

DIVA Client Adapters

Installation for DOS and OS/2

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Contents

Introduction	4
General	4
System requirements	4
Supported hardware	4
About this Online Manual	6
How to use this online manual	6
Structure of this manual	6
Path notation used in this manual	6
Driver Structure	7
Description of the DOS and OS/2 adapter drivers and enablers	7
DIVA 2.0, DIVA 2.01, DIVA Piccola	8
DIVA (ISA, MCA), DIVA/PCM, DIVA Pro, DIVA Pro 2.0, DIVA Pro PC Card	9
Driver Installation	10
Syntax	10
Manual driver installation	10
Maintenance Tools	21
DIMAINTE	21
DILOG	21
DICON	23
PnPDIAG	23
DOS Examples	25
OS/2 Notes	29
Error Messages	32
Supported D-Channel Protocols (ISDN Protocols)	34
Features	35
Glossary	37

Introduction

General

Your DIVA Client adapter can be installed under DOS or OS/2. It operates with any of the drivers described in this introduction.

All PC applications that use CAPI 1.1 or 2.0 (**Common ISDN API**) run with all DIVA Client adapters under DOS or OS/2. CAPI is the standardized, manufacturer-independent interface between the ISDN adapter and the ISDN application.

DIVA Client adapters are easy to configure. They can be used in any country in the world, when configured with the appropriate country-specific ISDN protocol.

All adapters include the Eicon file transfer program ACOPY2 (see ACOPY2 User's Guide under D:\DOC\ACOPY\ENGLISH\ACOPY_E.PDF) as well as maintenance tools for B-channel and D-channel and CAPI-Trace (see [Maintenance Tools](#) on page 21).

Instructions for hardware installation are provided in the printed guide that came with your adapter.

System requirements

The following system requirements are recommended for the installation of the DOS or OS/2 drivers:

- DOS version 5.0 or higher, or OS/2 version 2.x or higher.
- 4 MB hard disk space for installing the DOS drivers.
- 4 MB hard disk space for installing the OS/2 drivers.
- an installed DIVA Client adapter.

Supported hardware

The DOS and OS/2 drivers support the following DIVA Client adapters:

Intelligent adapters	Passive adapters
DIVA (ISA & MCA)	DIVA Piccola
DIVA Pro	DIVA 2.01 (ISA & PCI)
DIVA Pro 2.0 (ISA & PCI)	DIVA 2.0 (ISA & PCI)
DIVA Pro PC Card	
DIVA/PCM	

ISA adapters (except DIVA ISA)

All ISA adapters comply with the ISA Plug&Play standard and thus do not require any hardware settings on the adapter. However, the automatic configuration feature of the ISA Plug&Play mechanism is not available under DOS. Therefore, you have to define adequate hardware resources, i.e. I/O base address and interrupt, manually (for information on supported hardware resources see the DIVA Client Adapters User's guide). To enable the ISA bus adapter and program it to use the specified resources, you have to use the DIVAPP driver.

PCI adapters

The PCI adapters are automatically configured by the PCI BIOS of your computer. Therefore, you do not need to define hardware resources and you do not need to load the DIVAPP driver.

Note: Some PCI BIOSes version 2.00 have problems in assigning the resources (especially IRQ's) to the PCI adapters. It is therefore recommended to use a PCI BIOS version 2.10 or higher. If your PC uses a BIOS version 2.00, a corresponding message is displayed when you have inserted the DIVA Client adapter. The protocol driver might initialize and function correctly but if not, Eicon does not provide support for problems due to this BIOS version.

About this Online Manual

How to use this online manual

- To access a section, click on the corresponding bookmark located on the left.
- To access a topic that contains further information, click on the corresponding blue underlined phrase.
- You can also print out some or all of this manual.

Structure of this manual

This manual shows you how to install your DIVA Client adapter under DOS or OS/2:

Chapter	Contents
Introduction	Describes the DIVA Client adapter software, and lists the software requirements.
Driver Structure	Describes the driver structure of the various DIVA Client adapters.
Driver Installation	Describes how to install the software under DOS. To install the software under OS/2, see also the section OS/2 Notes on page 29.
Maintenance Tools	Gives a brief overview of the Eicon Maintenance Tools. Maintenance Tools help you to detect installation or connection errors.
DOS Examples	Gives examples of how to install the software under DOS.
OS/2 Notes	Gives additional information and examples of how to install the software under OS/2.
Error Messages	Describes some typical error messages that might appear while loading the protocol driver or the CAPI.
Supported D-Channel Protocols (ISDN Protocols)	Gives details on the supported D-channel (ISDN) protocols.
Features	Gives an overview of the functions provided by the interfaces.
Glossary	Explains ISDN-related terms.

Path notation used in this manual

Paths to the CD-ROM drive are indicated with the drive letter 'D:\'. If your system uses a different drive letter, change the letter accordingly.

If you downloaded updates of the DOS or OS/2 drivers from the Eicon Web, you must copy the files to a directory on your hard disk. This manual assumes that you have copied the installation files to a directory 'C:\ISDN'. If you have used a different path, change the drive letter and the path accordingly.

Driver Structure

Description of the DOS and OS/2 adapter drivers and enablers

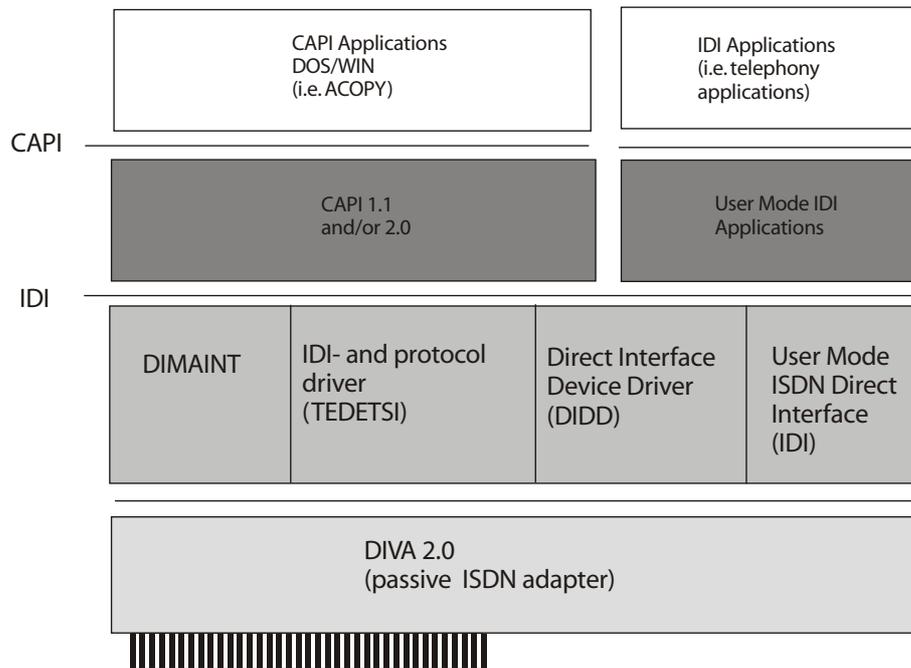
Note: DOS drivers have the file extension .EXE (except DIDD). OS/2 drivers have the file extension .OS2.

Drivers	Description
DIDD.SYS DIDD.OS2	The DIDD driver controls the ISDN ports that are available at the ISDN Direct Interface (IDI). It must be loaded in the CONFIG.SYS. See DIDD (Direct Interface Device Driver) on page 11.
DPMS.EXE (DOS only)	DOS Protected Mode Services (DPMS) are used to run device drivers and other memory-resident system extensions in protected mode. Hence, most ISDN drivers can be installed in the upper memory area above 1 MB (Extended Memory). This enables only a very small memory area to be occupied in conventional DOS memory. The conventional DOS memory therefore remains free for other applications. See Load DPMS driver on page 12.
DIMAINT.EXE DIMAINT.OS2	The maintenance driver DIMAINT continuously records the events, e.g. state, errors etc. that occur on the ISDN drivers. It collects these messages in a circular buffer. In case of erroneous functioning of the ISDN adapter, this buffer can be read out using the application DILOG that is included. The log file provides useful information for solving a problem. For further information on DILOG see DILOG on page 21.
DIVAPPEXE DIVAPP.OS2	DIVAPP enables the ISA Plug&Play interfaces to be activated. This allocates the resources to the ISA Plug&Play adapters (I/O address, IRQ). DIVAPP is not memory-resident, and only activates and configures the adapter. The DIVA Plug&Play enabler DIVAPP needs to be started only for ISA bus Plug&Play adapters, e.g. DIVA 2.0/2.01 ISA, DIVA Pro 2.0 ISA. The PCI bus adapters, e.g. DIVA 2.0/2.01 PCI and DIVA Pro 2.0 PCI, do not require an enabler. The configuration is carried out through the computer's PCI BIOS. See Load DIVAPP driver on page 12 for more information.
TED<Protocol>.EXE TED<Protocol>.OS2	This driver loads the necessary protocol software and the program files for auxiliary functions such as modem, fax and telephony. A list of all supported protocols is provided in chapter 9. The TED protocol driver makes the ISDN Direct Interface (IDI) available. IDI is used by all Eicon application drivers and network applications. That way, all protocol drivers and application interfaces can be installed on every DIVA Client adapter. See Load protocol driver on page 13 for more information.

Drivers	Description
DIAPIS.EXE DIAPIS.OS2	For applications that use the CAPI 1.1, e.g. ACOPY, ECOPY, load the interface program that makes the CAPI 1.1 available with DIAPIS. See Load CAPI 1.1 on page 16 for more information.
CAPI20.EXE CAPI20.OS2	For applications that use the CAPI 2.0, e.g. ACOPY2, load the interface program that makes the CAPI 2.0 available with CAPI20. The CAPI 2.0 is the ISDN interface. Ensure that new applications support the CAPI 2.0 driver. See Load CAPI 2.0 on page 16 for more information.

DIVA 2.0, DIVA 2.01, DIVA Piccola

Passive DIVA Client adapters do not have their own processor. The computer's CPU, therefore, must perform all processing. The diagram below illustrates the ISDN adapter driver structure for a DIVA 2.0:

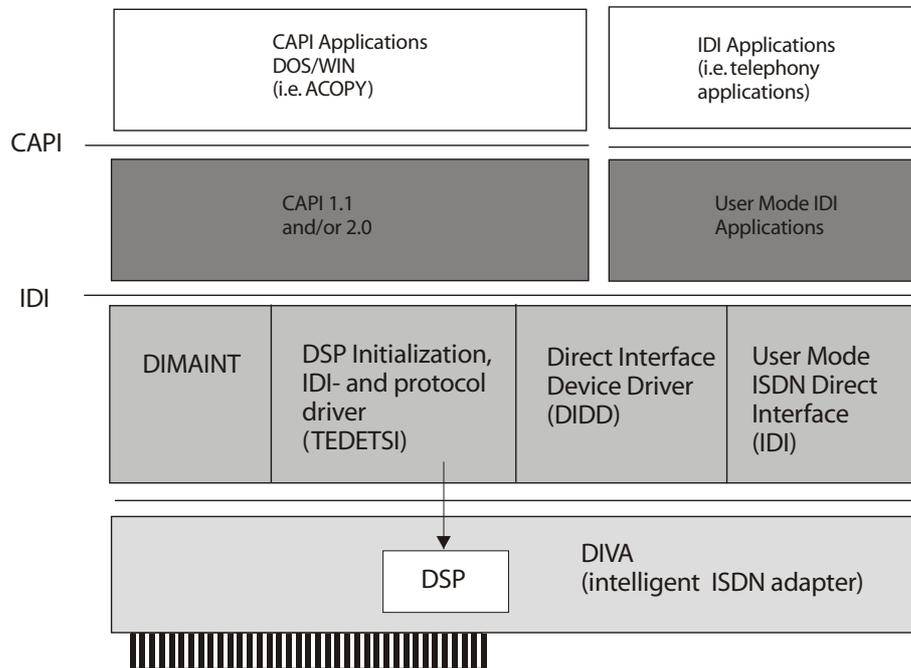


Note: For the DIVA 2.0/2.01 (PCI), the resources are allocated directly by the PCI BIOS (see the note in [PCI adapters](#) on page 5). For DIVA 2.0/2.01 (ISA) and DIVA Piccola the resources are allocated by the Plug&Play enabler DIVAPP.

DIVA (ISA, MCA), DIVA/PCM, DIVA Pro, DIVA Pro 2.0, DIVA Pro PC Card

Intelligent DIVA Client adapters feature a digital signal processor (DSP). As a result, some of the protocol processing occurs directly on the adapter, while some occurs on the computer's CPU.

The diagram below illustrates the ISDN adapter driver structure for an intelligent DIVA Client adapter:



Note: For the DIVA/PCM or the DIVA Pro PC Card, the resources are allocated directly by the protocol driver TED<Protocol>. In case of the PCI adapters the resources are allocated directly by the PCI BIOS (see note in [PCI adapters](#) on page 5). For the ISA adapters, the resources are allocated by the Plug&Play enabler DIVAPP.

CHAPTER 4

Driver Installation

Syntax

The following syntax is used throughout the guide:

Syntax	Description
Input	Keyboard entries used during the installation are printed in <i>courier</i> .
Command	Commands and entries that must be entered exactly as shown are printed in bold type.
<Variable>	Variables that must be entered with a command are printed in angle brackets. They may consist of numbers or other character strings. This is explained separately in the installation instructions.
[Opt]	Optional entries are printed in square brackets. They may consist of variables (e. g. <MSN>) and character strings (normal).
a1 a2	Alternative entries are separated by a vertical line (pipe character).

The DOS command **copy** for copying files is written with the following syntax:

```
copy [<source>]<filename> [<target>]<filename>
```

Manual driver installation

The following example is based on a DOS installation. For differences in the OS/2 installation, see also the section [OS/2 Notes](#) on page 29.

The table below briefly summarizes the installation sequence:

	Action	Note
1.	Copy adapter software to your hard disk (see Copy adapter software to the computer's hard disk on page 11)	
2.	Add DIDD.SYS to CONFIG.SYS (see DIDD (Direct Interface Device Driver) on page 11)	always load from CONFIG.SYS
3.	Restart computer	
4.	Load DPMS.EXE (see Load DPMS driver on page 12)	optional (DOS only)
5.	Load DIMAIN.TEXE (see Load DIMAIN.TEXE driver on page 12)	optional but recommended
6.	Load DIVAPP.EXE (see Load DIVAPP driver on page 12)	only ISA plug&play adapters
7.	Load TED<protocol>.EXE (see Load protocol driver on page 13)	always load

	Action	Note
8.	Load DIAPIS.EXE (see Load CAPI 1.1 on page 16)	optional: CAPI 1.1
9.	Load CAPI20.EXE (see Load CAPI 2.0 on page 16)	optional: CAPI 2.0

You must always load DIDD.SYS from CONFIG.SYS but for the other drivers you can perform the installation steps in different ways:

- Add all drivers to AUTOEXEC.BAT; this makes them available when you restart the computer.
- Write a batch file that calls all drivers.
- Enter the commands needed to launch the drivers one by one when required. This option should only be used to test-load individual driver configurations.

Note: In contrast to version 5.03, the protocols cannot be loaded as device drivers in the CONFIG.SYS file any more. This is due to internal technical reasons. If you need to load the protocol file as device driver in the CONFIG.SYS, you have to use the ted<protocol>.sys pendant. This file is not delivered with the standard product because of its size. In case you need to use the ted<protocol>.sys pendant, contact our customer services at +49-(0)-1803-34 82 47 or send an e-mail to callcentre.europe@eicon.com.

See below for information on what commands and parameters are needed to install the DIVA for DOS and OS/2 drivers.

Copy adapter software to the computer's hard disk

Create a directory for the ISDN software on the hard disk, e.g.:

```
md \isdn
```

If you are installing from the DIVA Client Software Suite CD-ROM, copy the files from the CD-ROM to the directory you have just created for the ISDN software. Specify the full path e.g.:

```
copy d:\dos\client\install\*.* c:\isdn
```

(d: CD-ROM drive letter, c: hard disk drive letter)

If you are installing from diskettes or if you have downloaded the software from the Eicon Web, copy the files to the directory you have just created for the ISDN software, e.g.:

```
copy a:\*.* c:\isdn
```

(a: diskette drive letter, c: hard disk drive letter)

DIDD (Direct Interface Device Driver)

First of all you must load the Direct Interface Device Driver. To load the DIDD, add the following command to the CONFIG.SYS file:

```
device=c:\isdn\didd.sys
```

Restart your computer before you continue the installation.

Load DPMS driver

Note: Make sure that the memory manager HIMEM.SYS is included in the CONFIG.SYS file before you load the DPMS driver. To include HIMEM.SYS, edit the CONFIG.SYS file and add the following command: `device=c:\dos\himem.sys`

You must load the DPMS driver **after** the DIDD but **before** the other drivers. To load the driver use the following command:

```
c:\isdn\dpms.exe
```

Load DIMAINT driver

You must load the DIMAINT driver **before** loading the protocol driver. To load the driver use the following command:

```
c:\isdn\dimaint.exe [-b<Buffer>]
```

Parameter	Meaning
-b<Buffer>	Specifies the size of trace memory in bytes. The minimum size is 5,000 bytes, the maximum is 20,000 bytes. If this parameter is not entered, the maximum size is automatically set.

After installing the [DIMAINTEXE](#) driver, a trace is permanently active, i.e. events occurring on the adapter are recorded continuously. If more events are recorded than available memory permits, the oldest records are overwritten.

Load DIVAPP driver

(ISA bus Plug&Play adapters only)

The DIVAPP driver assigns the hardware resources to ISA bus Plug&Play adapters (DIVA Piccola, DIVA 2.0 ISA, DIVA 2.01 ISA, DIVA Pro, DIVA Pro 2.0 ISA).

Note: Some Plug&Play enablers of other vendors reset the configuration of all Plug&Play adapters in the system, i.e. the I/O address and IRQ. If you use Plug&Play enablers of other vendors, make sure that you load these enablers before loading DIVAPP.

Load the DIVAPP driver with the following command:

```
c:\isdn\divapp.exe -a<addr>,<int>
```

Options	Meaning
<addr>	Specifies the I/O address through which the PC communicates with the ISDN adapter. Permissible I/O address values can be found in the printed guide that came with your adapter.
<int>	Specifies your adapter's interrupt. Permissible interrupts can be found in the printed guide that came with your adapter.

Example:

```
c:\isdn\divapp.exe -a260,9
```

If you do not specify the <addr> or <int> options for an adapter, the standard settings (I/O address 240, interrupt 3) are used. If you specify one of the options (e.g. <addr>), you must also specify the other (e.g. <int>).

Note: Ensure that no other components of the PC are using the I/O address space or interrupt. To do so, either check the configuration of all components installed in your PC or use a tool that performs this check (such as the supplied Eicon Maintenance program PnPDIAG or the program MSD included in DOS).

Load protocol driver

Note: If you want to run a protocol trace on the adapter for diagnostic purposes, you must load the DIMAINT driver before loading the protocol.

Load the protocol driver by using the following command:

```
c:\isdn\ted<protocol>.exe [<options>]
```

Protocol

The corresponding protocol labels must be input according to the ISDN D-channel protocol (country-specific). See [Supported D-Channel Protocols \(ISDN Protocols\)](#) on page 34.

The following command loads the driver for the Euro-ISDN protocol (DSS1):

```
c:\isdn\tedetsi.exe [<options>]
```

The following syntax applies to the protocol driver options:

```
[-a<addr>[,<name>]] [-i<int>] [<protocolparameter>] [<lineID>]
```

or

```
[-a*[,<name>]] [<protocolparameter>] [<lineID>]
```

or

```
[-a$[,<name>]] [<protocolparameter>] [<lineID>]
```

Options	Meaning
<addr>	For DIVA (ISA) and PCMCIA adapters only: Specifies the I/O address. A value is only required if the DIP switch setting on the adapter is different from the standard setting (240h) for the DIVA (ISA), or if a setting other than the standard is to be used for PCMCIA adapters. Possible I/O address values can be found in the DIVA Client Adapters User's Guide.
,<name>	Specifies a name for the adapter (max. 8 characters). The CAPI, for example, can then be allocated directly to a specific adapter during loading. However, this is important only if there are other ISDN adapters in the system.

Options	Meaning
<int>	For DIVA (ISA) and PCMCIA adapters only: Specifies the interrupt. A value is only required if the interrupt is different from the standard setting (3). Possible interrupt values for your adapter can be found in the DIVA Client Adapters User's Guide.
-a*	For ISA Plug&Play and MCA adapters only: The resources defined by the Plug&Play enabler or the operating system are integrated transparently.
-a\$	For PCI adapters only: The resources defined by the PCI BIOS are integrated transparently.

Notes:

- If the parameter **-a** is entered, either the exact address value or ***** or **\$** must be entered.
- Important for the installation of a DIVA (MCA) in a microchannel computer: When loading the drivers, you should not enter details about the hardware configuration. Use **-a*** instead. If the computer was started with the PS/2 reference disk and the new adapter has been registered, the system (PS/2) automatically allocates the resources to the adapter during startup.

Protocol parameters

Parameter	Meaning
-n	Specifies that the ISDN adapter operates in NT2 mode (suffix dialing capability). This function is normally only available in connection with the so-called point-to-point configuration (station connection or leased line).
-o	Specifies No Order Check. The protocol software does not check whether the protocol elements are transmitted in the correct sequence by the exchange. This parameter should only be used if the DIVA Client adapter is operated on a Telenorma series 33x telecommunications system which works with the SW Release A.24 or earlier.
-p	Specifies that the ISDN software is configured for leased lines with D-channel. If -p is given, -t0 , -n and -s2 must be set.
-s1	Specifies that the D-channel layer 2 is set on request and kept permanently active.
-s2	Specifies that the D-channel layer 2 is set on initialisation and kept permanently active (application: Station connection or leased line).
-t<TEI>	Specifies that the D-channel layer 2 protocol is set to point-to-point operation. The TEI (Terminal Endpoint Identifier) value can be a decimal number between 0 and 63. It gives the preset TEI value to the connection. This parameter is required only in exceptional cases. If -t is set, -s2 normally must be set, too. The TEI value is 0 for a leased line or station connection.
-r	DOS only. The command ted<protocol>.exe -r removes the loaded protocol from memory again. If it was loaded from CONFIG.SYS, this is not possible! If another memory-resident Eicon driver is loaded, such as the Common ISDN API, this other driver must be removed first.
-1	DOS only. Specifies that the protocol driver will ignore the loaded DPMS driver.

Parameter	Meaning
-q	Specifies Quiet Mode. Only the most important messages are displayed on the screen during the driver-loading process.
-c	PCMCIA adapters only. Deactivates the use of card and socket services. This can be used if you want to enable your PCMCIA adapter directly.
-e<memadr>	PCMCIA adapters only. Specifies that the PCMCIA adapter will be enabled directly. The memory at <memadr> (size 4 K) is used to grant the PC access to adapter-specific information. This memory area should not be used for any other purpose, i.e. make sure that this region is not included in emm386.exe. Example for CONFIG.SYS: device=emm386.exe x=D000-D0FF Default: D000
[<oad1>+ <SPID1> [.<oad2>+ <SPID2>]]	LineID (North America only): The SPID is required in North America only, with the National ISDN 1 and the AT&T protocol. With these protocols and in specific cases, the BRI port is assigned one or two SPIDs (S ervice P rofile I dentifications) by the telecommunications company. Every terminal device connects with these SPIDs when the SPIDs are activated. With two available SPIDs (Dual SPID) every SPID can be allocated a separate OAD (Origination Address) or MSN (M ultiple S ubscriber N umber), so that both logical connections on the adapter can connect with different SPIDs when activated.

Examples:

The Euro-ISDN protocol and IDI are loaded for a microchannel or ISA Plug&Play adapter with the name BOARD1:

```
c:\isdn\tedetsi.exe -a*,BOARD1
```

The Euro-ISDN protocol and IDI are loaded for a PCI adapter with the name BOARD1:

```
c:\isdn\tedetsi.exe -a$,BOARD1
```

This is a typical configuration for a station connection with TEI=0 and Euro-ISDN protocol:

```
c:\isdn\tedetsi.exe -t0 -s2
```

This is a typical configuration for a leased line **with** D-channel.

```
c:\isdn\tedetsi.exe -t0 -s2 -p -n
```

Note: For leased lines **without** D-channel (no -p), ensure that the applications used support this type of operation.

To load the National ISDN-1 protocol with SPID 4711 based on OAD (MSN) 1234, enter (the parameter -s2 is usually required for exchanges with National ISDN-1 protocol):

```
c:\isdn\tedni.exe -s2 1234+4711
```

To load the National ISDN-1 protocol with SPID1 (4711) based on MSN1 (1234) and SPID2 (0815) based on MSN2 (5678), enter:

```
c:\isdn\tedni.exe -s2 1234+4711.5678+0815
```

Load CAPI 1.1

If the ISDN adapter is to be used with applications based on CAPI 1.1, the Common ISDN API driver must be loaded with the following command:

```
c:\isdn\diapis.exe [-s<SWInt>] [-a<name>][ -o ] [ -r ]
```

Parameter	Meaning
-s<SWInt>	Specifies the number of the software interrupt (to be input as decimal) with which the CAPI is called. If this parameter is missing, the standard value of 241 (0F1 hex) is used. Input the software interrupt if several ISDN adapters from different manufacturers are installed in the computer. The interrupt in the application software must also be configurable for this purpose.
-a<name>	Specifies the board name of the ISDN adapter. This parameter identifies the ISDN adapter on which the CAPI is to be loaded. If this parameter is missing, the CAPI will be loaded for the first ISDN adapter found. The entry -a may be repeated for the installation of several ISDN adapters if, for example, you want to install a DIVA Client adapter and a DIVA Server adapter, such as DIVA Server BRI-2M, in the same computer. Up to four ISDN adapters may be used in this way, although the system can use only one adapter of the DIVA Client family. The controller number in the CAPI (starting with 0) specifies the sequence in which the parameters were entered.
-o	Ensures that the CAPI does not conduct an EAZ test and forwards all incoming calls directly to the application as global calls (EAZ=0).
-r	DOS only. Removes the CAPI from memory. Memory-resident applications that were loaded after CAPI, must first be removed from memory.

Examples:

The CAPI 1.1 is loaded on a DIVA Client adapter with the name BOARD1:

```
c:\isdn\diapis.exe -aBOARD1
```

The CAPI 1.1 is installed on a DIVA Client and a DIVA Server adapter with the names Board1 and Board2:

```
c:\isdn\diapis.exe -aBOARD1 -aBoard2
```

Load CAPI 2.0

If the ISDN adapter is to be used with applications that are based on CAPI 2.0, the Common ISDN API driver must be loaded using the following command:

```
c:\isdn\capi20.exe [-s<SWInt>] [-a<name>] [-z<numberofapplic.>]
```

Parameter	Meaning
-s<SWInt>	Specifies the number of the software interrupt (to be input as decimal) that calls the CAPI 2.0. If this parameter is missing, the standard value 241 (0F1 hex) is assumed. An input will make sense if there are several ISDN adapters from different manufacturers installed in the computer. Hence, the interrupt must also be configurable in the application software.
-a<name>	Identifies the adapter for which the CAPI 2.0 is to be loaded. If no name is entered, the CAPI 2.0 will be loaded for the first adapter found. The parameter -a<name> may be input up to four times to load the CAPI 2.0 for several adapters. The controller number in the CAPI 2.0 specifies the sequence in which the parameters were entered. Note that only one DIVA Client adapter can be installed in a system.
-z[<number ofapplic.>]	Identifies the number of applications that can be run in parallel on the CAPI 2.0. Minimum: 2 (default) Maximum: 32
-r	DOS only. Specifies that the CAPI 2.0 is to be removed from memory. If another memory-resident application is loaded later, this command will be rejected.

The API_MAP program

The CAPI 1.1 has been designed for the German 1TR6 protocol with EAZ addressing. To use it for a Euro-ISDN (ETSI) connection with Multi-Subscriber Numbering (MSN) and subaddressing, the MSNs must be modified.

The program API_MAP.EXE allows complete numbers and subaddresses to be allocated to one EAZ. This single-character EAZ can then be forwarded to the application via the CAPI 1.1.

After the CAPI has been loaded, the program API_MAP can be started with the following command:

```
c:\isdn\api_map.exe
```

After the call, several commands may be entered at the API_MAP command line:

```
set <EAZ> <number>*<subaddress>
```

This command allocates a combined number and subaddress to an EAZ. A number or a subaddress may also be input alone.

Example:

Command	Explanation
set 2 4711*12	An application that can only be configured for EAZ 2 should be used. The ISDN connection number is 4711 and the subaddress is 12.
set 4 4711	EAZ 4 is allocated the number 4711 only.
set 6 *3	All numbers with subaddress 3 are allocated to EAZ 6. The number will be ignored.

If several adapters are supported by the CAPI, switching between the adapters must be done with the command:

```
controller <number>
```

Note: Only one adapter of the DIVA Client family can be installed in a system.

Example:

An application requires that three ISDN adapters be configured to EAZ 8. The three ISDN connections have the numbers 1234, 2345, 3456. The following inputs are required to place the application in the allocation file:

```
controller 0
set 8 1234
controller 1
set 8 2345
controller 2
set 8 3456
```

Command	Explanation
list	Enables all currently active allocations that were set with the command set to be displayed.
quit	Terminates the program.

Allocation at system startup

If the allocation described is to be set automatically at system startup, all commands (implementation rules) required for this may be saved in a file and called with the following command:

```
c:\isdn\api_map.exe < <name>
```

Option	Explanation
<Name>	Specifies the name of the file that contains the implementation rules.

Structure of the file with the implementation rules:

```
set <EAZ> <number>*<subaddress>
set <EAZ> <number>*<subaddress>
...
quit
```

Example:

For example, the file may have the name `api_map.cfg` and have the following structure:

```
set 1 93410
set 4 92458
set 5 93410*1
set 8 *3
list
quit
```

After the entry activating CAPI 1.1, the following entry must be included in the AUTOEXEC.BAT or in the batch file which starts all ISDN drivers:

```
c:\isdn\api_map.exe < c:\isdn\api_map.cfg
```

CAPI applications under Windows 3.x

For CAPI applications under Windows or in several DOS windows under Windows, the following line must be included in the SYSTEM.INI under [386enh]:

```
device=c:\isdn\vcapid.386
```

Note: The file VCAPID.386 must be copied to the directory with the Windows system files (usually \windows\system).

The following section must be added to the end of SYSTEM.INI to forward the parameters for the file VCAPID.386, e.g.:

```
[vcapid]
max_data=2053
max_ncci=6
max_appl=3
api_int=f1
```

If no parameters are specified, then the default values apply. The meaning of the various parameters and their default values are listed in the following table:

Parameter	Default value	Meaning
max_data	2140	Specifies the maximum frame size of a forwarded data frame.
max_ncci	2	Specifies the maximum number of logical connections running at the same time.
max_appl	2	Specifies the maximum number of CAPI applications open at the same time under Windows (including in DOS windows). Many applications occupy two entries.
api_int	f1	Specifies the software interrupt occupied by the CAPI (see Load CAPI 1.1 on page 16 or Load CAPI 2.0 on page 16). Standard interrupt value is f1 (to be input as hexadecimal).

Copy the files CAPI.DLL and CAPI20.DLL from the installation directory to the Windows directory. These dynamic link libraries are based on the DOS CAPI drivers. They will provide the CAPI 1.1 DLL and CAPI 2.0 DLL interface for your Windows 3.x applications.

Installing more than one Eicon ISDN adapter

It is not possible to operate more than one DIVA Client adapter at the same time in a PC. However, the DOS and OS/2 drivers support the simultaneous operation of a DIVA Client adapter and an Eicon server adapter. Follow the instructions below to configure the drivers for operation on multiple adapters:

- Assign a unique name to every adapter when loading the protocol driver. You can do this by adding an extension to the `-a<address>` command line parameter that specifies the adapter's address. You can append a name of up to 8 characters separated by a comma.
- The CAPI 1.1 and CAPI 2.0 drivers accept the command line parameter `-a<name>` up to 4 times. Use this option to attach the CAPI drivers to more than one ISDN adapter.

Example:

Assume you have installed an Eicon DIVA Pro ISA adapter configured for I/O address 240 and interrupt 10 and an Eicon SCOM adapter configured for memory address D0000 and interrupt 11 in your PC. Then you may use the following entries in the AUTOEXEC.BAT file to operate both adapters attached to the CAPI 1.1 and CAPI 2.0 driver:

```
c:\isdn\dimaint.exe
c:\isdn\divapp.exe -a240,10
c:\isdn\tedetsi.exe -a*,MyDIVA
c:\isdn\isdnxd.exe -aD0000,11,te_etsi,MySCOM
c:\isdn\diapis.exe -aMyDIVA -aMySCOM
c:\isdn\capi20.exe -aMyDIVA -aMySCOM
```

Note: The ISDNXDI.EXE driver is used for server adapters to download program code to the digital signal processors and to the RISC CPU on the adapter. The digital signal processors are responsible for the lower protocol layers, whereas the RISC CPU processes the higher layers of the ISDN D-channel and B-channel protocols. The ISDNXDI driver is also responsible for accessing the card and providing a standard interface for all higher level device drivers.

Maintenance Tools

The Eicon maintenance tools help to analyze problems that might occur during installation or operation of your DIVA Client adapter.

The DIMAINT/DILOG pair allows you to monitor the message flow on the ISDN line and the message flow between the IDI and CAPI.

The DICON tool allows you to change your configuration and to retrieve trace and status information.

The PnP diagnostic tool reads all resources allocated by the Plug&Play BIOS and thus helps to allocate a free resource to the DIVA Client adapter to be installed.

DIMAINT

When the adapter software is loaded, the [DIMAINTE.EXE](#) driver is loaded before the protocol software. DIMAINT stores all status messages and error situations that are reported by the Eicon ISDN drivers in a buffer and thus allows to monitor the D-channel and B-channel actions and the message flow between IDI and CAPI. When the buffer is full, the oldest records are overwritten. If you encounter any problems while running the Eicon DOS driver software, you can use the application DILOG to read out this message buffer into a text file. This log file provides useful information to solve most problems.

Note: The DIMAINT driver must be started before the IDI driver is loaded.

DILOG

Note: DILOG requires that the DIMAINT driver be installed first.

The DILOG program allows you to read out the actions logged by DIMAINT into a text file.

Starting the DILOG program

When you start the DILOG program, all actions that have occurred are written either in a file or to the screen.

To start DILOG, type:

```
c:\isdn\dilog.exe <filename>
```

Option	Meaning
<filename>	Specifies the name of file where the trace is written. To display the trace on the screen, a '-' must be entered instead of a file name. Press any key to stop the output to the screen.

The file generated is a normal DOS text file that can be printed or viewed with the standard DOS commands.

Every line in the record file describes an event. The entries are in the following form:

HH:SSSS (TTTTT) - Event

HH: Hours since DIMAINT was loaded

SSSS: Seconds since DIMAINT was loaded

TTTTT: Number of timer ticks (18 ticks equals approximately 1 second with DOS; with OS/2, 32 ticks equals 1 second)

DILOG Trace (example):

```
ISDN Log Facility for DOS, Version 5.03, Build 96-119
0:0000 (00000) - DIMAINT loaded
0:0000 (00001) - DIVAPCM:DI-Maint found
0:0001 (00020) - a=300 i=10
0:0001 (00020) - load TED adr=300, irq=10
0:0001 (00021) - TED loaded
0:0001 (00022) - API loaded
0:0001 (00023) - CAPI20 loaded
```

At this point, all drivers required to establish a connection have been loaded. The connection can now be established:

```
0:0003 (00064) - SYNC_GAINED
0:0003 (00064) - L1_UP
```

L1_UP: Layer 1 of the connection is established, i.e. there are no problems with the connection to the telco switch.

```
0:0009 (00174) - CAPI11_PUT(022) APPL 0a4e 0000:CONNECT REQ
00 83 3F 00 00 00 07 00 38 04 81 35 33 30
0:0009 (00174) - SIG-X(022) 08 01 01 05 A1 04 02 88 90 18
01 83 6C 02 80 38 70 04 81 35 33 30
Q.931 CR0001 SETUP
MORE
Bearer Capability 88 90
Channel Id 83
Calling Party Number 80 '8'
Called Party Number 81 '530'
0:0009 (00174) - D-X(008) FC FF 03 0F 4D 3B 01 FF
0:0009 (00174) - CAPI11_GET(012) APPL 0a4e 0000:CONNECT CON
80 00 00 00
0:0009 (00174) - D-R(008) FE FF 03 0F 4D 3B 02 81
0:0009 (00174) - D-X(003) 00 81 7F ...
```

CAPI messages:

Depending on the direction of the data flow, the CAPI messages CAPI<XX>_GET and CAPI<XX>_PUT are listed with the commands sent.

Signaling:

Signaling during transmission is identified by SIG-X, reception of signaling by SIG-R.

D-channel:

The transmission of data over the D-channel is shown by D-X, the reception of D-channel data by D-R.

B-channel (n: B-channel number):

Transmission of data over the B-channel is identified by B<n>-X, reception by B<n>-R.

Network layer primitive:

Network layer primitives are shown by: N_??? REQ/IND.

DICON

The program DICON provides a front end to the management interface that is built into the protocol file. The management interface allows you to change your configuration after the drivers have been loaded. The configuration variables can be changed to control the program flow, and the national protocol variants can be adjusted.

Using DICON, you can also retrieve trace information and status information (e.g. B-channel status or charges) from the management interface. To create trace information, start the DICON program adding the log file as a parameter, e.g. `DICON.EXE logfile.txt`.

The program includes context-sensitive help. You can access it by pressing the F1 key. The help is self-explaining.

Note for OS/2:

The DICON program is only available as a DOS version. Therefore, under OS/2, you must use the tool in the DOS box.

PnPDIAG

The DOS application PnPDIAG.EXE examines the ISA Plug&Play adapters in the computer and displays their identification and configuration on the screen. Plug&Play adapters from third-party manufacturers are also supported. PnPDIAG can help you resolve resource conflicts.

The program is launched as follows:

```
c:\isdn\pnpdiag.exe [-h] [-a] [-r] [-p<addr>]
```

Note: If you enter a wrong parameter, a syntax aid and a key to abbreviations are displayed on the screen.

If you run PnPDIAG without parameters, only the IDs of Eicon Client and Server adapters are displayed.

Parameter	Meaning
-h	Displays the online help.
-a	Displays the IDs of all ISA Plug&Play adapters, including those from third party manufacturers.
-r	In addition to the IDs, the occupied resources are displayed. If the computer has a Plug&Play BIOS and you start PnPDIAG immediately after resources have been assigned by the Plug&Play BIOS, PnPDIAG should display a resource allocation free of conflicts.
-p<addr>	In case of Plug&Play read-port address conflicts the PnPDIAG tool searches independently for an unoccupied read port address. If this does not work, a fixed value may be entered with this parameter. Default is 0x20f (to be input as hexadecimal).

Use the following legend for the interpretation of the output:

Legend	Meaning
CSN	Indicates the Card Select Number. This is an ID used to address specific adapters directly. The CSN is allocated to every adapter during the Plug&Play isolation process. The Eicon adapters are isolated and loaded in the CSN sequence.
VID	Indicates the Vendor IDentifier. It has the value GDI for Eicon adapters.
PID	Indicates the Product IDentifier. It is a specific value that identifies the adapter according to manufacturer.
RID	Indicates the Revision IDentifier. It is the revision number of the adapter.
Serial#	Indicates the serial number of the adapter.
Active	YES or NO, indicates whether the adapter function is activated or not.
Namestring	Provides a clear text identification of the manufacturer/type of the adapter.

Note for OS/2:

The PnPDIAG tool is available only as a DOS version, because OS/2 applications cannot directly access I/O ports. Therefore, under OS/2, you must use the tool in the DOS box.

DOS Examples

CONFIG.SYS entries:

```
device=c:\isdn\didd.sys
Further entries
```

AUTOEXEC.BAT entries:

When you load the drivers, always type the directory into which the driver has previously been copied, e.g. c:\isdn\.

The following tables show the order in which you must load the drivers in AUTOEXEC.BAT:

	Driver	DIVA Piccola, DIVA 2.0/2.01 ISA, DIVA Pro, DIVA Pro 2.0 ISA	DIVA MCA
1	DPMS	dpms.exe	dpms.exe
2	DIMAIN	dimaint.exe	dimaint.exe
3	DIVAPP	divapp.exe -a<addr>,<int>	
4	TED<Prot.>	ted<protocol>.exe -a*,<name> [<options>]	ted<protocol>.exe -a*,<name> [<options>]
5	DIAPIS	diapis.exe	diapis.exe
6	CAPI20	capi20.exe	capi20.exe

	Driver	DIVA 2.0/2.01 PCI, DIVA Pro 2.0 PCI	DIVA ISA, DIVA/PCM, DIVA Pro PC Card
1	DPMS	dpms.exe	dpms.exe
2	DIMAIN	dimaint.exe	dimaint.exe
3	TED<Prot.>	ted<protocol>.exe -a\$,<name> [<options>]	ted<protocol>.exe -a<addr>,<name> -i<IRQ> [<options>]
4	DIAPIS	diapis.exe	diapis.exe
5	CAPI20	capi20.exe	capi20.exe

For more information on the appropriate parameters see [Driver Installation](#) on page 10.

Configuration examples

DIVA 2.01 ISA

The configuration is based on the following assumptions:

- A DIVA 2.01 ISA is installed in a PC. The adapter resources are defined with I/O address 260h and interrupt 4.
- The Euro-ISDN protocol is used.
- The CAPI 2.0 interface is required.

Lines added to the CONFIG.SYS file:

```
device=c:\isdn\didd.sys
```

Lines added to the AUTOEXEC.BAT file:

```
c:\isdn\dimaint.exe
c:\isdn\divapp.exe -a260,4
c:\isdn\tedetsi.exe -a*,board1
c:\isdn\diapis.exe
c:\isdn\capi20.exe
```

DIVA Pro ISA

The configuration is based on the following assumptions:

- DIVA Pro ISA is installed in a PC. The adapter resources are defined with I/O address 240 and interrupt 10.
- The Euro-ISDN protocol is used. The phone numbers 123, 124, and 125 have been assigned to the ISDN line. An MSN-to-EAZ mapping file is required.
- The CAPI 1.1 and the CAPI 2.0 interfaces are required.
- DPMS is required.

Created CAPI 1.1 MSN-to-EAZ mapping file API_MAP.CFG:

```
controller 0
set 3 123
set 4 124
set 5 125
quit
```

Lines added to the CONFIG.SYS file:

```
device=c:\dos\himem.sys
devicehigh=c:\isdn\didd.sys
```

Lines added to the AUTOEXEC.BAT file:

```
loadhigh c:\isdn\dpms.exe
loadhigh c:\isdn\dimaint.exe
loadhigh c:\isdn\divapp.exe -a240,10
loadhigh c:\isdn\tedetsi.exe -a*
```

```
loadhigh c:\isdn\diapis.exe
loadhigh c:\isdn\api_map.exe < c:\isdn\api_map.cfg
loadhigh c:\isdn\capi20.exe
```

DIVA 2.01 PCI

The configuration is based on the following assumptions:

- A DIVA 2.01 PCI is installed in a PC. The adapter resources are assigned by the PCI BIOS.
- The Euro-ISDN protocol is used.
- The CAPI 2.0 interface is required.
- DPMS is required.

Lines added to the CONFIG.SYS file:

```
device=c:\dos\himem.sys
devicehigh=c:\isdn\didd.sys
```

Lines added to the AUTOEXEC.BAT file:

```
loadhigh c:\isdn\dpms.exe
loadhigh c:\isdn\dimaint.exe
loadhigh c:\isdn\tedetsi.exe
loadhigh C:\isdn\capi20.exe
```

DIVA/PCM

The configuration is based on the following assumptions:

- A DIVA/PCM is installed in a computer. Card and socket services are available. The adapter resources are defined with I/O address 240 and interrupt 5.
- The ISDN AT&T protocol is required. The phone numbers 234 with related SPID 002340 and 235 with related SPID 002350 have been assigned to the ISDN line.
- The CAPI 2.0 interface is required.

Lines added to the CONFIG.SYS file:

```
device=c:\isdn\didd.sys
```

Lines added to the AUTOEXEC.BAT file:

```
c:\isdn\dimaint.exe
c:\isdn\ted5ess.exe -a240 -i5 -s2 234+002340.235+002350
c:\isdn\capi20.exe
```

DIVA Pro PC Card

The configuration is based on the following assumptions:

- DIVA Pro PC Card is installed in a PC. Card and Socket Services are not available. The adapter resources are defined with I/O address 240 and interrupt 10. Memory address range D0000-D0FFF is available for the PCMCIA direct enabler.

- The National ISDN 1 D-channel protocol is used. The phone numbers 123 with related SPID 001230 and 124 with SPID 001240 have been assigned to the ISDN line.
- The CAPI 2.0 interface is required.
- DPMS is required.

Lines added to the CONFIG.SYS file:

```
device=c:\dos\himem.sys
devicehigh=c:\isdn\didd.sys
```

Lines added to the AUTOEXEC.BAT file:

```
loadhigh c:\isdn\dpms.exe
loadhigh c:\isdn\dimaint.exe
loadhigh c:\isdn\tedni -a240 -i10 -e -c -s2 123+001230.124+001240
loadhigh c:\isdn\capi20.exe
```

SYSTEM.INI (Windows)

For CAPI applications running under Windows, add the following lines to SYSTEM.INI in section [386enh]:

```
device=vcapid.386
```

The file VCAPID must be in the Windows system directory.

Place the parameters for the file VCAPID.386 at the end of SYSTEM.INI, e.g. with the following section:

```
max_data=2140
max_ncci=2
max_appl=2
api_int=f1
```

See also [CAPI applications under Windows 3.x](#) on page 19.

CHAPTER 7

OS/2 Notes

For OS/2, the drivers for the Eicon DIVA Client adapters are installed almost exactly as under DOS.

On OS/2 startup, the CONFIG.SYS file is read for configuration information. Therefore all drivers must be loaded in the CONFIG.SYS file.

CONFIG.SYS

When you load the drivers, always type the directory into which the driver has previously been copied, e.g. c:\isdn\.

The drivers for OS/2 can be recognized by the file extension .OS2.

The following table shows the order in which you must load the adapter drivers in CONFIG.SYS:

	Driver	DIVA Piccola, DIVA 2.0/2.01 ISA, DIVA Pro, DIVA Pro 2.0 ISA	DIVA MCA
1	DIDD	didd.os2	didd.os2
2	DIMAIN	dimaint.os2	dimaint.os2
3	DIVAPP	divapp.os2 -a<addr>, <int>	
4	TED<Prot>	ted<protocol>.os2 -a*, <name> [<options>]	ted<protocol>.os2 -a*, <name> [<options>]
5	DIAPIS	diapis.os2	diapis.os2
6	CAPI20	capi20.os2	capi20.os2

	Driver	DIVA 2.0/2.01 PCI, DIVA Pro 2.0 PCI	DIVA ISA, DIVA/PCM, DIVA Pro PC Card
1	DIDD	didd.os2	didd.os2
2	DIMAIN	dimaint.os2	dimaint.os2
3	TED<Prot>	ted<protocol>.os2 -a\$, <name> [<options>]	ted<protocol>.os2 -a<addr>, <name> -i<int> [<options>]
4	DIAPIS	diapis.os2	diapis.os2
5	CAPI20	capi20.os2	capi20.os2

For more information on the appropriate parameters see [Driver Installation](#) on page 10.

Configuration Examples

DIVA/PCM

The configuration is based on the following assumptions:

- A DIVA/PCM is installed in a PC. Card and socket services are available. The adapter resources are defined with I/O address 260 and interrupt 4.
- The German national protocol 1TR6 is used.
- The CAPI 1.1 and CAPI 2.0 interfaces are required.

Note: In this case, the card and socket services must be installed. Some socket service drivers require an extra parameter to activate I/O PC cards. See the README.TXT file and your PC manual.

```
device=c:\isdn\didd.os2
device=c:\isdn\dimaint.os2
device=c:\isdn\ted1tr6.os2 -a260 -i4
device=c:\isdn\diapis.os2
device=c:\isdn\capi20.os2
```

DIVA Pro PC Card

The next example is based on the following assumptions:

- A DIVA Pro PC Card is installed in a PC. The adapter resources are defined with I/O base address 260 and interrupt 4. Card and socket services are not available. The direct enabler is used.
- The Euro-ISDN protocol is required.
- The CAPI 2.0 and CAPI 1.1 interfaces are required.

Note: There should be no card and socket services installed for this type of installation. However, if any are installed for other cards, and they do not function with the DIVA Pro PC card, you should deactivate them for the DIVA Pro PC card. To do so, enter the parameter `-c` in addition to `-e` for the Direct Enabler.

```
device=c:\isdn\didd.os2
device=c:\isdn\dimaint.os2
device=c:\isdn\tedetsi.os2 -a260 -i4 -e
device=c:\isdn\diapis.os2
device=c:\isdn\capi20.os2
```

DIVA Pro 2.0 PCI

The configuration is based on the following assumptions:

- A DIVA Pro 2.0 PCI is installed in a PC. The adapter resources are assigned by the PCI BIOS.
- The national ISDN 1 D-channel protocol is required.
- The CAPI 2.0 interface is required.

```
device=c:\isdn\didd.os2
device=c:\isdn\dimaint.os2
device=c:\isdn\tedni.os2
device=c:\isdn\capi20.os2
```

Additional CONFIG.SYS entries

The following lines in CONFIG.SYS should be changed for better control of the driver installation:

```
path=<pathname>
```

Here, type the directory where your ISDN adapter drivers are located.

```
libpath=<pathname>
```

If one of your CAPI applications requires a CAPI DLL, type the directory where the files CAPI.DLL or CAPI20.DLL are located.

ISDN support for OS/2 DOS windows and Win-OS/2

If you need ISDN support of OS/2 DOS windows or of Win-OS/2, the Eicon virtual IDI device driver (VIDI) is also available as an add-on.

The VIDI device driver is a virtual OS/2 device driver that provides a virtual Eicon IDI interface in one or more DOS sessions. This enables DOS applications (e.g. ACPY) or DOS drivers (e.g. CAPI) that use the IDI interface to run unchanged in one or more OS/2 DOS windows.

The following interfaces are supported by VIDI:

	CAPI 1.1	CAPI 2.0	IDI	DIMAIN
OS/2-DOS window	Yes	Yes	Yes	Yes
Win-OS/2	Yes	No*	No	No (limited)

* Only with DOS-resident CAS driver (driver installed in DOS memory by Windows applications).

Note: For more information, please see the README.TXT file provided with the VIDI.

CHAPTER 8

Error Messages

Below is a list of error messages that can appear after a command is entered:

When loading the protocol driver (e.g. TEDETSI, TED1TR6):

Error message	Meaning
Command line error	An invalid option was entered.
DI already loaded	The protocol driver is already loaded. You need to remove it before you can load it again.
Unable to open <file>	The file cannot be opened and was not found in the directory entered or the wrong file name was entered.
Illegal IRQ <#> for PCMCIA controller	Relates to the Direct Enabler <code>-e</code> . The interrupt entered is not available. Enter another interrupt.
PCMCIA card not found	The PCMCIA adapter could not be detected in a slot.
PCMCIA card not enabled	The PCMCIA adapter could not be enabled.
No PCMCIA card found	No PCMCIA adapter was detected in any of the available slots.
No PCMCIA controller (82365SL) detected	No PCMCIA controller was detected.
No DIVA card found in socket <x> or memory at <addr> already in use	A PCMCIA adapter was detected in socket <x> but the identification cannot be read. There is either no DIVA adapter in this slot or the memory area <addr> has not been freed. When <code>emm386.exe</code> is used, this region must be excluded with <code>x=<addr> -<addr+fff></code> .
Timeout reading serial number	The serial number of the DIVA adapter could not be read.
DIVA configuration register not found	Configuration register read/write test error. The adapter is defective.
<Path name> too long	The path is too long (max. 255 characters allowed). Use another path.
Interrupt test failed	The interrupt test did not work. Use another interrupt or check whether the adapter is defective.
Hardware initialization failed	The adapter could not be initialized. Try again with other values for the I/O address or interrupt.
Illegal interrupt (IRQ#)	The interrupt entered may not be used. Enter another interrupt.
<filename> length error	<filename> indicates a length value that does not correspond to the file length. Copy the files from the diskette or CD again.

Error message	Meaning
Warning: PCI BIOS should have a version greater 2.00	The PCI BIOS version is not supported. Nevertheless, it might be started and work properly.
DIDD device not found	Entry in CONFIG.SYS is corrupt or incomplete.
DI remove error (assigned entities)	Message after unload option <code>-r</code> . Error deleting from memory. Begin by unloading the driver that was loaded after the protocol.
DI already loaded	The command for loading the protocol driver has already been carried out.
Can't remove a not installed IDI	Message occurs after unload option <code>-r</code> . Indicates that the protocol was not loaded.
No 80286 CPU support	In connection with DPMS, the DOS and OS/2 drivers do not support 80286 CPUs.
Cannot register at DPMS. Probably DPMS not loaded.	Probably, the DPMS driver was not loaded. Load the DPMS driver before the protocol driver.
Download verify failed at <address>	Download could not be carried out correctly. Indicates the address where it failed.
Wrong port number	Internal error. Contact technical support.
Can't map <type>ram to selector	Internal error. Contact technical support.
General error	Internal error. Contact technical support.

On loading the DIAPIS (CAPI 1.1) or CAPI20 (CAPI 2.0) drivers:

Error message	Meaning
API not found, not removed	Removal is refused. The command <code>diapis -r</code> or <code>cap20 -r</code> was invoked without CAPI being successfully loaded.
API already installed	The command <code>diapis</code> or <code>cap20</code> has been carried out.
DIDD device not found	The entry <code>device=didd.sys</code> in CONFIG.SYS is missing or is corrupt/incomplete.
ISDN adapter not found	The protocol driver is not loaded or a wrong adapter name <code>-a</code> was specified.
Invalid option selector	An invalid option has been entered. Check the options available when loading the Common ISDN API.

Supported D-Channel Protocols (ISDN Protocols)

When the TED protocol driver `ted<protocol>.exe` is loaded, the desired ISDN D-channel protocol must be entered. Use the following table to find the appropriate protocol label for loading the driver:

Protocol label	Area used
1TR6	Germany + DKZ1/ DKZ N/ DKZ E (national); only following a PBX
5ESS	USA, Canada (AT&T 5ESS custom)
ATEL	Australia (national)
BELG	Belgium (national)
ETSI	Euro-ISDN protocol DSS1 - approved throughout Europe (except for Luxembourg)
FRANC	France (VN3), Luxembourg national
JAPAN	Japan, Hong Kong (national)
NI	USA, Canada: National ISDN 1 (DMS100, Siemens, Northern Telecom); without AUTOSPID
SWED	Sweden (national)
US	USA, Canada: AT&T 5ESS or National ISDN (DMS100, Siemens, Northern Telecom) are automatically detected (switch detection). National ISDN with AUTOSPID. If switch detection is not desired or does not function, the North American protocols can also be selected directly (see 5ESS and NI).

Notes for North America:

The protocol driver TEDUS.EXE detects the North American protocols AT&T 5ESS and National ISDN (DMS100, Siemens, Northern Telecom) automatically.

Additionally, AUTOSPID is supported on some National ISDN switches. In this case, you do not need to configure SPIDs. However, if the switch type does not support AUTOSPID, you need to configure the SPIDs explicitly (see [Load protocol driver](#)).

If you enter the SPIDs manually, these SPIDs are always used, even in cases where the switch type supports AUTOSPID.

CHAPTER 10

Features

Each of Eicon's DIVA Client adapters provides different features and capabilities. The tables below outline the feature set of each Eicon DIVA Client adapter's DOS or OS/2 drivers (version 6.0 or higher).

However, all features may not be available on all the supported interfaces. The interfaces supported by DIVA Client adapters are as follows:

- IDI** ISDN Direct Interface. Supports all features and capabilities of DIVA Client adapters.
- CAPI 1.1** Common ISDN Application Programming Interface. A standard interface for applications to interact with ISDN adapters.
- CAPI 2.0** Common ISDN Application Programming Interface. A standard interface for applications to interact with ISDN adapters.

DIVA ISA, MCA, and PCM adapters

Features via interface:	IDI	CAPI 1.1	CAPI 2.0
Transparent HDLC, 64/56 kbps	•	•	•
Transparent (Voice)	•	•	•
X.75 64/56 kbps	•	•	•
T.70/T.90 (T-Online)	•	•	•
V.110 (CompuServe)	•	•	•
V.120 (CompuServe)	•	•	
V.120 64/56 kbps	•	•	
T.30 Fax Group 3 (analog), Class 1 and 2	•		•
Fax Group 4	•	•	•
X.25, X.31, ISO 8208	•	•	•
Transparent access to the D-channel	•		•

DIVA Piccola, and DIVA 2.0x adapters

Features via interface:	IDI	CAPI 1.1	CAPI 2.0
Transparent HDLC, 64/56 kbps	•	•	•
Transparent (Voice)	•	•	•
X.75 64/56 kbps	•	•	•
T.70/T.90 (T-Online)	•	•	•
V.120 (CompuServe)	•	•	
Fax Group 4	•	•	•
X.25, X.31, ISO 8208	•	•	•
Transparent access to the D-channel	•		•

DIVA Pro, Pro 2.0, and Pro PC Card adapters

Features via interface:	IDI	CAPI 1.1	CAPI 2.0
Transparent HDLC, 64/56 kbps	•	•	•
Transparent (Voice)	•	•	•
X.75 64/56 kbps	•	•	•
T.70/T.90 (T-Online)	•	•	•
V.110 (CompuServe)	•	•	•
V.120 (CompuServe)	•	•	
V.120 64/56 kbps	•	•	
V.34 analog modem	•	•	
T.30 Fax Group 3 (analog), Class 1 and 2	•		•
Fax Group 4	•	•	•
X.25, X.31, ISO 8208	•	•	•
Transparent access to the D-channel	•		•
Telephony with hand-/headset (DIVA Pro 1.1 only)	•		•
Recording via the telephony interface (DIVA Pro 1.1 only)	•		•

CHAPTER 11

Glossary

Term	Explanation
1TR6	National German ISDN D-channel protocol. The 1TR6 today has largely been replaced by the European DSS1 protocol. It will be removed within several years.
ACOPY/ACOPY2/ ACOPYDLL	Command-line-based file transfer program from Eicon. ACOPY is for CAPI 1.1 and ACOPY2/ACOPYDLL for CAPI 2.0 (see 'CAPI'). ACOPY/ACOPY2/ACOPYDLL are automatically installed with the Eicon driver software. The calling computer must be configured as an ACOPY client and the called computer as an ACOPY server. ACOPY/ACOPY2/ACOPYDLL online help is called with the command: ACOPY /? or ACOPY2 /? or ACOPYDLL /?
AUTOEXEC.BAT	A batch file that runs various functions under DOS during system startup.
AUTOSPID	For the North American D-channel protocol National ISDN, some switches support AUTOSPID. In these cases the terminal equipment selects the SPIDs automatically, and the user does not have to configure them.
Basic access	Defined user interface between an ISDN terminal device and the ISDN, also known as S ₀ -interface. Basic access provides the ISDN user with 2 B-channels that each have a transfer rate of 64 kbps and a D-channel transfer rate of 16 kbps. Up to eight terminal devices may be connected to a basic access.
B-channel	Channel for transmission of ISDN user data at a transfer rate of 64 kbps. The format of the data for transfer is not specified by the ISDN protocols. This allows a wide variety of services to be transmitted over the B-channel, including speech, video, audio and data signals (see also 'D-channel').
Bus configuration	In the ISDN context, the bus configuration is the type of connection between the ISDN terminal device and the NT. This can be either point-to-point, i.e. only one ISDN terminal device is attached to the basic access, or point-to-multipoint, i.e. up to eight terminal devices can share one basic access.
CAPI	Common ISDN Application Program Interface. Standardized interface between ISDN applications and ISDN adapters. CAPI version 1.1 is based on the German 1TR6. CAPI 2.0 is based on Q.931 like Euro ISDN or National ISDN 1. CAPI 2.0 is the most commonly used ISDN interface. It is not compatible with version 1.1.
Card Service	Part of the PCMCIA specification. Card Service is a software management system that automatically allocates system resources (memory address, interrupts) as soon as the socket service has detected a PC card. When a PC card is removed, the socket service frees the resources again. In addition, the card service displays the interface to the PC card hardware drivers.
CONFIG.SYS	ASCII file that loads additional drivers during system startup under DOS or OS/2 and configures the system environment.

Term	Explanation
D-channel	Also referred to as the control channel. Messages between the ISDN terminal device and the ISDN, i.e. signals required for establishing and terminating the connection (e.g. service attributes), are transmitted over the D-channel. The D-channel of a basic access transmits these signals at 16 kbps; the D-channel of a primary rate access transmits them at 64 kbps. In some cases, different, mutually incompatible protocols are used in the D-channel of different countries.
Download	Copying a file from a WWW or FTP server or from a bulletin board.
DSS1	D igital S ubscriber S ignalling System No. 1. European ISDN protocol. The DSS1 has an expanded capacity in comparison to the national German 1TR6 protocol, e.g. three-way conversation.
EAZ (TSD)	T erminal device S election D igit (EAZ). Terminal selection method of the German 1TR6 protocol. The EAZ is the last digit of an ISDN connection call number. The EAZ allows the terminal device connected to an ISDN basic access to be selected.
ETSI	E uropean T elecommunications S tandards I nstitute. European institute that issues standards valid throughout Europe on the basis of international recommendations.
ISDN	I ntegrated S ervices D igital N etwork. Digital network that offers all services (voice, text, images, data) over one connection. The term 'ISDN' describes: (1) a number of protocols, services and the interfaces between them, with which a network can be built up and that provides purely digital connections. (2) the interface over which a user can access the digital services of this network. ISDN services currently in use are: WAN services, high-speed fax, video conferencing, database access, distribution of electronic documents and much more.
ISDN adapter	With an ISDN adapter, a PC is able to transmit data over ISDN.
ISDN-API	See 'CAPI'.
ISDN number	Telephone number of an ISDN device. In contrast to conventional telephone numbers, ISDN numbers can include special addressing information that can address a specific device on the selected line. See also 'EAZ' and 'MSN'.
Multilink	Several ISDN B-channels combined into a virtual channel with a higher transfer rate. The throughput rate for bundled channels will correspond to a multiple of a single B-channel only under the most favorable conditions (depending on the size of the data blocks and the data compression). MLPPP (Multi-Link Point-to-Point Protocol) is the Microsoft standard.
MSN	Multiple Subscriber Number. The MSN enables the terminal devices on a Euro-ISDN connection to be selected (only for DSS1).
NI-1	ISDN D-channel protocol used in North America.
NT	Network Terminator. Provides an S/T interface to the Terminal Equipment.
OAD	O rigination A ddress: Local ISDN number of an outgoing call.

Term	Explanation
PCMCIA	P ersonal C omputer M emory C ard I nternational A ssociation. Organization supported by all well known hardware and software manufacturers. The organization's task is to establish and develop the PC card standard. Three housing sizes are defined for PCMCIA cards, which are classified into three types, all of which have a unified size of 54mm x 86mm. However, their thickness varies. Type I is 3.3mm thick, type II 5mm and type III 10.5mm.
Protocol	A collection of procedures, data formats and rules that describe how two systems can communicate with each other. Different protocols are required for every level of data transmission, beginning with the description of the electrical properties of a single bit to the highly developed mutual use of data by various applications.
Q.931	Blue Book. Digital Subscriber Signalling System No. 1 (DSS1). This standard is the basis for most national ISDN D-channel protocols.
S ₀ -interface	See 'Basic access'.
Socket Service	Part of the PCMCIA specification. Socket service is the term for a software interface at the BIOS level which controls the computer's access to the PCMCIA slots. The system detects the number of PCMCIA slots available or whether a PC card is being connected or removed with the socket service driver, which is loaded on boot-up. The socket service passes this information to the card service (see 'Card Service').
SPID	S ervice P rofile I Dentifications (only North America). The SPID is required in North America only, with the National ISDN 1 and the AT&T protocol. With these protocols, basic access is allocated one or more SPIDs (SPID1 or SPID2) by the telecommunications company (in specific cases). When activated, every terminal device connects with these SPIDs. With two available SPIDs (Dual SPID), every SPID can be allocated a separate OAD (Origination Address) or MSN (multiple subscriber number), so that both logical connections on the adapter can connect with different SPIDs when activated.
Subaddress	Additional addressing information attached to the ISDN number. ISDN subaddresses are not required by the network to forward the call. However, they are used by the called terminal equipment (e.g. PBX) to forward the call to a specific device (e.g. an ISDN telephone).
Switch Detection	Automatic detection of the D-channel protocol. Switch detection is currently only required in North America.
Terminal Endpoint Identifier (TEI)	An identifier negotiated with the switching center in the D-channel protocol for distinguishing various terminal devices at an S ₀ -interface. Its control signals are multiplexed on the same D-channel. Depending on the configuration of the ISDN connection, some devices demand a TEI from the network connection when making a connection, while others request the use of a specific TEI.
Transparent D-channel access	The transparent D-channel access is suitable for such cases as non-standard ISDN implementations of telecommunications systems.
Driver	Type of software that is connected interactively with specific hardware components of a system, e.g. graphics card, printer, keyboard. Drivers are often loaded via CONFIG.SYS during system startup.
VN3	An ISDN D-channel protocol used in France.