibm.com/pc/support.

Type of Support

Marketing, installation, and configuration support through the HelpCentre will be withdrawn or made available for a fee, at IBM's discretion, 90 days after the option has been with-

drawn from marketing. Additional support offerings, including step-by-step installation assistance, are available for a nominal fee.

Telephone Technical Support

1. To assist the technical support representative, have available as much of the following information as possible:
2. Option name
3. Option number
4. Proof of purchase
5. Computer manufacturer, model, serial number (if IBM), and manual
6. Exact wording of the error message (if any)
7. Description of the problem
8. Hardware and software configuration information for your system

If possible, call from your computer. Your technical support representative may want to walk you through the problem during the call.

For the support telephone number and support hours by country, refer to the following table or to the enclosed technical support insert. If the number is not provided, contact your IBM reseller or IBM marketing representative. Response time may vary depending on the number and nature of the calls received.

Country	Phone number	Language
Austria	01-24592-5901	Deutsch
Belgium	02-210 9800	Français
Belgium	02-210 9820	Vlaams
Denmark	03-525-0291	Dansk
Finland	9-22-931840	Suomi
France	02-3855-7450	Français
Germany	07032-1549 201	Deutsch

Country	Phone number	Language
Ireland	01-815 9200	English
Italy	02-482-75040	Italiano
Luxembourg	298-977-5063	Français
Netherlands	020-514-5770	Nederlands
Portugal	02-791 5147	Portogues
Spain	91-662-4916	Español
Sweden	08-751-5227	Svenska
Switzerland	0848-805252	Deutsch, Français, Italiano
United Kingdom	01475-555 055	English

Note: The above table was correct at the time of writing of this manual. Alternatively, you can consult IBM's web site at http://www.ibm.com/pc/qtechinfo/MIGR-4HWSE3.html for the correct phone number. The URL for the phone number is case-sensitive.

Note: The support phone number is available Monday through Friday during normal business hours. However, IBM reserves the right to change the availability of this service and its telephone numbers without notice.

20 Appendix F: Product Warranties and notices

This section contains the warranty period for your product, information about obtaining warranty service and support, and the IBM Statement of Limited Warranty.

Warranty period

Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country or region where service is performed.

Machine - IBM International ISDN PC Card
Warranty period*: Two Years

Service and support

The following information describes the technical support that is available for your product, during the warranty period or throughout the life of the product. Refer to your IBM Statement of Limited Warranty for a full explanation of IBM warranty terms

Warranty information on the World Wide Web

The IBM Machine Warranties Web site at http://www.ibm.com/servers/support/machine_warranties/ contains a worldwide overview of the IBM Limited Warranty for IBM Machines, a glossary of terms used in the Statement of Limited Warranty, Frequently Asked Questions (FAQ), and links to Product Support Web pages. The IBM Statement of Limited Warranty is available from this Web site in 29 languages in Portable Document Format (PDF).

Online technical support

Online technical support is available during the life of your product. Online assistance can be obtained through the Personal Computing Support Web site and the IBM Automated Fax System.

Online technical support	
IBM Personal Computing Support Web site	http://www.ibm.com/pc/support/
IBM Automated Fax System	1-800-426-3395 (U.S. and Canada)

IBM Statement of Limited Warranty Z125-4753-06 8/2000

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 replace or modify those of Part 1. The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

The IBM Warranty for Machines: IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications"). The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded.

Extent of Warranty: The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty: IBM does not warrant uninterrupted or error-free operation of a Machine. Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service: To obtain warranty service for a Machine, contact IBM or your reseller. If you do not register your Machine with IBM, you may be required to present proof of purchase.

During the warranty period, IBM or your reseller, if approved by IBM to provide warranty service, provides without charge certain types of repair and exchange service to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. At its discretion, IBM or your reseller will 1) either repair or exchange the failing Machine and 2) provide the service either at your location or a service center. IBM or your reseller will also manage and install selected engineering changes that apply to the Machine

Some parts of IBM Machines are designated as Customer Replaceable Units (called "CRUs"), e.g., keyboards, memory, or hard disk drives. IBM ships CRUs to you for replacement by you. You must return all defective CRUs to IBM within 30 days of your receipt of the replacement CRU. You are responsible for downloading designated Machine Code and Licensed Internal Code updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty servi

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;

2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and

3. where applicable, before service is provided:

a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides;

b. secure all programs, data, and funds contained in a Machine;

c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations; and

d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Limitation of Liability: Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code. .

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC

CONSEQUENTIAL DAMAGES, LOST PROFITS OR LOST SAVINGS, EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Governing Law: Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles..

Part 2 - Country-unique Terms

AMERICAS

BRAZIL

Governing Law: *The following is added after the first sentence:*
Any litigation arising from this Agreement will be settled exclusively by the court of Rio de Janeiro.

NORTH AMERICA

Warranty Service: *The following is added to this Section:*
To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

CANADA

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws in the Province of Ontario.

UNITED STATES

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of the State of New York.

ASIA PACIFIC

AUSTRALIA

The IBM Warranty for Machines: *The following paragraph is added to this Section:*
The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

Limitation of Liability: *The following is added to this Section:*
Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974 or other similar legislation, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of the State or Territory.

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of the State of New York.

The following is added to this Section:
Disputes and differences arising out of or in connection with this Agreement shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own competence and on the validity of the Agreement to

submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator.

The two arbitrators appointed by the parties shall appoint a third arbitrator before proceeding upon the reference. The third arbitrator shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the ICC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

The English language version of this Agreement prevails over any other language version.

HONG KONG AND MACAU

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:* laws of Hong Kong Special Administrative Region.

INDIA

Limitation of Liability: *The following replaces items 1 and 2 of this Section:*

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any

way related to the subject of this Statement of Limited Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

JAPAN

Governing Law: *The following sentence is added to this Section:*
Any doubts concerning this Agreement will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

NEW ZEALAND

The IBM Warranty for Machines: *The following paragraph is added to this Section:*
The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: *The following is added to this Section:*

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law: *The following replaces this Section:*
Both you and IBM consent to the application of the laws of the State of New York (except when local law requires otherwise) to govern, interpret, and enforce all your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Any disputes arising from or in connection with this Agreement will first be resolved by friendly negotiations,

failing which either of us has the right to submit the dispute to the China International Economic and Trade Arbitration Commission in Beijing, the PRC, for arbitration in accordance with its arbitration rules in force at the time. The arbitration tribunal will consist of three arbitrators. The language to be used therein will be English and Chinese. An arbitral award will be final and binding on all the parties, and will be enforceable under the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958).

The arbitration fee will be borne by the losing party unless otherwise determined by the arbitral award.

During the course of arbitration, this Agreement will continue to be performed except for the part which the parties are disputing and which is undergoing arbitration.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:
The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

Warranty Service: If you purchase an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM. If you purchase an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchase an IBM Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country, or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM authorized service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM authorized service provider.

Governing Law: The applicable laws that govern, interpret and enforce rights, duties, and obligations of each of us arising from, or relating in any manner to, the subject matter of this Statement, without regard to conflict of laws principles, as well as Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided, except that in 1) Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Romania, Slovakia, Slovenia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan, the laws of Austria apply; 2) Estonia, Latvia, and Lithuania, the laws of Finland apply; 3) Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Djibouti, Democratic Republic of Congo, Equatorial Guinea, France, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia, this Agreement will be construed and the legal relations between the parties will be determined in accordance with the French laws and all disputes arising out of this Agreement or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 4) Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and

Zimbabwe, this Agreement will be governed by English Law and disputes relating to it will be submitted to the exclusive jurisdiction of the English courts; and 5) in Greece, Israel, Italy, Portugal, and Spain any legal claim arising out of this Statement will be brought before, and finally settled by, the competent court of Athens, Tel Aviv, Milan, Lisbon, and Madrid, respectively.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

The IBM Warranty for Machines: *The following replaces the first sentence of the first paragraph of this Section:*
The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section:

The minimum warranty period for Machines is six months. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: *The second paragraph does not apply.*

Warranty Service: *The following is added to this Section:*
During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this Section:*
The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:
IBM’s liability under this item is limited to the violation of

essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *The following replaces item 2 in this Section:*
as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

Applicability of suppliers and resellers (unchanged).

FRANCE

Limitation of Liability: *The following replaces the second sentence of the first paragraph of this Section:*
In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: *(items 1 and 2 unchanged).*

IRELAND

Extent of Warranty: *The following is added to this Section:*
Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: *The following replaces items one and two of the first paragraph of this Section:*
1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and
2. the amount of any other actual direct damages, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section:
IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY

Limitation of Liability: *The following replaces the second sentence in the first paragraph:*
In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than:
1. *(unchanged)*
2. as to any other actual damage arising in all situations involving nonperformance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.
Applicability of suppliers and resellers (unchanged).

The following replaces the third paragraph of this Section:
Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: *(items 1 and 2 unchanged)* 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

Limitation of Liability: *The following is added to this Section:*
IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

UNITED KINGDOM

Limitation of Liability: *The following replaces items 1 and 2 of the first paragraph of this Section:*

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence;

2. the amount of any other actual direct damages or loss, up to 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim;

The following item is added to this paragraph:
3. breach of IBM's obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

Applicability of suppliers and resellers (unchanged).

The following is added to the end of this Section:
IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

Notices

IBM may not offer the products, services, or features discussed in this document in all countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

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IBM Director of Licensing
IBM Corporation
North Castle Drive

Armonk, NY 10504-1785
U.S.A.

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Electronic emission notices

IBM International ISDN Adapter

Note: 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 an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. 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.

Responsible party:

International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193

Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Industry Canada Class B emission compliance statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformite a la reglementation d'Industrie Canada

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Deutsche EMV-Direktive (electromagnetische Verträglichkeit)

Zulassungbescheinigunglaut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995 (bzw. der EMC EG Richtlinie 89/336):

Dieses Gerät ist berechtigt in Übereinstimmungmit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die:

IBM Deutschland Informationssysteme GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 50082-1 und EN 55022 Klasse B.

EN 50082-1 Hinweis:

"Wird dieses Gerät in einer industriellen Umgebung betrieben (wie in EN 50082-2 festgetlegt), dann kann es dabei eventuell gestört werden. In solch einem FA11 ist der Abstand bzw. die Abschirmungzu der industriellen Störquelle zu vergrößern."

Anmerkung:

Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den IBM Handbüchern angegeben, zu installieren und zu betreiben.

European Union - emission directive

This product is in conformity with the protection requirements of EU Council Directive 89/336/ECC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

IBM can not accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

Union Européenne - Directive Conformité électromagnétique

Ce produit est conforme aux exigences de protection de la Directive 89/336/EEC du Conseil de l'UE sur le rapprochement des lois des États membres en matière de compatibilité électromagnétique.

IBM ne peut accepter aucune responsabilité pour le manquement aux exigences de protection résultant d'une modification non recommandée du produit, y compris l'installation de cartes autres que les cartes IBM.

Ce produit a été testé et il satisfait les conditions de l'équipement informatique de Classe B en vertu de Standard européen EN 55022. Les conditions pour l'équipement de Classe B ont été définies en fonction d'un contexte résidentiel ordinaire afin de fournir une protection raisonnable contre l'interférence d'appareils de communication autorisés.

Unione Europea - Directiva EMC (Conformidad électromagnética)

Este producto satisface los requisitos de protección del Consejo de la UE, Directiva 89/336/CEE en lo que a la legislatura de los Estados Miembros sobre compatibilidad electromagnética se refiere.

IBM no puede aceptar responsabilidad alguna si este producto deja de satisfacer dichos requisitos de protección como resultado de una modificación no recomendada del producto, incluyendo el ajuste de tarjetas de opción que no sean IBM.

Este producto ha sido probado y satisface los límites para Equipos Informáticos Clase B de conformidad con el Estándar Europeo EN 55022. Los límites para los equipos de Clase B se han establecido para entornos residenciales típicos a fin de proporcionar una protección razonable contra las interferencias con dispositivos de comunicación licenciados.

Union Europea - Normativa EMC

Questo prodotto è conforme alle normative di protezione ai sensi della Direttiva del Consiglio dell'Unione Europea 89/336/CEE sull'armonizzazione legislativa degli stati membri in materia di compatibilità elettromagnetica.

IBM non accetta responsabilità alcuna per la mancata conformità alle normative di protezione dovuta a modifiche non consigliate al prodotto, compresa l'installazione di schede e componenti di marca diversa da IBM.

Le prove effettuate sul presente prodotto hanno accertato che esso rientra nei limiti stabiliti per le le apparecchiature

di informatica Classe B ai sensi del Norma Europea EN 55022. I limiti delle apparecchiature della Classe B sono stati stabiliti al fine di fornire ragionevole protezione da interferenze mediante dispositivi di comunicazione in concessione in ambienti residenziali tipici.

이 기기는 가정용

주거지역에서는

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Japanese statement of compliance for products less than or equal to 20 A per phase

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IBM

HelpCenter

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UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, or service names may be the trademarks or service marks of others.

Warranty Telephone Numbers in Europe

Note: These numbers were correct at the time of printing of this manual.

Country	Telephone
Austria	01-6164123-8380
Belgium	02-225-3611
Denmark	45-96-50-50
Finland	9-4591 or 0800-1-4260
France or Luxembourg	0801-63-12-13 or +33-2-38-55-77-50
Germany	01805-253558
Italy	1678-20094 or 02-269-26503 or 02-269-26504
Netherlands	020-513-3939
Norway	66-99-9300
Portugal	01-791-5115 or 02-207-1115
Spain	901-100-000 or 01-397-6503
Sweden	08-793-3000
Switzerland	0800-55-5454
UK	0345-500-900

In the absence of an appropriate number, please contact your IBM representative or Point of Purchase.

The telephone numbers listed in this publication may change at any time without notice.

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