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AVM ISDN-Controller

B1 PCI v4.0

HIGH-PERFORMANCE COMMUNICATION BY ...



AVM ISDN-Controller B1 PCI v4.0

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Symbols and Highlighting

The following highlighting and icons are used to designate important information:

Highlighting

The following highlighting is used in this manual.

Highlighting	Function	Example
Quotation marks	Keys, buttons, icons, tabs, menus, commands	“Start / Programs” or “Enter”
Capital letters	Path and file names in running text	SOFTWARE\INFO.PDF or README.DOC
Pointed brackets	Variables	<CD-ROM drive>
Typewriter font	Information to be typed in using the keyboard	a:\setup
Gray italics	Tips, instructions and warnings	... for more information, see ...

Symbols

The following icons are used in the manual:



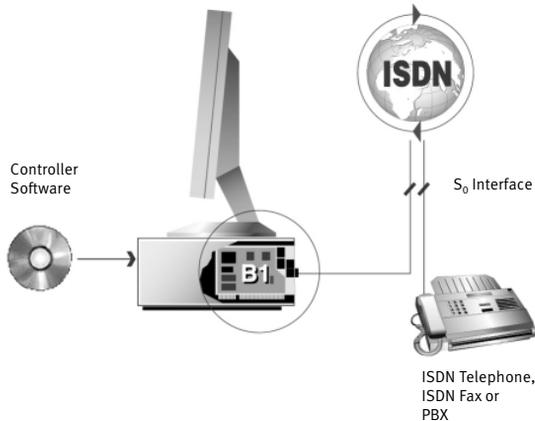
This symbol designates sections which contain important information.



This symbol indicates useful tips and information.

1 The AVM ISDN-Controller B1 PCI v4.0

The AVM ISDN-Controller B1 PCI v4.0 is an active ISDN-Controller, which means that the controller is equipped with its own processor. It processes both B channels of an ISDN basic rate interface at the same time ($2 \times 64,000$ Bit/s). It owes this extraordinary power to the Strong T Multitasking RISC Processor (50 MIPS), which makes this ISDN-Controller the ideal platform for software applications with high demands on system stability and data throughput. No additional burdens are placed on the main memory and processor of your computer by ISDN-based communication tasks.



Computer with AVM ISDN-Controller B1 PCI v4.0

As the above figure shows, the ISDN-Controller is simply plugged into a free slot on the PCI bus. The ISDN-Controller is connected to the ISDN line over the S₀ interface on the controller. This interface is connected to the ISDN line using the cable included in the product package.

1.1 The Driver Software of the ISDN-Controller B1 PCI v4.0

The driver software takes control of the communications processes and data transmission.

The driver software is loaded to the ISDN-Controller from the hard disk. This procedure ensures that the driver software can be updated quickly and easily at any time.

The driver software can compress data according to the V.42bis standard. For more information about automatic data compression, see the section “CAPI SoftCompression X75/V42bis” from page 71.

The driver software also supports the analog Fax G3 service. For details, see the section “CAPI SoftFax” from page 72.

CAPI (COMMON-ISDN-API)

The driver software for the ISDN-Controller B1 PCI v4.0 provides the industry standard CAPI 2.0 applications interface on your computer. This interface specified by the international standardization organization ETSI guarantees the universal exchangeability of ISDN applications for the use of data, fax and speech transmission. This interface allows the ISDN-Controller B1 PCI v4.0 to be used with a wide range of CAPI 2.0-based ISDN applications.

For more information about CAPI 2.0, see the section “The CAPI 2.0 Application Interface” from page 66.

Protocols Supported

The driver software supports the international D-channel protocol DSS1 (Euro ISDN) as well as the national protocols 5ESS, NI1 and 1TR6.

The drivers for the various D-channel protocols are included in the software package. Current drivers may be downloaded from the AVM Data Call Center (ADC) or from the Internet. See the section “Product Documentation” from page 82 for information about how to reach the ADC or AVM’s Internet site.

Operating Systems Supported

The driver software for the ISDN-Controller B1 PCI v4.0 is available for all operating systems for which a CAPI 2.0 standard is defined at the time this manual was printed:

- Windows 7 x64, Windows Server 2008, Windows Vista x64, Windows XP x64, Windows Server 2003 x64
- Windows 7 / Vista / XP / Server 2003 / Windows 2000 / NT / Me / 98 / 95 / 3.x
- DOS
- NetWare 6.x, 5.x, 4.x and 3.12
- OS/2
- Linux



The instructions for installing the driver software in Windows 3.x and DOS is documented in Readme files. These Readme files are located in the folders `CARDWARE\B1_PCI\WINDOWS.3.XX\<LANGUAGE>` and `CARDWARE\B1_PCI\DOS\<LANGUAGE>` on the ISDN-Controller B1 PCI v4.0 installation CD.

Applications without CAPI Support

The controller package includes three AVM system drivers: the AVM ISDN CAPI Port Driver, the AVM NDIS WAN Driver and the TAPI Services for CAPI. These system drivers allow you to use CAPI-based ISDN applications alongside communications programs that do not have built-in CAPI support. For example, you can use Microsoft's Dial-Up Networking to connect your computer to the Internet or to access remote servers.

For detailed information about the AVM system drivers, see the section "The AVM System Drivers" from page 69.

Combining Multiple ISDN-Controllers

Combining multiple active AVM ISDN-Controllers in one computer presents no problems. Up to four active AVM ISDN-Controllers can be operated at the same time. It is also possible to equip the computer with a combination of B1 ISDN-Controllers for the PCI, ISA and PCMCIA buses and the USB, or to combine the B1 with the AVM ISDN-Controller C4 or C2. Such configurations make it simple to meet growing ISDN communication needs.

Downward Compatibility with the AVM B1 Family

The Multitask RISC processor StrongT developed by AVM makes the ISDN-Controller B1 PCI v4.0 fully compatible with all earlier controller versions from the AVM B1 family. New features such as ECM (Error Correction Mode), support for new ISDN protocols and new operating systems thus are generally available for older controllers as well, depending on the capabilities of the hardware used.

1.2 System Requirements

The following hardware and software requirements must be met in order to use the ISDN-Controller B1 PCI v4.0:

- a computer with a Pentium or Pentium-compatible processor (CPU) or higher
- operating system Windows 7, Server 2008, Windows Vista, Server 2003, Windows XP, 2000, NT, Me, 98, 95, 3.x, DOS, NetWare 6.x, 5.x, 4.x und 3.12, OS/2 or Linux
- CD-ROM drive for installation of the driver software
- free PCI slot compliant with specification 2.1 or higher (5-V slot)

1.3 Package Contents

The package contains:

- AVM ISDN-Controller B1 PCI v4.0 (plug-in card for the PCI bus)
- 1 ISDN cable (6 m)
- “AVM ISDN-Controller B1 PCI v4.0” manual
- 1 compact disk (CD-ROM) with all installation programs and the AVM ISDN-Tools

The AVM ISDN-Tools are a collection of ISDN applications based on CAPI 2.0. They include such programs as “Connect32” for convenient data transfer in ISDN.

- “AVM ISDN-Tools” manual in PDF format in the INFO\MANUAL folder on the installation CD

Additional CAPI applications may be acquired separately from your vendor.

2 Installing the ISDN-Controller B1 PCI v4.0

First install the ISDN-Controller B1 PCI v4.0 hardware in the computer, before you install the driver software.

Proceed as follows to install the ISDN-Controller B1 PCI v4.0:

1. Switch off your computer and any connected devices. Disconnect their power supply.
2. Open the cover of the computer. Touch the metal of the housing to discharge any static electricity.
3. Choose a PCI slot, unscrew and remove the slot blanking plate at the back of the computer, and insert the ISDN-Controller B1 PCI v4.0 in the slot.



For installation in Novell NetWare: Note the number of the slot in which you have inserted the ISDN-Controller B1 PCI v4.0 for subsequent configuration.

4. Screw the back plate of the ISDN-Controller B1 PCI v4.0 on to the back panel of the computer.
5. Close the computer housing and plug the power cord back in to the socket.
6. Connect the ISDN-Controller B1 PCI v4.0 to your ISDN supply. The ISDN cable has an RJ45 plug at each end. Insert one end into your ISDN NT and the other end into the S₀ socket on the back plate of your ISDN-Controller B1 PCI v4.0.

This completes the hardware installation.

The individual steps taken to install the driver software differ among the operating systems. Read the section that describes the driver installation for your operating system.

3 Installation in Windows 7 / Server 2008

The AVM ISDN-Controller B1 PCI v4.0 is shipped with drivers that are especially developed for use in Microsoft Windows 7, which can also be used in Windows Server 2008. The CAPI 2.0 applications interface supplied supports both 32-bit and 64-bit applications (Windows 7 x64 Edition). Applications in DOS windows are not supported. Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

Windows 7 itself includes a version of the driver software for the ISDN-Controller B1 PCI v4.0. Windows 7 installs this automatically. Once the automatic installation is complete, install the current driver software from the installation CD.

 **US only:** In addition to the D-channel protocol, ISDN users in the USA must find out their SPID.

SPID stands for **S**ervice **P**rofile **I**Dentifier. A SPID is a number assigned by your ISDN service provider to each subscriber interface. SPIDs let the ISDN switch know which ISDN services a given logical terminal (ISDN device) can access. This is particularly important for ISDN telephones. 



AVM continuously extends the functionality of the driver software for your ISDN-Controller B1 PCI v4.0. If a more current version of the driver software is available, it may be obtained from the ADC under `CARDWARE\B1_PCI\WINDOWS.7\ENGLISH`.

3.1 Installing the Driver Software

Once the ISDN-Controller B1 PCI v4.0 has been installed in your computer, it will be recognized automatically as a Plug & Play device.

The CAPI 2.0 interface and the AVM NDIS WAN CAPI Driver are available on your system. For details about the AVM ISDN NDIS WAN CAPI Driver and the other two AVM system drivers, see the section “The AVM System Drivers” from page 69.

3.2 Changing the Settings

After installation is concluded, you have the opportunity to enter or change the MSNs.

1. Open “Start / Control Panel / Hardware and Sound / Device Manager”.
2. Click the plus sign “+” next to “Network adapters” to expand the node.
3. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
4. Select “Properties” and switch to the “ISDN” tab.
5. Click the “Configure” button. Enter the Multiple Subscriber Number (MSN) for the ISDN NDIS WAN CAPI Driver.

On the “Advanced” page you can enable support for operation on a point-to-point connection.

3.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer.

To install an additional ISDN-Controller for the PCI bus, simply insert it in a suitable slot as described in “Installing the ISDN-Controller B1 PCI v4.0” on page 12 and start Windows. Make the entries described in the section “Installing the Driver Software” on page 13. That’s all!

The driver software for all installed ISDN-Controllers is loaded automatically when Windows 7 starts.

3.4 Removing the ISDN-Controller B1 PCI v4.0

To uninstall the ISDN-Controller B1 PCI v4.0 in Windows 7, simply remove the controller. If you would like to uninstall the driver software as well, proceed as follows:

1. Open “Start / Control Panel / Hardware and Sound / Device Manager”.
2. Click the plus sign “+” next to “Network adapters” to expand the node.
3. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
4. Select “Uninstall”.
5. Confirm the uninstallation in the following security prompt. The ISDN-Controller B1 PCI v4.0 is then removed from the system.



Only one ISDN-Controller can be removed at a time. If you have installed several ISDN-Controllers and want to remove them all, then perform the procedure described here several times, without restarting Windows between each operation.

4 Installation in Windows Vista

The AVM ISDN-Controller B1 PCI v4.0 is shipped with drivers that are especially developed for use in Microsoft Windows Vista. The CAPI 2.0 applications interface supplied supports both 32-bit and 64-bit applications (Vista x64 Edition). Applications in DOS windows are not supported. Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

Windows Vista itself includes a version of the driver software for the ISDN-Controller B1 PCI v4.0. Windows Vista installs this automatically. Once the automatic installation is complete, install the current driver software from the installation CD.

 **US only:** In addition to the D-channel protocol, ISDN users in the USA must find out their SPID.

SPID stands for **S**ervice **P**rofile **I**dentifier. A SPID is a number assigned by your ISDN service provider to each subscriber interface. SPIDs let the ISDN switch know which ISDN services a given logical terminal (ISDN device) can access. This is particularly important for ISDN telephones. 



AVM continuously extends the functionality of the driver software for your ISDN-Controller B1 PCI v4.0. If a more current version of the driver software is available, it may be obtained from the ADC under `CARDWARE\B1_PCI\WINDOWS.VISTA\ENGLISH`.

4.1 Installing the Driver Software

Once the ISDN-Controller B1 PCI v4.0 has been installed in your computer, it will be recognized automatically as a Plug & Play device.

The CAPI 2.0 interface and the AVM NDIS WAN CAPI Driver are available on your system. For details about the AVM ISDN NDIS WAN CAPI Driver and the other two AVM system drivers, see the section “The AVM System Drivers” from page 69.

4.2 Changing the Settings

After installation is concluded, you have the opportunity to enter or change the MSNs.

1. Open “Start / Control Panel / Hardware and Sound / Device Manager / Show Hardware and Devices”.
2. Confirm the query from the “User Account Control” by clicking “Continue”.
3. Click the plus sign “+” next to “Network adapters” to expand the node.
4. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
5. Click the “Properties” command and select the “ISDN” page.
6. On this settings page, click the “Configure” button. Enter the Multiple Subscriber Number (MSN) for the ISDN NDIS WAN CAPI Driver.

If the current driver software from AVM is installed on your system, the “Device Manager” includes an additional “Advanced” settings page which allows you to enable Direct Dial-in.

4.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer. Active AVM ISDN-Controllers for the PCI, PCMCIA and USB buses can also be combined in the same system.

To install an additional ISDN-Controller for the PCI bus, simply insert it in a suitable slot as described in “Installing the ISDN-Controller B1 PCI v4.0” on page 12 and start Windows. Make the entries described in the section “Installing the Driver Software” on page 16. That’s all!

The driver software for all installed ISDN-Controllers is loaded automatically when Windows Vista starts.

4.4 Removing the ISDN-Controller B1 PCI v4.0

To uninstall the ISDN-Controller B1 PCI v4.0 in Windows Vista, simply remove the controller. If you would like to uninstall the driver software as well, proceed as follows:

1. Open “Start / Control Panel / Hardware and Sound / Device Manager / Show Hardware and Devices”.
2. Confirm the query from the “User Account Control” by clicking “Continue”.
3. In the “Network adapters” section of the “Device Manager”, select the “AVM ISDN-Controller B1 PCI” entry.
4. In the “Action” menu, select the “Uninstall” command.
5. Confirm the uninstallation in the following security prompt. The ISDN-Controller B1 PCI v4.0 is then removed from the system.



Only one ISDN-Controller can be removed at a time. If you have installed several ISDN-Controllers and want to remove them all, then perform the procedure described here several times, without restarting Windows between each operation.

5 Installation in Windows XP / Server 2003

The AVM ISDN-Controller B1 PCI v4.0 is shipped with drivers that are especially developed for use in Microsoft Windows XP, which can also be used in Windows Server 2003. The CAPI 2.0 interface supports both 32-bit and 64-bit applications (Windows XP/Server 2003 x64 Edition). Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

Windows XP itself includes a version of the driver software for the ISDN-Controller B1 PCI v4.0. Windows XP installs this automatically. Once the automatic installation is complete, install the current driver software from the installation CD.

 **US only:** In addition to the D-channel protocol, ISDN users in the USA must find out their SPID.

SPID stands for **S**ervice **P**rofile **I**dentifier. A SPID is a number assigned by your ISDN service provider to each subscriber interface. SPIDs let the ISDN switch know which ISDN services a given logical terminal (ISDN device) can access. This is particularly important for ISDN telephones. 



AVM continuously extends the functionality of the driver software for your ISDN-Controller B1 PCI v4.0. If a more current version of the driver software is available, it may be obtained from the ADC under `CARDWARE\B1_PCI\WINDOWS.XP\ENGLISH`.

5.1 Installing the Driver Software

Once the ISDN-Controller B1 PCI v4.0 has been installed in your computer, it will be recognized automatically as a Plug & Play device. Use the “Found New Hardware Wizard” to configure the ISDN-Controller for operation. To do so, proceed as follows:



The following dialogs are part of the Windows XP operating system. Consult the Windows XP manual wherever necessary.

1. Start Windows XP.
2. The Windows XP Plug & Play mechanism automatically recognizes the ISDN-Controller as the “Network Controller”.
3. The “Add/Remove Hardware Wizard” is started. Confirm with “Next”.
4. First specify the D-channel protocol to be used: DSS1 (Euro ISDN), NI1, 5ESS or 1TR6 (obsolete). Confirm with “Continue”.
5. Enter the desired multiple subscriber numbers in the “Phone Number and SPID Information” window.



The settings performed are relevant only for the NDIS WAN CAPI Driver (Internet, RAS over Dial-Up Networking).

6. Confirm with “Next” and finally with “Finish”.

A message appears stating that you may start operation of the ISDN-Controller immediately. This completes the initial driver software installation for the ISDN-Controller B1 PCI v4.0 in Windows XP.

Once the driver installation is concluded, the second step is to update the driver software from the installation CD.



We recommend installing the current driver software from the installation CD or the ADC.

1. Run the SETUP.EXE file.

This files is located in the CARDWARE\B1_PCI\WINDOWS.XP\ENGLISH folder on the installation CD.

2. The installation program displays its sign-on dialog. Click “Next”.
3. In the next dialog, select “Update” and once again “Continue”.

In the next dialog Windows may prompt you to install software not digitally signed by Microsoft. This request depends on the driver signature options set on your computer. Answer the question with “Continue Anyway”.

Repeat this procedure in the next dialog for the AVM ISDN CoNDIS WAN CAPI Driver.

4. After the driver software installation is concluded, a window appears reporting that the software was updated successfully.
5. Click “Finish” and restart your computer.

After installation the CAPI 2.0 and the AVM ISDN NDIS WAN CAPI Driver are available on your system. For details about the AVM ISDN NDIS WAN CAPI Driver and the other two AVM system drivers, see the section “The AVM System Drivers” from page 69.

5.2 Changing the Settings

After installation is concluded, you have the opportunity to change the D-channel protocol and the MSNs of the ISDN-Controller. To do so, proceed as follows:

1. Select “start / Control Panel / Performance and Maintenance / System”. On the “Hardware” dialog page, click the “Device Manager” button.
2. Click the plus sign “+” next to “Network adapters” to expand the node.
3. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.

4. Click the “Properties” command and select the “ISDN” page.
5. Select the desired D-channel protocol on this settings page and then click the “Configure...” button to enter the Multiple Subscriber Numbers for the NDIS WAN CAPI Driver.

If the current driver software from AVM is installed on your system, the “Device Manager” includes an additional “Advanced” settings page which allows you to enable Direct Dial-in.

5.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer. Active AVM ISDN-Controllers for the ISA, PCI, PCMCIA buses and USB can also be combined in the same system.

To install an additional ISDN-Controller for the PCI bus, simply insert it in a suitable slot as described in “Installing the ISDN-Controller B1 PCI v4.0” on page 12 and start Windows. Make the entries described in the section “Installing the Driver Software” on page 20. That’s all!

If you want to add an ISA-Controller, carry out the controller installation procedure as described in the appropriate manual. USB devices such as the B1 USB are recognized by the Plug & Play mechanism.

The driver software for all installed ISDN-Controllers is loaded automatically when Windows XP starts.

5.4 Removing the ISDN-Controller B1 PCI v4.0

Proceed as follows to remove the ISDN-Controller B1 PCI v4.0 driver software in Windows XP:

1. Select “start / Control Panel / Performance and Maintenance / System”. On the “Hardware” dialog page, click the “Device Manager” button.
2. In the “Network adapters” section of the “Device Manager”, select the “AVM ISDN-Controller B1 PCI” entry.
3. In the “Action” menu, select the “Uninstall” command.
4. Confirm the uninstallation in the following security prompt. The AVM ISDN-Controller B1 PCI is then removed from the system.



Only one ISDN-Controller can be removed at a time. If you have installed several ISDN-Controllers and want to remove them all, then perform the procedure described here several times, without restarting Windows between each operation.

6 Installation in Windows 2000

The AVM ISDN-Controller B1 PCI v4.0 is shipped with drivers that are especially developed for use in Microsoft Windows 2000. The CAPI 2.0 interface supplied supports 32-bit applications. Applications in DOS windows are not supported. Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

Windows 2000 itself includes an older version of the driver software for an older hardware version. Windows 2000 installs this automatically. Once the automatic installation is complete, install the current driver software from the installation CD.

 **US only:** In addition to the D-channel protocol, ISDN users in the USA must find out their SPID.

SPID stands for **S**ervice **P**rofile **I**Dentifier. A SPID is a number assigned by your ISDN service provider to each subscriber interface. SPIDs let the ISDN switch know which ISDN services a given logical terminal (ISDN device) can access. This is particularly important for ISDN telephones. 



AVM continuously extends the functionality of the driver software for your ISDN-Controller B1 PCI v4.0. If a more current version of the driver software is available, it may be obtained from the ADC under `CARDWARE\B1_PCI\WINDOWS.2K\ENGLISH`.

6.1 Installing the Driver Software

Once the ISDN-Controller B1 PCI v4.0 has been installed in your computer, it will be recognized automatically as a Plug & Play device. Use the “Found New Hardware Wizard” to configure the ISDN-Controller for operation. To do so, proceed as follows:



The following dialogs are part of the Windows 2000 operating system. Consult the Windows 2000 manual wherever necessary.

1. Start your computer.
The “Found New Hardware Wizard” recognizes a new Plug & Play device to be installed.
2. First specify the D-channel protocol to be used. Select the DSS1 (Euro ISDN) protocol here, even if 1ESS or NI1 is used on your line. Confirm your selection by clicking “Next”.
3. Enter the desired multiple subscriber numbers in the “Phone Number and SPID Information” window.



The settings performed in this dialog are relevant only for the NDIS WAN CAPI Driver (Internet, RAS over Dial-Up Networking). They have no effect on other ISDN software.

The MSNs entered here are valid for both incoming and outgoing calls. The first MSN entry is valid for the first B channel; the second for the second B channel. A maximum of two B channels is supported by the ISDN NDIS WAN CAPI Driver. When a B channel is busy, the first MSN (default MSN) will be signaled as the outgoing MSN. Tip: simply enter the same MSN for both B channels to monitor all costs accrued on this number.

4. Click “Next”.
Please wait a few seconds. Installation of the ISDN-Controller B1 PCI v4.0 will be concluded. The ISDN-Controller is now ready for immediate operation.

Once the driver installation is concluded, the second step is to update the driver software from the installation CD.



We recommend that you always install the current driver software from the installation CD or the ADC to take advantage of the entire potential of the ISDN-Controller B1 PCI v4.0 (for instance, faxing on two B channels simultaneously).

1. Run the SETUP.EXE file.
This files is located in the CARDWARE\B1_PCI\WINDOWS.2k\ENGLISH folder on the installation CD.

2. The welcome screen of the installation program appears automatically. Click “Next”.
3. In the next dialog, select “Update” and once again “Continue”.
4. In the next dialog Windows may prompt you to install software not digitally signed by Microsoft. This request depends on the driver signature options set on your computer. If you are prompted for confirmation, click “Yes”. Repeat this procedure in the next dialog for the AVM ISDN CoNDIS WAN CAPI Driver.
5. Select the setting for the D-channel protocol and confirm your entries by clicking “Continue”.



US only: The next dialog asks you to enter your first complete ISDN directory number (area code plus telephone number) in the first input field. In the second field, enter your first complete SPID.

In the following dialog, enter your second complete ISDN directory number and your second SPID. If you have been assigned only one directory number and one SPID, leave the input fields in this dialog blank and click “Continue”. 

The installation program then copies all files to the specified folder.

6. After the driver software installation is concluded, a window appears reporting that the software was updated successfully. Click “Finish”.
7. Restart your computer.

After installation the CAPI 2.0 and the AVM ISDN NDIS WAN CAPI Driver are available on your system. For details about the AVM ISDN NDIS WAN CAPI Driver and the other two AVM system drivers, see the section “The AVM System Drivers” from page 69.

6.2 Changing the Settings

After installation is concluded, you have the opportunity to change the D-channel protocol and the MSNs of the ISDN-Controller. To do so, proceed as follows:

1. Select “Start / Settings / Control Panel / System”. On the “Hardware” dialog page, click the “Device Manager...” button.
2. Click the plus sign “+” next to “Network adapters” to expand the node.
3. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
4. Click the “Properties” command and select the “ISDN” page.
5. Select the desired D-channel protocol on this settings page and then click the “Configure...” button to enter the Multiple Subscriber Numbers for the NDIS WAN CAPI Driver.

If the current driver software from AVM is installed on your system, the “Device Manager” includes an additional “Advanced” settings page which allows you to enable Direct Dial-in.

6.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer. Active AVM ISDN-Controllers for the ISA, PCI, PCMCIA buses and USB can also be combined in the same system.

To install an additional ISDN-Controller for the PCI bus, simply insert it in a suitable slot as described in “Installing the ISDN-Controller B1 PCI v4.0” on page 12 and start Windows. Make the entries described in the section “Installing the Driver Software” on page 24. That’s all!

If you want to add an ISA-Controller, carry out the controller installation procedure as described in the appropriate manual. USB devices such as the B1 USB are recognized by the Plug & Play mechanism.

The driver software for all installed ISDN-Controllers is loaded automatically when Windows 2000 starts.

6.4 Removing the ISDN-Controller B1 PCI v4.0

To remove the ISDN-Controller B1 PCI v4.0 from your computer in Windows 2000, proceed as follows:

1. Select “Start / Settings / Control Panel”, then double-click the “Add/Remove Hardware” icon.
2. The “Add/Remove Hardware Wizard” is started. Click “Next”.
3. Select the “Uninstall/Unplug a device” option in the following dialog and click “Next”.
4. Then select the “Uninstall a device” option. Confirm by clicking “Next”.
5. In the next dialog, the device to be removed must be selected. Enable the option “Show hidden devices” and click “Next”.

Select the entry “AVM ISDN-Controller B1 PCI”. Click “Next”.

6. Confirm the uninstallation by enabling the option “Yes, I want to uninstall this device” and click “Next”.
7. As a final step, click “Finish”.

The ISDN-Controller is then removed from the system.



Only one ISDN-Controller can be removed at a time. If you have installed several ISDN-Controllers and want to remove them all, then perform the procedure described here several times, without restarting Windows between each operation.

7 Installation in Windows NT



AVM no longer provides support for use of the ISDN-Controller B1 PCI v4.0 with the Windows NT operating system and there is no further development of the driver software.

The AVM ISDN Controller B1 PCI v4.0 is shipped with drivers that are especially developed for use in Microsoft Windows NT. The CAPI 2.0 interface supplied supports both 16-bit and 32-bit applications. Applications in DOS windows are not supported. Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

 **US only:** In addition to the D-channel protocol, ISDN users in the USA must find out their SPID.

SPID stands for **S**ervice **P**rofile **I**Dentifier. A SPID is a number assigned by your ISDN service provider to each subscriber interface. SPIDs let the ISDN switch know which ISDN services a given logical terminal (ISDN device) can access. This is particularly important for ISDN telephones. 

7.1 Installing the Driver Software

Once the ISDN-Controller B1 PCI v4.0 has been physically installed in your computer, the next step is to install the driver software. Proceed as follows:

1. Start Windows NT.
2. Insert the installation CD in your CD-ROM drive.
3. Select “Run...” in the Windows NT Start menu. Enter the path to the installation program in the command line:

```
<CD-ROM drive>\cardware\b1_pci\  
windows.nt\english\setup.exe
```

Confirm by clicking “OK”.

4. The installation's welcome screen appears. For more information about the ISDN-Controller and the installation process, click "View AVM Readme now" in this window.



Use the "F1" key at any time to view a help text for the current installation step.

Click "Continue".

5. The next window contains a list of the installed controllers. If no AVM ISDN-Controller is installed, the "New" entry (add an ISDN-Controller) is already active.

Select the type of controller to be installed and click "Continue".

6. In the next window, enter the folder in which the driver software is to be installed.

7. Enter in the next window which D-channel protocol is used on your ISDN line.

Select the desired option and then click "Continue".

 **US only:** The next dialog asks you to enter your first complete ISDN directory number (area code plus telephone number) in the first input field. In the second field, enter your first complete SPID.

In the following dialog, enter your second complete ISDN directory number and your second SPID. If you have been assigned only one directory number and one SPID, leave the input fields in this dialog blank and click "Continue". 

The installation program then copies all files to the specified folder.

8. As a final step, a window appears with the settings of the ISDN-Controller B1 PCI v4.0. Confirm with "Continue".

This completes the driver software installation in Windows NT. Now the ISDN-Controller can be put into operation.

A new program group called “AVM” is created in the Program Manager/Start menu. This program group contains the files “AVM Internet Home Page” (Windows NT 4.0 only: link to the AVM Internet pages), “B1 Readme”, “B1 Setup” and “B1 Test”.



By default the ISDN-Controller B1 PCI v4.0 is loaded automatically every time Windows NT is started. Because the controller is loaded before the items in the “Startup” program group, it is no problem to include communications programs based on CAPI in the “Startup” group.

7.2 Changing the Settings

After installation has been concluded, you have the option of changing the following settings of the ISDN-Controller B1 PCI v4.0:

- D-channel protocol: DSS1 (Euro ISDN), NI1, 5ESS, 1TR6
- enable automatic data compression (CAPI SoftCompression X75/V42bis)

Open the “B1 Setup” program from the “AVM” program group and follow the instructions there.



Information on CAPI SoftCompression can be found in the section “CAPI SoftCompression X75/V42bis” from page 71.

7.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer. Active AVM ISDN-Controllers for the ISA, PCI and PCMCIA buses can also be combined in the same system.

To install an additional ISDN-Controller for the PCI bus, simply insert it in a suitable slot as described in “Installing the ISDN-Controller B1 PCI v4.0” on page 12 and start Windows. Make your settings in the dialogs as described in the section “Installing the Driver Software” on page 29. That’s all!

If you want to add an ISA-Controller, carry out the controller installation procedure as described in the appropriate manual.

The driver software for all installed ISDN-Controllers is loaded automatically when Windows starts.

7.4 Removing the ISDN-Controller B1 PCI v4.0

Proceed as follows to remove the ISDN-Controller B1 PCI v4.0 driver software in Windows NT:

1. Select “Start / Settings / Control Panel”, then double-click the “Add/Remove Programs” icon.
2. The list of software installed includes an entry for the “AVM ISDN-Controller B1 PCI”. Select this entry and click the “Add/Remove...” button.

The uninstall program is started.

3. To conclude the uninstallation you will be prompted to restart Windows NT so that the changes can take effect.

Rebooting the computer concludes the uninstallation.



Only one ISDN-Controller can be removed at a time. If you have installed several ISDN-Controllers and want to remove them all, then perform the procedure described here several times, without restarting Windows between each operation.

8 Installation in Windows Me



AVM no longer provides support for use of the ISDN-Controller B1 PCI v4.0 with the Windows Me operating system and there is no further development of the driver software.

The AVM ISDN-Controller B1 PCI v.0 is shipped with drivers that are especially developed for use in Microsoft Windows Me. The driver architecture conforms to the Microsoft Win 32 Driver Model (WDM). This true 32-bit device driver offers full support for all features of Windows Me.

The CAPI 2.0 supplied with the ISDN-Controller supports Windows applications and applications in DOS windows at the same time. Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

 **US only:** In addition to the D-channel protocol, ISDN users in the USA must find out their SPID.

SPID stands for **S**ervice **P**rofile **I**Dentifier. A SPID is a number assigned by your ISDN service provider to each subscriber interface. SPIDs let the ISDN switch know which ISDN services a given logical terminal (ISDN device) can access. This is particularly important for ISDN telephones. 

8.1 Installing the Driver Software

Once the ISDN-Controller B1 PCI v4.0 has been physically installed in your computer, the next step is to install the driver software. Proceed as follows:

1. Start Windows Me and insert the installation CD.
2. The Windows Me Plug & Play mechanism recognizes the ISDN-Controller, and the Windows database is updated with driver information.
3. The “Add New Hardware Wizard” is started and looks for drivers for the new device. In the next window, select the option “Automatic search for a better driver (Recommended)”. Click “Next”.

4. The following message appears: “Windows has found more than one driver that may work for your hardware. Please select the driver that matches your language and hardware.” Select from the list the entry “AVM ISDN Controller B1 Family - <CD-ROM-Drive>:\CARDWARE\B1_PCI\WINDOWS.ME\ENGLISH\ALLSETUP.INF” and confirm with “OK”.
5. The driver files are copied. Then click “Finish”.
6. The installation’s welcome screen appears. For more information about the ISDN-Controller and the installation process, click “View AVM Readme now” in this window.



Use the “F1” key at any time to view a help text for the current installation step.

Click “Continue”.

7. Choose the ISDN-Controller you want to install. If no ISDN-Controller has been installed yet, the controller “B1 PCI” is enabled by default. Click “Next”.
8. In the next window, enter the folder in which the driver software is to be installed. When your entries are complete, click “Continue”.
9. First specify the D-channel protocol to be used: DSS1 (Euro ISDN), NI1, 5ESS or 1TR6 (obsolete). Click “Continue”.

 **US only:** The next dialog asks you to enter your first complete ISDN directory number (area code plus telephone number) in the first input field. In the second field, enter your first complete SPID.

In the following dialog, enter your second complete ISDN directory number and your second SPID. If you have been assigned only one directory number and one SPID, leave the input fields in this dialog blank and click “Continue”. 

The installation program then copies all files to the specified folder.

10. As a final step, a window appears with the settings of the ISDN-Controller B1 PCI v4.0. Confirm with “Continue”.

A new folder called “AVM” is created in the “Programs” group of the Windows Me Start menu. This folder contains the programs “AVM Internet Home Page” (link with the AVM Internet pages), “B1 Readme”, “B1 Setup” and “B1 Test”.

 **US only:** In addition to the above files, your AVM program folder also contains the program “B1 SPID Tool”. With this tool, you can change the Directory Number(s) and SPID(s) for the ISDN-Controller. Restart Windows Me after each modification to activate the changes.

Note that the “Startup” folder also contains the program “SPID Test”. This test program runs automatically each time Windows is started and the ISDN-Controller B1 PCI v4.0 is loaded. “SPID Test” runs in the background, contacting the ISDN switch and checking the validity of your SPIDs. If your SPIDs are valid, no message is displayed; otherwise, a message appears. If you want to change the SPIDs at this time, select “Yes” in the message window. The program “B1 SPID Tool” is opened. Enter the desired changes and restart Windows. 

This completes the driver software installation for the ISDN-Controller B1 PCI v4.0. Now the controller can be put into operation.



The ISDN-Controller B1 PCI v4.0 driver software is loaded automatically when Windows Me is started. Because the controller is loaded before the items in the “Startup” program group, it is no problem to include communications programs based on CAPI in the “Startup” group.

8.2 Changing the Settings

After installation has been concluded, you have the option of changing the following settings of the ISDN-Controller B1 PCI v4.0:

- D-channel protocol: DSS1 (Euro ISDN), NI1, 5ESS, 1TR6
- enable automatic data compression (CAPI SoftCompression X75/V42bis)

Open the “B1 Setup” program from the “AVM” program group and follow the instructions there.



Information on CAPI SoftCompression can be found in the section “CAPI SoftCompression X75/V42bis” from page 71.

8.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer. Active AVM ISDN-Controllers for the ISA, PCI, PCMCIA buses and USB can also be combined in the same system.

To install an additional ISDN-Controller for the PCI bus, simply insert it in a suitable slot as described in “Installing the ISDN-Controller B1 PCI v4.0” on page 12 and start Windows. Make your settings in the dialogs as described in the section “Installing the Driver Software” on page 33. That’s all!

If you want to add an ISA-Controller, carry out the controller installation procedure as described in the appropriate manual. USB devices such as the B1 USB are recognized by the Plug & Play mechanism.

The driver software for all installed ISDN-Controllers is loaded automatically when Windows starts.

8.4 Removing the ISDN-Controller B1 PCI v4.0

Proceed as follows to remove the ISDN-Controller B1 PCI v4.0 driver software in Windows Me:

1. Select “Start / Settings / Control Panel”, then double-click the “Add/Remove Programs” icon.
2. The list of software installed includes an entry for the “AVM ISDN-Controller B1 PCI”. Select this entry and click the “Add/Remove...” button.

The uninstall program is started.

3. Restart your computer.

Rebooting the computer concludes the uninstallation.



Only one ISDN-Controller can be removed at a time. If you have installed several ISDN-Controllers and want to remove them all, then perform the procedure described here several times, without restarting Windows between each operation.

9 Installation in Windows 98



AVM no longer provides support for use of the ISDN-Controller B1 PCI v4.0 with the Windows 98 operating system and there is no further development of the driver software.

The AVM ISDN-Controller B1 PCI v.0 is shipped with drivers that are especially developed for use in Microsoft Windows 98. The driver architecture conforms to the Microsoft Win 32 Driver Model (WDM). This true 32-bit device driver offers full support for all features of Microsoft Windows 98.

The CAPI 2.0 supplied with the ISDN-Controller supports Windows applications and applications in DOS windows at the same time. Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

 **US only:** In addition to the D-channel protocol, ISDN users in the USA must find out their SPID.

SPID stands for **S**ervice **P**rofile **I**dentifier. A SPID is a number assigned by your ISDN service provider to each subscriber interface. SPIDs let the ISDN switch know which ISDN services a given logical terminal (ISDN device) can access. This is particularly important for ISDN telephones. 

9.1 Installing the Driver Software

Once the ISDN-Controller B1 PCI v4.0 has been physically installed in your computer, the next step is to install the driver software. Proceed as follows:

1. Start Windows 98.
2. Insert the installation CD in your CD-ROM drive.
3. The Windows 98 Plug & Play mechanism recognizes the ISDN-Controller, and the Windows database is updated with driver information.

4. The “Add New Hardware Wizard” is started and looks for drivers for the new device. You are prompted to install a new device driver. Click “Next”.
5. In the next window, select the option “Search for the best driver for your device (Recommended)”. Click “Next”.
6. Select the option “Specify a location”. Click the “Browse...” button and browse to the path where the installation files are located:

```
CD-ROM drive:\cardware\b1_pci\  
windows.98\english
```

Confirm the path by clicking “Next”.

7. Start installation by clicking “Next” again.
8. The Windows 98 “Add New Hardware Wizard” reports that a driver file for the ISDN-Controller B1 PCI v4.0 has been found. If the information is correct, click “Next”.
9. The driver files are copied to a temporary folder. Then click “Finish”.
10. The installation’s welcome screen appears. For more information about the ISDN-Controller and the installation process, click “View AVM Readme now” in this window.



Use the “F1” key at any time to view a help text for the current installation step.

Click “Continue”.

11. Choose the ISDN-Controller you want to install. If no ISDN-Controller has been installed yet, the controller “B1 PCI” is enabled by default. Click “Continue”.
12. In the next window, enter the folder in which the driver software is to be installed. When your entries are complete, click “Continue”.
13. First specify the D-channel protocol to be used: DSS1 (Euro ISDN), NI1, 5ESS or 1TR6 (obsolete). Confirm with “Continue”.

 **US only:** The next dialog asks you to enter your first complete ISDN directory number (area code plus telephone number) in the first input field. In the second field, enter your first complete SPID.

In the following dialog, enter your second complete ISDN directory number and your second SPID. If you have been assigned only one directory number and one SPID, leave the input fields in this dialog blank and click “Continue”. 

The installation program then copies all files to the specified folder.

14. As a final step, a window appears with the settings of the ISDN-Controller B1 PCI v4.0. Confirm with “Continue”.

A new folder called “AVM” is created in the “Programs” group of the Windows 98 Start menu. This folder contains the programs “AVM Internet Home Page” (link with the AVM Internet pages), “B1 Readme”, “B1 Setup” and “B1 Test”.

 **US only:** In addition to the above files, your AVM program folder also contains the program “B1 SPID Tool”. With this tool, you can change the Directory Number(s) and SPID(s) for the ISDN-Controller. Restart Windows 98 after each modification to activate the changes.

Note that the “Startup” folder also contains the program “SPID Test”. This test program runs automatically each time Windows is started and the ISDN-Controller B1 PCI v4.0 is loaded. “SPID Test” runs in the background, contacting the ISDN switch and checking the validity of your SPIDs. If your SPIDs are valid, no message is displayed; otherwise, a message appears. If you want to change the SPIDs at this time, select “Yes” in the message window. The program “B1 SPID Tool” is opened. Enter the desired changes and restart Windows. 

This completes the driver software installation for the ISDN-Controller B1 PCI v4.0 in Windows 98. Now the ISDN-Controller can be put into operation.



The ISDN-Controller B1 PCI v4.0 driver software is loaded automatically when Windows 98 is started. Because the controller is loaded before the items in the “Startup” program group, it is no problem to include communications programs based on CAPI in the “Startup” group.

9.2 Changing the Settings

After installation has been concluded, you have the option of changing the following settings of the ISDN-Controller B1 PCI v4.0:

- D-channel protocol: DSS1 (Euro ISDN), NI1, 5ESS, 1TR6
- enable automatic data compression (CAPI SoftCompression X75/V42bis)

Open the “B1 Setup” program from the “AVM” program group and follow the instructions there.



Information on CAPI SoftCompression can be found in the section “CAPI SoftCompression X75/V42bis” from page 71.

9.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer. Active AVM ISDN-Controllers for the ISA, PCI, PCMCIA buses and USB can also be combined in the same system.

To install an additional ISDN-Controller for the PCI bus, simply insert it in a suitable slot as described in “Installing the ISDN-Controller B1 PCI v4.0” on page 12 and start Windows. Make your settings in the dialogs as described in the section “Installing the Driver Software” on page 38. That’s all!

If you want to add an ISA-Controller, carry out the controller installation procedure as described in the appropriate manual. USB devices such as the B1 USB are recognized by the Plug & Play mechanism.

The driver software for all installed ISDN-Controllers is loaded automatically when Windows starts.

9.4 Removing the ISDN-Controller B1 PCI v4.0

Proceed as follows to remove the ISDN-Controller B1 PCI v4.0 driver software in Windows 98:

1. Select “Start / Settings / Control Panel”, then double-click the “Add/Remove Programs” icon.
2. The list of software installed includes an entry for the “AVM ISDN-Controller B1 PCI”. Select this entry and click the “Add/Remove...” button.

The uninstall program is started.

3. Restart your computer.

Rebooting the computer concludes the uninstallation.



Only one ISDN-Controller can be removed at a time. If you have installed several ISDN-Controllers and want to remove them all, then perform the procedure described here several times, without restarting Windows between each operation.

10 Installation in Novell NetWare 6.x, 5.x, 4.x and 3.12

Once the ISDN-Controller B1 PCI v4.0 has been physically installed in your computer, the next step is to install the driver software. You have the option of installation in the NetWare versions 6.x, 5.x, 4.x and 3.12.



Two installation variants are supplied for Novell NetWare 6.x, 5.x and 4.x: Stand-Alone CAPI and CAPI Manager.

The CAPI Manager in Novell NetWare 6.x is only available with the “Small Business Edition”. If you would like to use the Novell CAPI Manager, make sure that it is installed before installing the ISDN-Controller B1 PCI v4.0.

For Novell NetWare 3.12, only the Stand-Alone CAPI driver is available.

The Novell CAPI Manager is a part of the Novell NetWare 4.x, 5.x and the “Small Business Edition” of Novell NetWare 6.x operating systems and is supplied by Novell.

The installation and uninstallation procedures are almost identical for both driver types and for all three Novell NetWare versions. Configuration and operation of the ISDN-Controller B1 PCI v4.0 is different depending on whether the Stand-Alone CAPI or the CAPI Manager version is used.

10.1 Installing the Driver Software



Before you begin the driver installation in Novell NetWare 4.x or 3.12, install the operating system patch LANDR9 or higher, available from Novell.



The following installation instructions are valid for Novell NetWare 5.x. Minor deviations may be required for installation in Novell NetWare 5.x, 4.x and 3.12.

In order to install the driver software, carry out the following steps:

1. Start your computer.
2. Insert the installation CD in your CD-ROM drive.
3. Enter the following command:

```
load nwconfig
```

to load the installation menu of the Novell NetWare server. The “Configuration Options” menu of the configuration program appears.

4. Select the “Product Options” item from the menu and press “Return”.

On a NetWare 3.12 server, the screen now displays a list of the programs already installed.

Version 6.x, 5.x or 4.x NetWare servers show a menu labeled “Other Installation Actions”. Select the “Install a product not listed” item from the menu and press “Return”.

5. The disk drive “A:\” is suggested by default. To specify another path, press “F3”.
6. To install the driver software for the Stand-Alone version of the ISDN-Controller, enter the following command:

```
<CD-ROM drive>:\CARDWARE\B1_PCI\  
NETWARE\CAPI20\ENGLISH
```

To enter the driver software for the CAPI Manager, enter the following command:

```
<CD-ROM drive>:\CARDWARE\B1_PCI\  
NETWARE\4CAPIMGR\ENGLISH
```

Confirm with “Return”.

7. In the next step, select “Install on this server” and press “Return”.

The files for the ISDN-Controller B1 PCI v4.0 are now copied to the SYS:\SYSTEM directory.

The README file for the ISDN-Controller B1 PCI v4.0 is displayed on the screen, concluding the installation.

8. Press “Esc” to close the display.
9. Press “Esc” as often as necessary to close all sub-menus and return to the “Configuration Options” menu.
10. Select “Exit” to leave the installation program.

See the following sections for information about how to start operation and configure the ISDN-Controller with Stand-Alone CAPI.

To use the CAPI Manager, read further under “Operation of the ISDN-Controller B1 PCI v4.0 with CAPI for the CAPI Manager” on page 46.

10.2 Configuring the ISDN-Controller B1 PCI v4.0 with Stand-Alone CAPI

To configure the ISDN-Controller B1 PCI v4.0 with Stand-Alone CAPI, enter at the system console:

```
load blsetup
```

A list of available ISDN-Controllers with their I/O addresses, interrupts and D-channel protocols appears. Use the cursor keys to select the ISDN-Controller to be configured from this list and then press “Return”.

The configuration window for the ISDN-Controller B1 PCI v4.0 appears. Here you can perform the settings for the D-channel protocol, the Point-to-Point protocol (Direct Dial-In) and automatic data compression. Move the selection to the entry desired and press “Return”. Select the desired setting from the overview displayed or type the new value in the activated input field.



Information on CAPI SoftCompression can be found in the section “CAPI SoftCompression X75/V42bis” from page 71.

Exit the configuration by pressing “Esc”. Answer “Yes” to save your settings.

The ISDN-Controller B1 PCI v4.0 settings can be changed at any time using this method.

10.3 Operation of the ISDN-Controller B1 PCI v4.0 with Stand-Alone CAPI

Enter the following command at the system console to load the ISDN-Controller:

```
load capi20
```

A message appears reporting that the ISDN-Controller has been loaded and the CAPI interface is available.



When using NetWare 6.x, keep in mind that the display for successful loading is shown in an extra console. This can be accessed using the key combination “Alt+Esc”.

Enter the following command in order to unload the ISDN-Controller:

```
load capi20 -d
```

The system displays a message confirming the action.

10.4 Operation of the ISDN-Controller B1 PCI v4.0 with CAPI for the CAPI Manager

Proceed as follows to configure and start operation of the ISDN-Controller B1 PCI v4.0 with CAPI for the CAPI Manager:



Using NetWare 6.x, the ISDN-Controller B1 PCI v4.0 with CAPI for the CAPI Manager can only be configured using the “Small Business Edition”.

1. Enter the following command at the system console:

```
load inetcfg
```
2. The “Internetworking Configuration” window appears. Select the “Boards” entry.

A list displays the ISDN-Controllers already configured.

3. To bind the ISDN-Controller into the operating system, press the “Ins” key.

Please wait a moment.

4. In the “Select A Driver” dialog, select the “WHSMCAPI” entry and press “Return”.

5. In the next window, assign a name to the ISDN-Controller B1 PCI v4.0, for instance B1PCI.
6. Configure the ISDN-Controller in the “WHSMCAPI Board Configuration” window. Move the highlight to “Select to View” and press “Return”.
7. When prompted to choose whether the ISDN-Controller should be loaded automatically, select “Yes”.
8. In the next dialog, select the ISDN-Controller “B1PCI” and press “Return”.
9. Then enter your parameters:
 - PCI slot
 - Reports (fixed at 2)
 - Switch Type (D-channel protocol)
 - Line Config (MTP = multipoint or PPT = point-to-point)
 - Automatic Data Compression



Information on CAPI SoftCompression can be found in the section “CAPI SoftCompression X75/V42bis” from page 71.

10. Exit the configuration dialog by pressing “Esc” twice and select “Yes” to confirm that you want to save the new settings.
11. The final step in the configuration process is to update the system and load the ISDN-Controller.

In the “Internetworking Configuration” window, select the “Reinitialize System” command and confirm it by selecting “Yes”.
12. Exit the configuration by pressing “Esc”. Answer “Yes” to save your settings.

This concludes the configuration and loading processes for the ISDN-Controller B1 PCI v4.0 with the CAPI Manager.

The ISDN-Controller B1 PCI v4.0 settings can be changed at any time using this method.

10.5 Installing Additional Controllers

If you want to install additional ISDN-Controllers, enter at the system console:

```
load b1setup
```

In the list of available ISDN-Controllers, press “Ins”. Each time an ISDN-Controller is installed, another ISDN-Controller is displayed, complete with an available I/O address and interrupt level.

10.6 Removing the ISDN-Controller B1 PCI v4.0

To remove the ISDN-Controller B1 PCI v4.0 in Novell NetWare 6.x, 5.x, 4.x or 3.12, proceed as follows:

1. Enter the following command at the system console:

```
load nwconfig
```

to load the installation menu of the Novell NetWare server. The “Installation Options” menu of the configuration program appears. Select the “Product Options” item from the menu and press “Return”.

2. If you are removing the ISDN-Controller from a NetWare 3.12 server, a list of the programs already installed appears.

If you are removing the ISDN-Controller from a NetWare 6.x, 5.x or 4.x server, open the menu “Other Installation Actions”. Select here the entry “View/Configure/Remove installed products” and press “Return”. A list of the programs already installed is displayed.

3. Move the highlight to the entry for the AVM ISDN-Controller B1 PCI v4.0 and press “Del”. Confirm with “Yes”.
4. Press “Esc” as often as necessary to close all sub-menus and return to the “Configuration Options” menu.
5. Select “Exit” to leave the installation program.

This concludes the uninstallation of the ISDN-Controller B1 PCI v4.0 in Novell NetWare.

11 Installation in Linux

The ISDN-Controller B1 PCI v4.0 can be used with all current Linux distributions. For the SUSE Linux distributions, pre-compiled drivers are included in the software package. In versions SUSE Linux 8.2 or higher, a CAPI4Linux driver is already integrated in the operating system. Installation for these distributions is described in this manual.

The pre-compiled driver software directly supports the INTEL i386 platform. The drivers must be re-generated and compiled to be used in other distributions or kernel versions, on other CPU platforms or on a multi-processor system. Tips about generating the source code are included in the SRC directory created by extracting the respective TAR archive.

The driver software supports up to four active AVM ISDN Controllers installed in one system. For details, see the section “Installing Additional Controllers” on page 55.

The ISDN-Controller B1 PCI v4.0 is designed for operation on a point-to-multipoint line, but can also be used on a point-to-point line. For further details see “The ISDN-Controller B1 PCI v4.0 on Point-to-Point Lines” from page 60.

CAPI4Linux

The CAPI 2.0 standard for Linux makes it possible to develop applications and drivers that can run on any ISDN-Controller with a compatible CAPI 2.0 driver. The CAPI4Linux software package is based on this standard.



Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

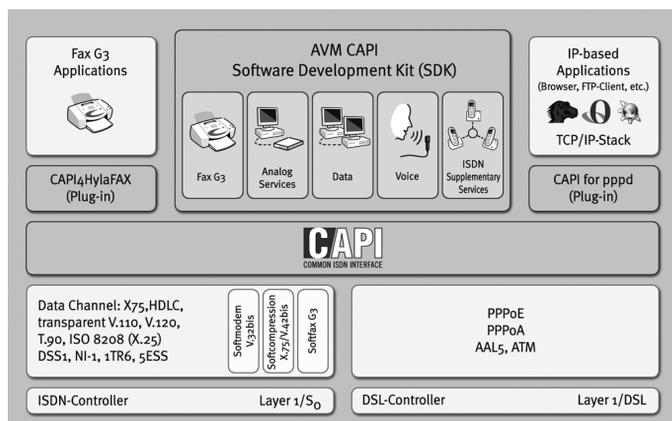
With CAPI4Linux you can use the entire range of ISDN services like Internet access, Remote Access Service, telephony, Fax G3 and file transfer over a standardized applications interface CAPI with corresponding applications.

The CAPI4Linux software package consists of:

- CAPI 2.0 driver
- a CAPI plug-in: an adaptation (CAPI plug-in) of the “Generic PPP” stack (pppd = Point-to-Point Daemon) to allow the use of Internet applications like web browsers and FTP clients
- CAPI 2.0 interface for the popular Fax G3 application “HylaFAX” (CAPI4HylaFAX)
- AVM Software Development Kit (SDK): a tool and resources for developing CAPI 2.0-compatible applications

For more information about the CAPI plug-in for the Generic PPP stack (pppd), see the INSTALL_ACTIVE-E.HTML file (SUSE 8.0 or higher) or the INSTALL_ACTIVE.EN file (up to SUSE 8.0) and the relevant Unix manual page after extracting the archive. Open this manual page by entering `man capiplugin` at the system console.

Documentation on the supplementary components of the CAPI4Linux package like CAPI4HylaFAX and the AVM Software Development Kit (SDK) are located as README files in the corresponding tar archives on the installation CD.



CAPI4LINUX



Architecture of CAPI4Linux

SUSE Linux

To simplify installation, AVM provides pre-compiled driver archives for SUSE Linux 6.3 and higher. In versions SUSE Linux 8.1 or higher, a CAPI4Linux driver is already integrated in the operating system.

Other Distributions

The ISDN-Controller B1 PCI v4.0 can be used with all other current Linux distributions.

Installation in other distributions or kernel versions must be adapted individually depending on the components used. All driver components required for integration into other software distributions or kernel versions, including the source code and short instructions, are supplied in the SRC directory of the corresponding tar archive. Since the binary-only modules contained in the drivers (for instance b1.t4) are kernel-independent, they do not execute any direct kernel calls. This means that they can be integrated into any Linux kernel.



The ISDN4Linux package is not required for the installation of CAPI4Linux.

For information about parallel operation of ISDN4Linux and CAPI4Linux, see the “Service” section on the AVM Internet pages:

www.avm.de/en/service/FAQs

and the AVM Data Call Center (ADC).

11.1 Installation in Linux

SUSE Linux

In versions SUSE Linux 8.2 or higher, a CAPI4Linux driver is already integrated in the operating system. For older SUSE versions, information is provided in the documentation on the installation CD, in the tar archive of the corresponding SUSE version.

Once the ISDN-Controller B1 PCI v4.0 has been physically installed in your computer, the next step is to install the ISDN-Controller using YaST. Once installation has been completed, CAPI 2.0 applications can be started immediately. The first step we recommend is to use the CAPI Plug-in for the Generic PPP Stack (pppd) to establish a test connection to the AVM Data Call Center (ADC).

Other Linux Distributions

To install the driver software in other Linux distributions, follow these instructions:

The CAPI modules are part of the standard Linux kernel and can be generated using it as long as the correct settings are made in the kernel configuration. In order to be able to use the ISDN-Controller B1 PCI v4.0, the kernel modules “capi.ko”, “kernelcapi.ko” and “capifs.ko” are required. The source text for these modules is part of the Linux kernel (in the directory /usr/src/linux/drivers/isdn/capi) and will be translated with this kernel if the following settings are made in the kernel configuration:

```
CONFIG_EXPERIMENTAL=y
CONFIG_ISDN_CAPI=m
CONFIG_ISDN_DRV_AVMB1_VERBOSE_REASON=y
CONFIG_ISDN_CAPI_MIDDLEWARE=y
CONFIG_ISDN_CAPI_CAPI20=m
CONFIG_ISDN_CAPI_CAPIFS_BOOL=y
CONFIG_ISDN_CAPI_CAPIFS=m
CONFIG_ISDN_CAPI_CAPIDRV=m
```

After “make menuconfig”, switch to “Device Drivers”, “ISDN subsystem” and select:

```
...
<M> CAPI2.0 support
[*] Verbose reason code reporting
(kernel size +=7K)
```

```

[*]      CAPI2.0      Middleware      support
(EXPERIMENTAL)

<M> CAPI2.0 /dev/capi support

[*] CAPI2.0 filesystem support

<M> CAPI2.0 capidrv interface support

...

```

In the “Code maturity level options” menu, also enable the option “Prompt for development and/or incomplete code/drivers”.

Once the kernel has been compiled, all CAPI modules will be located in the directory:

```
/lib/modules/'uname -r'/kernel/drivers/isdn/capi/
```

The CAPI tools and libraries can be obtained from the capi4k-utils package (in the file capi4k-utils-XXXX-YY-ZZ.tar.gz on <ftp://ftp.in-berlin.de/pub/capi4linux/>).

Detailed instructions on the capi4k-utils package can be found in the README file, which is also located in the above-mentioned directory.

The completed translations of the modules are copied by the installation routine to the system directory

```
/lib/modules/'uname -r'/extra [kernel 2.6]
```

```
/lib/modules/'uname -r'/kernel/drivers/isdn/avmb1
[kernel 2.4]
```

and loaded by the CAPI tool “capiinit”. This tool expects to find information about which ISDN-Controller or which ISDN-Controller driver should be loaded in the /ETC/CAPI.CONF file. An example of the structure of the /ETC/CAPI.CONF file can be taken directly from the capi4k-utils package.

Please download the most current firmware for the active AVM ISDN-Controller from the following address:

<ftp://ftp.in-berlin.de/pub/capi4linux/firmware/>

11.2 Testing the Installation

At the end of the installation, perform a PING test to check whether the software has been installed correctly. For this purpose a test connection to the AVM Data Call Center (ADC) in Berlin is established over the “pppd” module. This test simulates dialing in to any ISP (Internet Service Provider) using PPP sync in accordance with RFC 1618 over HDLC. The necessary parameters for the test connection are pre-defined in the “AVM” dialing script.



Version ppp-2.3.11-24 or higher of the Generic PPP Stack (pppd) is required for Internet access. These versions are included in all operating system packages from SUSE 6.4.

Proceed as follows to establish a test connection:

1. Start a console (command prompt).
2. Establish a pppd connection with the following command:

```
pppd call isdn/avm usepeerdns
```

For extensions with outside dialing access “0”, use the following command:

```
pppd call isdn/avm numberprefix 0 usepeerdns
```

Once the test connection has been established, the output window contains the PING transit time to the AVM server over your ISDN-Controller. This means that installation was successful.

Now you can start a web browser and access the AVM home page. Enter www.avm.de/en.



Pre-defined scripts for dialing into different Internet Service Providers over the console are included in the AVM software package.

11.3 Installing Additional Controllers

Up to four active AVM ISDN-Controllers can be installed in your computer. Active AVM ISDN-Controllers for the ISA, PCI and PCMCIA buses can also be combined in the same system. It is not possible to use active and passive AVM ISDN-Controllers (like FRITZ!Card PCI) at the same time. If you would like to use an AVM DSL-Controller in addition to ISDN-Controller B1 PCI v4.0, the AVM DSL-Controller must be installed last.

To install an additional active AVM ISDN-Controller, simply perform the installation for the desired controller again. An individual configuration (D-channel protocol and line type) can be assigned to each ISDN-Controller.

If using the ISDN-Controller B1 PCI v4.0 with the AVM ISDN-Controller C4, note that the ISDN-Controller C4 consists of four separate logical ISDN-Controllers (numbers 1 through 4). This means that whenever the ISDN-Controller B1 PCI v4.0 is installed in a system with an ISDN-Controller C4, the ISDN-Controller B1 PCI v4.0 is addressed by the CAPI applications (like CAPI4HylaFAX) as CAPI controller number 5.

Only CAPI applications which can be configured for multiple ISDN-Controllers can be used. The CAPI4HylaFAX module and the CAPI plug-in allow configuration for multiple controllers.

12 Installation in OS/2



AVM no longer provides support for use of the ISDN-Controller B1 PCI v4.0 with the OS/2 operating system and there is no further development of the driver software.

For operation in OS/2 specially developed drivers are included with delivery. Any existing OS/2 applications based on CAPI 1.1 can also be used with this driver software. Information on CAPI can be found in the section “The CAPI 2.0 Application Interface” from page 66.

12.1 Installing the Driver Software

Proceed as follows to install the driver software in OS/2:

1. Insert the installation CD in your CD-ROM drive.
2. Open the SYSTEM directory and double-click “Drives”. Then click the icon of your CD-ROM drive. Switch to the directory below:

```
\CARDWARE\B1_PCI\OS2\ENGLISH
```

3. Start the INSTALL.EXE program.
4. An OS/2 command-line window opens and the installation program’s welcome screen appears. Press “Return”.

The installation can be aborted at any time by pressing “Ctrl+x”.

5. In the next dialog you are asked whether the ISDN-Controller B1 PCI v4.0 is to be loaded automatically every time OS/2 is started. Enable the desired option and confirm with “Return”.
6. Select the D-channel protocol used on your ISDN line: DSS1 (Euro ISDN), NI1, 5ESS or 1TR6.
7. Next specify the directory in which the driver software for the ISDN-Controller is to be installed.

The driver software then is copied to the specified directory.

8. A message now indicates that the CONFIG.SYS file has been changed. The drivers for the ISDN-Controller B1 PCI v4.0 and the command to load the driver software automatically were registered in this file. These entries generally appear as follows:

```
REM - AVM ISDN-Controller B1 PCI Begin-  
SET CAPI=C:\OS2\IDRIVER  
  
DEVICE=C:\OS2\IDRIVER\AVMB1.SYS /LD  
  
CALL=C:\OS2\IDRIVER\ISDNLOAD.EXE  
  
REM - AVM ISDN-Controller B1 PCI End --
```

The old CONFIG.SYS is saved as CONFIG.B1 so that you always have quick access to a backup copy.

9. At the conclusion of installation you are prompted to restart the system. This is necessary to activate the driver software. Confirm with "OK".

Rebooting the system completes the installation of the driver software in OS/2.

A new folder called AVM now appears on the desktop. It contains the programs "B1 Load" and "B1 Unload" along with the "B1 Readme" file.

12.2 Starting Operation of the ISDN-Controller B1 PCI v4.0

If you specified during installation of the driver software that the ISDN-Controller is to be loaded every time the computer is started, the message “Device driver for AVM ISDN-Controller B1 PCI installed” appears briefly upon start-up.

Loading the ISDN-Controller

The ISDN-Controller can be loaded manually by double-clicking the “B1 Load” icon in the “AVM” program group. An OS/2 window is opened and displays the following message when the loading procedure is complete:

AVM GmbH	ISDN-Controller B1 PCI
COMMON-ISDN-API	Serial Number xxxxxxxx
Version 2.0	Address xxx/IRQ x
E-DSS1/Release xxxxxx	
Add. Service: V.42bis, Fax G3 Polling, DTMF, GSM,	

Message after manually loading in OS/2

Unloading the ISDN-Controller

To unload the ISDN-Controller, double-click the “B1 Unload” icon in the “AVM” program group. A corresponding message is displayed.

12.3 Changing the Settings

After installation the D-channel protocol setting can be changed. Proceed as follows:

Open the program INSTALL.EXE as described in the section “Installing the Driver Software” from page 56 and follow the instructions there.



Information on CAPI SoftCompression can be found in the section “Installing the ISDN-Controller B1 PCI v4.0” on page 12.

12.4 Installing Additional Controllers

Up to four active AVM ISDN-Controllers may be installed in one system.

To add another ISDN-Controller B1 PCI v4.0, open the ISDN-LOAD.CFG file from the driver software directory (default: IDRIVER) in a text editor.

Copy the following section:

```
[ISDN-Controller-00]
:PROTOCOL= \xxx
```

Then switch off the computer and install the second ISDN-Controller. Subsequent loading procedures will load all installed ISDN-Controllers.

Active AVM ISDN-Controllers for the ISA, PCI, PCMCIA buses and USB can also be combined in the same system. When registering an ISA controller in the ISDNLOAD.CFG file, also define the I/O address and interrupt level of the ISA controller and add the line `Type=B1`. For more information, see the manual for the ISA controller or the corresponding Readme file.

The “B1 Load” program loads all the controllers installed.

12.5 Removing the ISDN-Controller B1 PCI v4.0

To remove the ISDN-Controller B1 PCI v4.0 in OS/2, start the installation program from the installation CD.

The program reports that an installed ISDN-Controller was found. Select the “Uninstall” option in the next window and follow the instructions on the screen.

The entries in the CONFIG.SYS file made during installation are deleted.

Restart the computer to conclude the uninstallation of the driver software.

13 Special Types of Lines

The default installation of the ISDN-Controller B1 PCI v4.0 is for operation on ISDN point-to-multipoint lines. However, it also can be operated with ISDN point-to-point lines or the internal bus of a PBX.

13.1 The ISDN-Controller B1 PCI v4.0 on Point-to-Point Lines

To work on a point-to-point BRI (also called a direct dial-in or DDI line), please observe the following guidelines depending on your operating system:



Please note that only one terminal device can be connected to a point-to-point BRI.

Windows 7

Proceed as follows to configure the ISDN-Controller B1 PCI v4.0 for a point-to-point BRI:

1. Open “Start / Control Panel / Hardware and Sound / Device Manager”.
2. Click the plus sign “+” next to “Network adapters” to expand the node.
3. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
4. Select “Properties” and switch to the “Advanced” tab.
5. Enable the option “Enable Support for ISDN point-to-point BRI (with direct-dial capability [DDI])”.
6. Confirm your choices by clicking “OK”.
7. Restart your computer.

Windows Vista

Proceed as follows to configure the ISDN-Controller B1 PCI v4.0 for a point-to-point BRI:

1. Open “Start / Control Panel / Hardware and Sound / Device Manager / Show Hardware and Devices”.
2. Confirm the query from the “User Account Control” by clicking “Continue”.
3. Click the plus sign “+” next to “Network adapters” to expand the node.
4. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
5. Click the “Properties” command and select the “Advanced” page.
6. On this page, enable the option “Enable Support for ISDN point-to-point BRI (with direct-dial capability [DDI])”.
7. Confirm your choices by clicking “OK”.
8. Restart your computer.

Windows XP

Proceed as follows to configure the ISDN-Controller B1 PCI v4.0 for a point-to-point BRI:

1. Select “start / Control Panel / Performance and Maintenance / System”. On the “Hardware” dialog page, click the “Device Manager” button.
2. Click the plus sign “+” next to “Network adapters” to expand the node.
3. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
4. Click the “Properties” command and select the “Advanced” page.
5. On this page, enable the option “Enable Support for ISDN point-to-point BRI (with direct-dial capability [DDI])”.

6. Confirm your choices by clicking “OK”.
7. Restart your computer.

Windows 2000

Proceed as follows to configure the ISDN-Controller B1 PCI v4.0 for a point-to-point BRI:

1. Select “Start / Settings / Control Panel / System”. On the “Hardware” dialog page, click the “Device Manager...” button.
2. Click the plus sign “+” next to “Network adapters” to expand the node.
3. Click the entry “AVM ISDN-Controller B1 PCI” with the right mouse button.
4. Click the “Properties” command and select the “Advanced” page.
5. On this page, enable the option “Enable Support for ISDN point-to-point BRI (with direct-dial capability [DDI])”.
6. Confirm your choices by clicking “OK”.
7. Restart your computer.

Windows NT 4.0 Server/Workstation

The “B1 Server Edition” developed especially for the AVM products Network Distributed ISDN for Windows 2000/NT and AVM MultiProtocol Router for Windows 2000/NT provides for easy configuration over a selection menu. This set-up can be obtained free of charge from the `CARDWARE\SERVER.B1` folder on the ADC or via the Internet (see the inside cover for the URL).

The “B1 Server Edition” can, of course, be used for all other CAPI applications.

Windows Me/98/95 and OS/2

Perform the standard installation for your operating system and exchange one single component of the driver. All necessary components and information are contained in the folder `CARDWARE\B1_PCI\X_MISC` on the ISDN-Controller B1 PCI v4.0 installation CD.



Please note that CAPI applications like fax servers must also be configured to interpret the DDI (Direct Dial-In) ISDN numbers correctly. Consult the documentation of your application for more information.

Novell NetWare 6.x, 5.x, 4.x and 3.x

Enable the “P2P” option in the menu for setting the D-channel protocol and restart Novell NetWare.

Linux

To operate the ISDN-Controller B1 PCI v4.0 at a point-to-point BRI (P2P=Point-to-Point), just change the `/ETC/CAPI.CONF` file manually. The same is true for multiple ISDN-Controller B1 PCI v4.0.

An example of a modified “`/etc/capi.conf`” file:

# card	file	proto	io	irq	mem	cardnr	options
#							
B1pci	b1.t4	DSS1	-	-	-	-	P2P

13.2 Connecting to an Internal PBX Bus

The ISDN-Controller B1 PCI v4.0 can be operated smoothly on internal S_0 buses of telecommunications PBXs. The CAPI 2.0 drivers supplied with the software support the D-channel protocols DSS1 (Euro-ISDN), NI1, 5ESS and 1TR6.

Note the following for operation at an internal bus of a PBX:

- The D-channel protocol of the PBX at the internal S_0 bus must be the same as the one selected during the ISDN-Controller installation.
- A number of PBXs require that the ISDN terminal device (the ISDN-Controller, for example) signal a certain MSN for outgoing calls. This MSN is generally the internal extension number rather than the (collective) number of the PBX. For details, see your PBX manual. If this MSN is not signaled or is signaled incorrectly, it is not possible to establish a connection over the PBX. The MSN signaled for outgoing calls is always configured directly in the CAPI 2.0 application (such as FRITZ!) rather than in the CAPI 2.0 driver. This is also the case for the system drivers of the AVM Middleware product series, such as the NDIS WAN CAPI Driver or the CAPI Port Driver. Here the outgoing MSN must also be configured directly in the system drivers.

In many cases charge-calculation software provided by the PBX manufacturers is also dependent on the signaling of the correct MSN by the ISDN terminal device.

- The ISDN service indicator desired by the CAPI 2.0 application (for example DATA64K, speech, 3.1 kHz audio) must be available for terminal devices at the corresponding extension. This generally depends on the configuration of the PBX software.
- If the ISDN-Controller or the CAPI 2.0 application using the ISDN-Controller are to accept calls (from Dial-Up Networking Servers or routers, for example), the extension must also be configured for incoming calls. If multiple terminal devices installed on the internal S_0 bus are configured for the same ISDN service indicator (for

instance, a router and FRITZ!data in Server Mode both respond to calls with the indicator “DATA64K”), the corresponding application must use different MSN configurations to direct calls correctly during parallel operation.

14 AVM System Architecture

This chapter presents information about the ISDN interface CAPI 2.0, the IDM architecture and the AVM system drivers included in the package, along with special CAPI features of the ISDN-Controller B1 PCI v4.0.

14.1 The CAPI 2.0 Application Interface

After the ISDN-Controller B1 PCI v4.0 has been installed, the ISDN interface CAPI 2.0 is available to the computer. This interface allows you to use all features of ISDN.

What Is CAPI?

CAPI (COMMON-ISDN-API) is a standardized software interface that provides applications with access to ISDN adapters on basic-rate and primary-rate lines. Applications that build on this standard interface use uniform mechanisms for communication over ISDN connections, and thus do not need to adapt to the peculiarities of particular manufacturers' hardware. This means that such applications are also unaffected by future extensions or hardware modifications: CAPI makes such changes transparent to the application. ISDN hardware manufacturers benefit from this standard too, since it makes all kinds of applications compatible with their products.

CAPI contains an abstract definition of ISDN services which is not dependent on the specifics of underlying telecommunications networks or the adapters used to connect computers to ISDN. The specification provides an interface that is easy for applications to use, and thus offers uniform access to the various ISDN services, such as data, voice and fax transmission, video conferencing and telephony.

Benefits of CAPI

CAPI has evolved into an internationally recognized standard. Important for this are the many advantages this uniform interface offers: independence from specific manufacturers and resulting high investment security, a wide variety of compatible applications for various operating systems and ISDN protocols, etc. ISDN (Integrated Services Digital Network) is becoming attractive for more and more telecommunications users since it affords fast and reliable transfer of information in many different forms.

This CAPI 2.0 version has all the advantages of an open interface, and covers most of the ISDN features. Since the CAPI interface handles most ISDN subscriber interface control functions, these no longer have to be programmed. This simplifies the development of ISDN applications. Furthermore, applications no longer have to be tailored to national or manufacturer-specific systems, so that a greater variety of applications is available.

For more information about the CAPI applications interface, see the CAPI Association's Internet site:

www.capi.org

Features of CAPI

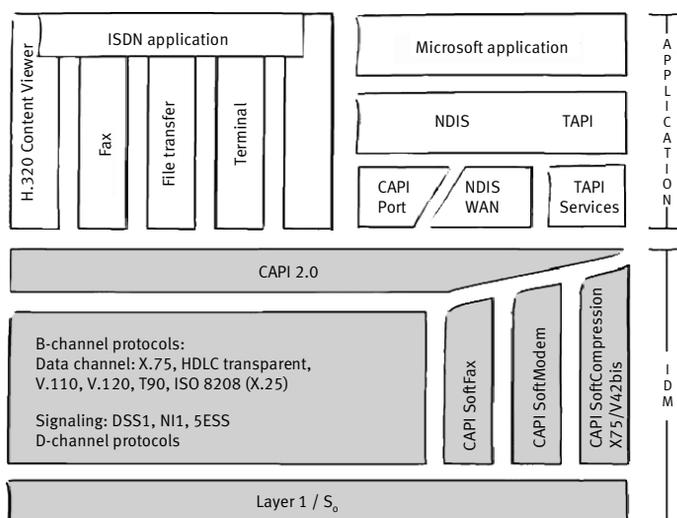
CAPI offers a number of important features:

- Support for basic call features such as establishing and clearing a connection
- Multiple B channel for data and/or voice connections
- Support for multiple logical data connections within a single physical connection
- Selection of specific services and protocols on dialing and in answering incoming calls
- Transparent interface for protocols above OSI Layer 3
- Support for one or several BRIs and PRIs through one or several ISDN adapters
- Support for multiple concurrent applications

- Messages independent of the operating systems
- A message-passing mechanism tailored to specific operating systems for optimum system integration
- An asynchronous, event-driven mechanism for high throughput

14.2 IDM Architecture

The ISDN Driver Model (IDM) shows how ISDN is integrated in Microsoft operating systems.



ISDN driver model (IDM)

The ISDN Driver Model is the framework for all driver components of AVM ISDN products. The IDM describes how ISDN services are integrated and how they are accessed by applications. It also defines the transparent integration of ISDN hardware resources in the operating system.

One of the most important features: the IDM enables is the coupling of existing communication components (such as RAS) with CAPI-based hardware. This connection is realized by the AVM system drivers such as the AVM CAPI Port Driver or the AVM NDIS WAN CAPI Driver.

This architecture permits the simultaneous use of CAPI, modem and networking applications over ISDN. Most importantly, it also permits the definition and implementation of new, extended capabilities. Examples to date include the incorporation of V.42bis data compression and Group 3 Fax.

14.3 The AVM System Drivers

AVM provides two system drivers with similar capabilities: the AVM ISDN CAPI Port Driver and the AVM NDIS WAN CAPI Driver. Both drivers are controlled over Dial-Up Networking, but use different mechanisms and interfaces and different protocols in the operating system. These drivers achieve the same transfer speeds in data communications.



The ISDN CAPI Port Driver and the NDIS WAN CAPI Driver can be installed and operated on the same computer if desired.

The AVM system drivers allow you to use CAPI-based ISDN applications, alongside communications programs that do not have built-in CAPI support, such as Windows' Dial-Up Networking.

The third AVM system driver, AVM ISDN TAPI Services, permits the use of telephony applications with the ISDN-Controller B1 PCI v4.0 in the Windows 7, Vista, XP, and 2000 operating systems.

The AVM system drivers are located in the PROGRAMS folder on the installation CD. The latest versions are also available for downloading from the AVM Data Call Center or from AVM's FTP server on the Internet.

For a detailed description of each driver's functions, please see the HELP file in the corresponding folder. The HELP file also contains complete installation instructions.

AVM ISDN CAPI Port Driver

The AVM ISDN CAPI Port Driver allows you to use an ISDN-Controller as if it were a modem.

The AVM ISDN CAPI Port Driver makes it possible for even programs designed for analog modems to communicate over the ISDN interface. This means that all of the various communications options of Windows can be used with all AVM ISDN-Controllers. For example, you can use Dial-Up Networking and the TCP/IP protocol to dial into your Internet Service Provider.

A number of different “virtual modems” preset for a variety of purposes can be selected in Windows applications such as Dial-Up Networking, Microsoft Exchange/Outlook and Microsoft Money. Just select a pre-configured destination to launch ISDN communication.

AVM ISDN NDIS WAN CAPI Driver

The AVM ISDN NDIS WAN CAPI Driver for Windows allows use of RAS (Remote Access Service) and dialing into Internet Service Providers over ISDN.

NDIS (Network Device Interface Specification) is a standard for connecting network adapters (hardware) to network protocols (software). NDIS WAN is a Microsoft extension of this standard for wide-area networking (WAN). The AVM ISDN NDIS WAN CAPI Driver thus allows the ISDN-Controller to be used as a network adapter addressed over the CAPI 2.0 applications interface.

Unlike the AVM ISDN CAPI Port Driver, the AVM NDIS WAN CAPI driver cannot be controlled by AT commands. It uses the standard protocols for network connections over ISDN (“HDLC” and “PPP over ISDN”).

AVM ISDN TAPI Services for CAPI

AVM ISDN TAPI Services for CAPI are drivers which can be used to implement TAPI applications with AVM ISDN-Controllers universally in Windows.

TAPI (Telephony Application Programming Interface) is a telephony interface by Microsoft which allows telephony programs to be controlled from within the Windows operating system. Using AVM ISDN TAPI Services for CAPI, phone calls can be made or voice-mail systems controlled on the computer. For instance, Windows's "Phone Dialer" can be used to establish connections to analog or ISDN phones. The conversation then takes place using a sound card and a headset or speakers and a microphone. Suitable TAPI applications can make use of numerous other features, such as direct telephone dialing to communication partners listed in programs such as Microsoft Outlook 2010/2007. In the operating systems Windows 7, Windows Vista and Windows XP, MS Fax service may also be used. Please read the relevant sections in the Online Help for instructions.

TAPI applications based on the Microsoft standard TAPI 2.1 or higher can be used in combination with AVM ISDN-Controllers and the AVM ISDN TAPI Services for CAPI.

14.4 CAPI SoftCompression X75/V42bis

CAPI SoftCompression X75/V42bis is a feature of the ISDN-Controller B1 PCI v4.0 driver software. The ISDN-Controller can perform data compression in accordance with the V.42bis standard. This reduces transfer times and connection costs.

When the driver software is installed, CAPI SoftCompression X.75/V.42bis is activated by default. Upon request by CAPI applications that support the V.42bis standard, data compression is negotiated with the remote system for the duration of a connection.

If you use older ISDN applications that do not support this method of data compression, you have the option of enabling data compression directly in the driver software of the ISDN-Controller B1 PCI v4.0. This switches on data

compression for all ISDN connections so that the controller will attempt to negotiate V.42bis data compression with the remote site for all X.75 connections, independent of the CAPI application. If the remote site does not perform data compression, the data will be transmitted without compression. This process takes place in the background and is not apparent to the user.



The “Changing the Settings” sections for each operating system describes how to enable or disable V.42 data compression after installation. For Novell NetWare, this information is contained in the sections “Configuring the ISDN-Controller B1 PCI v4.0 with Stand-Alone CAPI” on page 45 and “Operation of the ISDN-Controller B1 PCI v4.0 with CAPI for the CAPI Manager” from page 46.

If your computer does not meet the hardware requirements or if unexpected problems arise during data exchange with remote sites without V.42 capability, it is advisable to disable data compression in both the driver and the application.



If you have problems establishing a connection, try disabling data compression.

14.5 CAPI SoftFax

The CAPI SoftFax feature allows the ISDN-Controller to send and receive faxes on two B channels simultaneously at up to 14.4 kbit/s. The ISDN-Controller B1 PCI v4.0 sends and receives like a G3 fax device.

The following fax protocols are supported:

- V.17 (14.4 kbit/s)
- V.29 (9.6 kbit/s)
- ECM (Error Correction Mode)
- MR/MMR (2D compression)

15 Technical Specifications

This chapter contains information about the connector and cable pin assignments along with an overview of the ISDN-Controller’s features and technical specifications.

15.1 Connector Pin Assignments

The ISDN-Controller is connected to the ISDN BRI by a standard RJ45 connector. The pin assignments of this connector are shown in the following tables.

Connector pin assignments, S₀ interface (RJ45) to ISDN (IAE)

RJ45	ISDN Connector (IAE)	Function
1-		
2-		
- 5 (b1)	- 5 (b1)	transmit
- 4 (a1)	- 4 (a1)	transmit
- 3 (a2)	- 3 (a2)	receive
- 6 (b2)	- 6 (b2)	receive
7-		
8-		

Connector pin assignments, S₀ interface (RJ45) to ISDN (TAE 8)

RJ45	TAE Connector	Function
1-		
2-		
- 5 (b1)	- 4 (b1)	transmit
- 4 (a1)	- 3 (a1)	transmit
- 3 (a2)	- 6 (a2)	receive
- 6 (b2)	- 5 (b2)	receive
7-		
8-		

15.2 Features at a Glance

- ISDN card with a PCI S₀ interface for use on a BRI or on PBX extensions (point-to-multipoint and point-to-point)
- High-performance Multitasking RISC processor StrongT with 50 MIPS, 1 MB SRAM on the ISDN-Controller
- PCI standard supported for plug & play configuration (on PCI 2.1 5 V)
- PCI Busmaster DMA for optimum system integration
- Software configuration of the card
- Supports file transfer, internetworking, fax, voice and video communication
- Bidirectional Fax G3 simultaneous on 2 B channels at up to 14,400 bit/s (send) and 9,600 bit/s (receive), including ECM (Error Correction Mode), MMR (2-D compression)
- DTMF recognition and fax polling
- Designed for high-load operation with 2 B channels
- CAPI 2.0 interface fully downward-compatible with the older versions of the ISDN-Controller B1 PCI v4.0
- Driver software loadable for national and international protocols: DSS1 (Euro ISDN), NI1, 6ESS and 5TR1
- Software loaded on the ISDN-Controller, for instance, V.42bis data compression
- Implementation in different operating systems, up to four ISDN-Controllers in one computer; combinations with B1 v1.4, B1 v2.0, B1 v3.0, B1 PCI and B1 USB possible
- Standard interface
- Contains driver software, configuration program and diagnostics program
- Device Driver Developer Kit (DDK) included in package

- AVM ISDN Tools included with delivery: Connect2 (MS-DOS) and Connect32 (Windows Vista, XP and 2000) compatible with FRITZ!data and IDtrans, AVM ISDN NDIS WAN CAPI driver and AVM ISDN CAPI Port driver for Windows Vista, XP and 2000, AVM TAPI Services for CAPI (Windows 7, Vista, XP and 2000)
- Extensive application software available
- International certification

15.3 Technical Specifications at a Glance

- ISDN plug-in card for the PCI bus (SMT)
- S₀ interface for basic rate interface/PBX
- High-performance process (multitasking StrongT RISC processor with 50 MIPS peak)
- 1 MB SRAM (fast static RAM) on the ISDN-Controller
- Plug & play installation over BIOS, no jumper settings necessary
- Data transmission rate of 2 x 64,000 bit/s + 1 x 16,000 bit/s
- D-channel protocols supported: DSS1 (Euro ISDN), 1TR6, 5ESS, NI1
- Level 2 B-channel protocols supported: X.75 including V42bis, HDLC transparent, V.110, V.120 and V.29/V.17
- Level 3 B-channel protocols supported: transparent, X.25, ISO 8208, T.70, T.90 and T.30
- Standardized COMMON ISDN API Version 2.0 as the programming interface; Supplementary Services available
- Operation in the operating systems Windows 7, Server 2008, Windows Vista, XP, 2000, NT, Me, 98, 95 and 3.x, MS-DOS, OS/2, Novell NetWare und Linux
- Power consumption approx. 2 W
- Conforms to CE standard (cf. “Declaration of CE Conformity” on page 87)

16 Troubleshooting

This chapter describes general malfunctions and specific error messages, and suggests remedies. The error messages are grouped according to the operating systems in which the ISDN-Controller B1 PCI v4.0 can be operated.

16.1 General Malfunctions

The AVM ISDN-Controller is not detected or not initialized.

Have you installed new hardware components or changed the configuration of existing hardware?

If you combine adapters without plug-and-play support (Legacy) such as the AVM ISDN-Controller B1 v3.0 in the same system with PCI or ISA plug-and-play cards, the resources (I/O addresses and IRQ levels) used by the hardware without plug-and-play support should be so designated in the computer's BIOS. Otherwise, system resources may be allocated to more than one adapter, resulting in malfunctions. Please see your computer or mainboard manual.

You are unable to establish an ISDN connection.

If the ISDN-Controller is correctly installed but you are unable to establish a connection, check for the following conditions:

- Is the ISDN-Controller firmly inserted in the PCI slot? Is its slot plate screwed down?
- Are the ISDN cable connectors firmly connected to the ISDN-Controller and the ISDN socket?
- Is your ISDN line active? Use another terminal device, such as an ISDN telephone, to check it.
- Is your network terminator (NT) installed correctly? Some NTs must be connected to an electricity supply as well as to the incoming ISDN line.

- If your ISDN-Controller is connected to a point-to-point line, have you included the outside dialing prefix (usually “0”) in the numbers dialed?
- Are all the pertinent services (for data connections) available and enabled at your PBX?
- Did you specify the correct D-channel protocol for your ISDN line when installing the ISDN-Controller software? Lines installed in Europe after 1994 are generally DSS1 lines (Euro-ISDN lines).

Problems during operation of the ISDN-Controller.

If problems with operation of the ISDN-Controller occur, establish a test connection to the AVM Data Call Center. You may do so using the program Connect32 (Windows 7, Windows Vista, Windows XP), which is included in the AVM ISDN-Tools included with delivery of your ISDN-Controller. The ADC’s number is +49 (0)30 39 98 43 00.

In Windows 2000, Windows NT, Windows 98, Windows 95, Windows 3.x and MS-DOS, you can also run the “B1 Test” program located in the “AVM” program group and in the folder of the driver software on the installation CD. This program performs functional tests of the ISDN-Controller’s components and displays the results.

After you have run the diagnostic program “B1 Test”, the CAPI interface is no longer available (error message: COMMON-ISDN-API Version 2.0 is not installed).

Reload the ISDN-Controller B1 PCI v4.0 using the corresponding program for your operating system, e.g. IBASE.BAT in DOS or “B1 Load” in Windows 95/3.x.

Windows 2000: Restart the computer after performing the test program.

Applications like Connect32 are unable to connect to analog dial-in ports.

Only connections to ISDN remote systems are possible with your ISDN-Controller. With appropriate software such as FRITZ!fax, for example, you can connect to Group 3 (analog) fax machines.

DOS and Windows drivers loaded at the same time

Load either the DOS driver or the Windows driver for your AVM ISDN-Controller, not both at once. The Windows driver also supports CAPI-based DOS applications in DOS windows.

No connection charge information is displayed

The drivers for the ISDN-Controller B1 PCI v4.0 allow CAPI-based applications to display charge information. This information is only available if the corresponding ISDN service has been enabled by your ISDN carrier. Depending on the ISDN carrier, it may be necessary to enable this service for each B channel separately (and pay an extra charge).

Using Dual-boot Systems

To use the ISDN-Controller in a dual-boot system, install the drivers for each of the operating systems concerned in different folders, such as IDRIVER.WXP and IDRIVER.W95k.

16.2 Error Messages

Error Messages in Windows 7 / Vista / XP / 2000

Please refer to the documentation for your operating system supplied by Microsoft.

Error Messages in Novell NetWare

Error Message on loading the ISDN-Controller:
“Installation Error. Interrupt <xx> not available.”

Possible cause: There are no IRQs available to the PCI bus.

Remedy: Run your BIOS setup (see the computer or the mainboard manual) and release at least one free IRQ for use by PCI adapters.

Example (Award-BIOS): BIOS main menu / “PnP/PCI Configuration” / “IRQ x assigned to: PCI/ISA PnP”

If you combine adapters without plug-and-play support (Legacy) such as the AVM ISDN-Controller B1 v3.0 in the same system with PCI or ISA plug-and-play cards, the resources (I/O addresses and IRQ levels) used by the hardware without plug-and-play support should be so designated in the computer’s BIOS. Otherwise, system resources may be allocated to more than one adapter, resulting in malfunctions. Please see your computer or mainboard manual.

Error message: “CAPI not loaded.”

Possible cause: You tried to start an ISDN application without loading the ISDN-Controller B1 PCI v4.0 first.

Remedy: Load the ISDN-Controller B1 PCI v4.0 by entering `load capi20` at the system console and then start your ISDN application.

Error message: “Error in configuration file, no ISDN-Controller defined.”

Possible cause: During the ISDN-Controller B1 PCI v4.0 installation, the configuration file CAPI20.CFG is created. If you later edit this file manually and corrupt the ISDN-Controller definition(s) it contains, the error occurs.

Remedy: Repeat the complete installation of the ISDN-Controller B1 PCI v4.0.

Error Messages:

“Deinstallation error, wrong CAPI driver loaded.”

“Installation error, wrong CAPI driver loaded.”

“Installation error, ISDN-Controller-xx unknown keyword <xx>.”

“Installation error, ISDN-Controller-xx <xxxx> value too long.”

“Installation error, ISDN-Controller-xx <xxxx> illegal value.”

Possible cause: You have replaced some files in the ISDN-Controller driver installation folder (on obtaining updated drivers from the AVM Data Call Center, for example). Older files in the same directory cause version conflicts.

Remedy: Always perform the full ISDN-Controller B1 PCI v4.0 installation procedure; never replace individual files.

Error message: “Installation error, Controller-xx with I/O address <xxx> does not answer.”

Possible cause: The ISDN-Controller was not fully loaded or the hardware is damaged.

Remedy: Repeat the complete installation of the ISDN-Controller. To test the hardware, you may install the ISDN Controller in DOS and then run the program “B1 Test”. In case of a hardware defect, please contact your dealer or AVM.

Error message: “... at least one application is registered.”

Possible cause: You tried to unload or uninstall the AVM ISDN-Controller B1 PCI v4.0 while an application (such as a terminal or fax program) was still using it.

Remedy: First end all applications that use the ISDN-Controller. Then you can unload or uninstall it.



If the tips above do not help you resolve your problem, please contact AVM Support for further information.

17 Customer Service Guide

AVM is there to help should any questions or problems arise. Here you will find the important information you need, in the form of manuals, updates and support.



In many cases problems that arise during operation can be resolved by installing the current Microsoft Service Pack for your operating system. The current service pack can be obtained free of charge from Microsoft.

17.1 Product Documentation

To take advantage of all commands and features of your ISDN-Controller, consult the following product documentation:

- **User manual**
A printed user manual is included in the ISDN-Controller B1 PCI v4.0 package and a PDF file is available in the INFO\MANUAL folder on the installation CD.



You can install the Acrobat reader to view PDF documents from the INFO\ACROBAT folder of the installation CD.

- **AVM ISDN Tools manual**
This manual describes the AVM ISDN-Tools and is stored in PDF format in the INFO\MANUAL folder on the installation CD.
- **Readme**
The Readme file contains current information which was not yet available at the time the manual was completed. The README file is included on the installation CD.

17.2 Information in the Internet

On its web site AVM presents comprehensive information on your AVM products as well as new product announcements and new product versions.

Frequently Asked Questions (FAQs)

We would like to make our products as easy to use as possible. If you still have problems, sometimes you need just a tip to resolve them. That is why we present you with a selection of frequently asked questions.

The FAQs can be viewed at the following address:

www.avm.de/en/service/FAQs

17.3 Updates

AVM provides updates of the drivers and the firmware for the ISDN-Controller B1 PCI v4.0 for free downloading over the Internet.

- Enter the following URL to download the current driver software:
www.avm.de/en/download
- Experienced users can also download updates from the AVM FTP server. Click the “FTP Server” link in the download area, or enter the following address:
[ftp.avm.de](ftp://ftp.avm.de)

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Declaration of CE Conformity

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

herewith declares that the product

Type ISDN-Controller
Product B1 PCI v4.0

complies with the following directives:

1999/5/EC R&TTE Directive: Radio Equipment and
Telecommunications Terminal Equip-
ment
2009/125/EC EU directive: ecodesign requirements
for energy-related products

The following norms were consulted to assess conformity:

- EN 60950-1:2006 + A11:2009
- EN55022:05.2008
- EN 55024:10.2003



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

A handwritten signature in blue ink that reads "P. Foxel".

Berlin, 13/12/2010

Peter Foxel, Technical Director