

PRIMUX

PROFESSIONAL COMMUNICATION

Preface

Congratulations to your new **PrimuX** ISDN card, a high performance adapter for professional communications. This manual will guide you through installation and configuration of the **PrimuX** ISDN adapter.

We wish you lots of success with our ISDN adapters!

Sincerely, Gerdes AG

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Contractor/ manufacturer is:

Gerdes Aktiengesellschaft

Bergerwiesenstr. 9, D-53340 Meckenheim, Germany

News and Updates

You can find up-to-date information, software and add-on products for your **PrimuX** card on the internet at

www.primuxisdn.de

We highly recommend that regularly check this web site for updates or upgrades.

Customer Services

Your **PrimuX** ISDN adapter is very easy to install and use. This manual should contain all information you need. As every PC is different, it is always possible that problems occur that are due to specific configurations of your PC.

Answers to frequently asked questions and tips concerning ISDN or the internet are available on our web site

www.primuxisdn.de

If you can't find the answer to your questions there please call or mail our service team:

Phone + 49 2225 / 916030

Fax +49 2225 / 91601899

Mail service@gerdes-ag.de

Requirements

MS Windows

The driver software for the **PrimuX** adapters can be used on Windows XP, Windows Server 2003, Windows 7, 8, 8.1, 2008 Server and 2012 Server.

Linux

The driver software for the **PrimuX** adapters can be used with a Linux kernel version 2.4.x (2.4.10 or higher) or 2.6.x and 3.x. The **CAPICFG** and **TRACER** tools need the GTK libraries 1.2 or higher.

Please note that it is possible to use the GUI configuration tool to configure console-only PC connected to a LAN by using the **RMTCAPI daemon**. As these tools are TCP/IP based it is even possible to configure Linux PCs from Windows or the other way around. Tools like **HylaFAX** (using **CAPi4HylaFAX**), **CapiSuite** or **pppd** (using **capiplugin.so**) can be used without any modifications. **kisdnwatch** is supported but needs a patch in the manufacturer check (replace "avm" by "gerdes").

Installation

MS Windows

Please install the **PrimuX** software before adding the **PrimuX** adapter. This way you can configure your PCs first and install different **PrimuX** adapters at a later time.

Run **primux.exe** from the driver CD. Follow the instructions on screen. During installation Windows will ask if you trust software from *Gerdes AG*. Please acknowledge these prompts by clicking **Yes**. After the installation has finished all components needed for the **PrimuX** adapters have been installed.

After installing/connecting your hardware Windows will show a *New hardware found* dialog. Please select *Install the software automatically (Recommended)* and click **Next**. For each added ISDN WAN MiniPort a *New hardware found* dialog will appear. Select *Install the software automatically (Recommended)* and click **Next** each time. Acknowledge the following *Hardware has not passed Windows Logo testing* message by clicking *Continue Anyway*.

Deinstalling the drivers

To deinstall the driver software for your **PrimuX** adapter select *Start / Programs / PrimuX ISDN / Remove software* and follow the instructions on screen.

WARNING: The deinstallation process will remove all installed **PrimuX** adapters whether they are currently active or not. All driver settings will be lost. To reuse your settings at a later time you have to save them before deinstallation. After deinstallation you need to reboot your PC to completely remove all driver files.

Linux

Introduction

Because of dependencies between the driver and the kernel version used on your machine the OS dependent part of the driver has to be compiled during installation. The necessary kernel include files should have been installed by your distribution.

The **PrimuX** software doesn't need any distribution specific configuration applications (i.e. YaST2 with SuSE). These application won't be able to configure the **PrimuX** adapters and in most cases won't even show them in their list of installed hardware. You can configure your **PrimuX** adapter using **CAPICFG**.

Installation

To install the driver software run `setup.sh` from the installation CD. Depending on your system (graphical desktop or console) a compatible installation routine will start up:

- The text mode installation asks you to answer a few questions. Please keep the default settings by simply pressing *ENTER*. Based on these settings the driver and utilities will be installed, compiled and loaded
- In the GTK based installation program simply click *Begin Install*. The driver and utilities will be installed, compiled and loaded

As the **PrimuX** drivers are not licensed under the GPL, recent Linux kernels may show a warning message (tainted kernel) when loading the drivers. You can safely ignore this message, though.

Deinstalling the drivers

To deinstall the driver software for your **PrimuX** adapter please enter

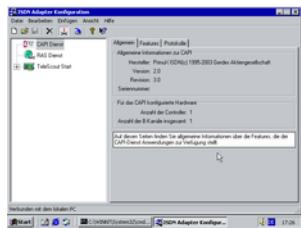
```
/usr/lib/primux/uninstall
```

at a bash prompt. This will remove all files and settings made by the installation process.

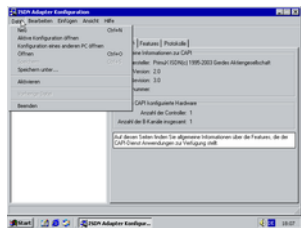
WARNING: The deinstallation process will remove all installed **PrimuX** adapters whether they are currently active or not. All driver settings will be lost. To reuse your settings at a later time you have to save them before deinstallation.

CAPICFG

On the left hande side of the **CAPICFG** main window a list of all available services and ISDN adapters is shown. The right hand side will show settings for the selected item on the left hand side.



The 'File' menu



New

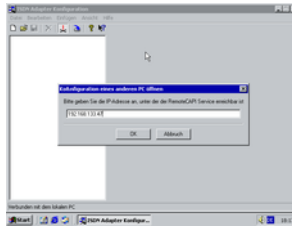
This command will create a new empty configuration. **CAPICFG** will query you to save your changes before deleting the current configuration.

Open active configuration

This command loads the current configuration from the driver. **CAPICFG** will query you to save your changes before deleting the current configuration.

Open remote configuration

This command opens a connection to a **PrimuX** driver loaded on another PC and loads its configuration. On the other PC the **RMTCAPI daemon** has to be started for this to work. **CAPICFG** will query you to save your changes before deleting the current configuration.



Please input the IP address of the remote PC and the port used by the [RMTCAPI daemon](#). Then click on *Ok*.

Open

This command loads a previously saved configuration from disk. **CAPICFG** will query you to save your changes before deleting the current configuration.

Save

This command saves the current configuration to disk.

Save as...

This command saves the current configuration to disk using a new or different file name.

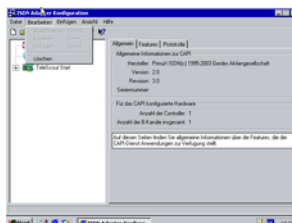
Activate

This command reconfigures the driver with the current configuration. If you originally loaded the configuration using the [Open remote configuration](#) command the driver on the remote PC will be reconfigured.

Exit

This command will close the program. **CAPICFG** will query you to save your changes before deleting the current configuration.

The 'Edit' menu



Cut

Copy selected data to the clipboard and delete it from the configuration.

Copy

Copy selected data to the clipboard.

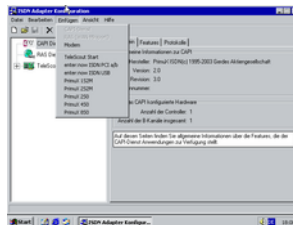
Paste

Insert clipboard contents into the configuration.

Delete

Delete selected data.

The 'Insert' menu



CAPI Service

The CAPI service can be added only once. It enables access to the ISDN adapters using the CAPI 2.0 (and CAPI 1.1) interface.

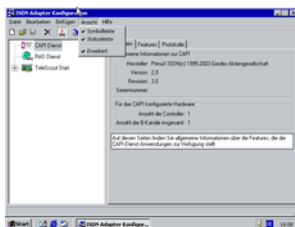
RAS (WAN miniport)

The WAN miniport can be added only once. It enables access to the ISDN adapters for internet dial up services. On Windows additional devices will be created that can be used with the Windows RAS service. On Linux you can access adapters configured for RAS by using different controller numbers (129, 130, ... instead of 1, 2, ...).

Add adapters

The lower part of this menu contains a list of all adapter types supported by the driver. You can add these adapters to a configuration manually. This way you can preconfigure a PC before installing the hardware for real.

The 'View' menu



Toolbar

Toggle the toolbar display.

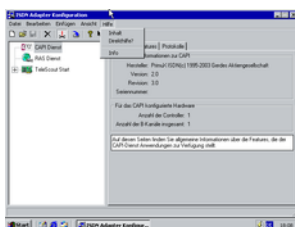
Statusbar

Toggle the status bar display.

Advanced

Toggle availability of the advanced settings page. This page shows some technical settings that you can modify on your own risk...

The 'Help' menu



Content

Open the contents page of the online help.

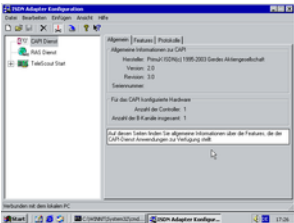
Context help

Open the help page for the current selection.

CAPI Service

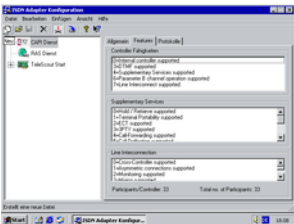
These pages show information about the features supported by the CAPI service. You can use this list to check if the driver supports specific features some applications require.

General



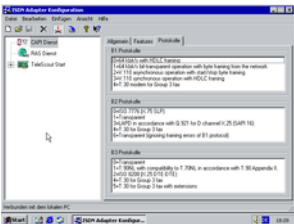
This page shows the manufacturer data, version and revision information and an optional serial number the adapter reports to applications. Furthermore you will find the number of controllers and B channels configured for the CAPI service here.

Features



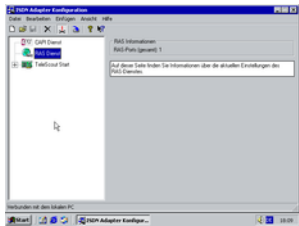
The CAPI service reports supported features in a standardized way. You will find a list of supported features on this page.

Protocols



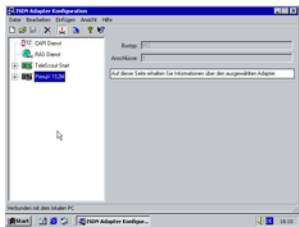
The CAPI service reports supported B channel protocols in a standardized way. You will find a list of supported protocols on this page.

RAS service



On this page you will find the number of channels available for internet dial up connections.

Adapter settings



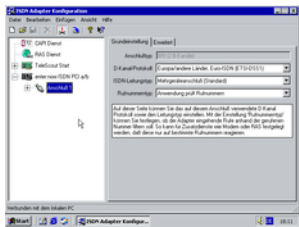
On this page you will find some general information about the selected adapter.

Some adapter types (i.e. adapters connected to the serial port) need additional settings. These settings will be shown on this page, too.

Port settings

An ISDN adapter supports one or more ISDN ports. For every port you will need to specify some information about the ISDN line it is connected to.

General



Line type Some technical data about the kind of line this port can be connected to.

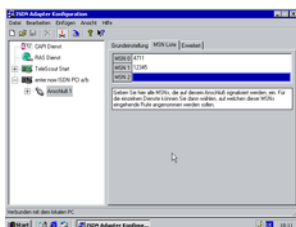
Switch Type You can get information about the switch and interface type from your phone provider. As most countries today use the ETSI-DSS1 standard the default setting should be a good start.

Interface Type ISDN lines in private homes usually are of the *Point-to-Multipoint* (PTMP) type. If the line is configured for a PABX it may be a *Point-to-Point* (PTP) line. Please ask your phone provider if you are not sure what kind of line you have.

Inbound calls This settings should be 'No Phone Numbers' at first. This way all inbound calls will immediately be signaled to the application software. When you use some software that will always accept all calls regardless of the called party number you can enable a filter in the driver. This way the application will only be notified of calls that matched your settings. The *MSN* (*Multiple Subscriber Number*) setting allows specification of those numbers the driver should pass through; the *Range of Extensions* setting allows selection of a range of numbers in a PTP setting.

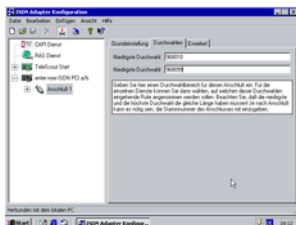
Diagnostics By pressing this button you can check if the line can connect to the phone company using the selected settings. Please keep in mind, that all your current settings will be activated in the driver for this test.

List of MSNs



On this page you can add up to 10 numbers to the list which the driver should pass through.

Dial-In numbers

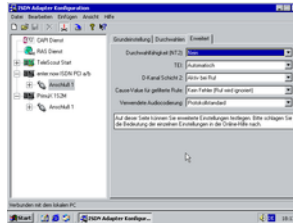


On this page you can specify a lowest and a highest extension. The driver will pass all calls directed to an extension in this range to the application. Both numbers have to be of the

same length and the lowest extension has to be numerically smaller than the highest extension. Depending on the port it may be necessary to add a trunk number to both numbers.

Advanced

The advanced settings are quite technical and require some basic knowledge of ISDN hardware.



Adapters for the S0 bus offer the following advanced settings:

Direct Dial In (NT2) If you set this to Yes the driver will automatically generate a SETUP ACK message on incomplete numbers. This way there won't be a timeout when the caller manually dials a long extension number.

The default on a PTMP line is *No*, on a PTP line it is *Yes*.

TEI Here you can select the TEI value to use for layer 2 connections. The default on a PTMP line is *Automatic*, on a PTP line it is *0*.

Layer 2 Connect Mode This setting specifies how the layer 2 connection is managed. On PTMP lines the default is *On Demand*; with this setting layer 2 will be established when a call is being made and released as soon as the last call is terminated. On PTP lines (and on PRI lines) the default is *No Disconnect*; with this setting layer2 will be established when a call is being made but it will never be (actively) released. With the *Permanent* setting layer 2 will be established immediately when a layer 1 connection is established.

Cause Value for Rejected Calls Here you can specify how the driver handles inbound calls that are not signalled to any application. Usually those calls are simply ignored but in special cases it may be necessary to reject them with a specific cause value (i.e. for call redirecting services to work).

Voice Coding Here you can specify whether the driver should use the *a-Law* or *u-Law* coding standard for generated tone signals (fax modulation, DTMF etc.). The default setting *Protocol default* sets the coding standard based on the selected switch type; usually there should be no need to manually change this setting.

Device Mode This setting selects if the ISDN port should be activated immediately upon loading the driver (setting *Default*) or only when an application is registered with the driver (setting *Hunt*

ISDN over LAN

The **RMTCAPI daemon** and the **RMTCONFIG application** enable you to share ISDN adapters over a TCP/IP network. To enable sharing you need to start the **RMTCAPI daemon** on those PCs with ISDN hardware. Other PCs can be set up to access the shared adapters by using **RMTCONFIG**.

Simply install the driver software on the additional PCs as described under [Installation](#). Then run **RMTCONFIG** or **CRMTCONFIG** as described below.

RMTCAPI

MS Windows

RMTCAPI is installed as a Windows service. Because of that it can not be installed on Windows 98 or Windows ME. After installing the daemon it will be available even after rebooting the PC unless you deinstall it again.

Linux

On Linux **RMTCAPI** is implemented as a daemon process. To enable **RMTCAPI** automatically when booting the PC you have to modify the corresponding init files (see the documentation of your Linux distribution).

Installation

Enter

```
rmtcapi -i
```

at a command prompt to install and start **RMTCAPI**. The service will accept inbound connections on port 4711 on every IP address available on this PC.

To select a different port use the `-p` option. The command

```
rmtcapi -i -p 4712
```

installs **RMTCAPI** and will accept connections on port 4712 instead of 4711.

On PCs connected to the internet it may be necessary to make **RMTCAPI** listen only on specific IP addresses. These addresses can be specified on the command line:

```
rmtcapi -i -p 4711 192.168.0.1
```

This way **RMTCAPI** will accept inbound calls only on port 4711 of address 192.168.0.1.

Deinstallation

The command

```
rmtcapi -u
```

will deinstalliert **RMTCAPI**. The program will be unloaded (Linux) or stopped (Windows) but it will not be removed so it can be restarted later on.

RMTCONFIG

RMTCONFIG configures PCs to use a shared ISDN adapter of a different PC.

In order to use a shared adapter simply check *Use remote CAPI* and enter an IP address and port (i.e. 192.168.0.1:4712) where a **RMTCAPI** daemon can be reached.

To use local ISDN adapters simply uncheck *Use remote CAPI* again.

CRMTCONFIG

CRMTCONFIG is a command line version of **RMTCONFIG** and enables you to include it in batch files (Windows) or shell scripts (Linux) or other automated processes.

The command

```
crmtconfig -i 192.168.0.1:4712
```

enables access to the **RMTCAPI** service reachable on port 4712 of the PC with IP address 192.168.0.1.

The command

```
crmtconfig -u
```

enables access to local ISDN adapters.

RMTCONFIG and DNS

When your local network is configured for DNS you can use DNS names instead of IP addresses when configuring shared ISDN access.

CAPI Extensions

The following chapters describe extensions to the CAPI standard the **PrimuX** drivers offer. These informations only will be useful for software developers.

NT Mode

The *NT Mode* can be enabled on supported adapters using **CAPICFG**. The port settings (*Switch Type*, *TEI* etc.) retain their meaning in *NT Mode*. This way it is possible to create PTMP and PTP ports.

Simple

When set to *NT - Network Termination [simple]* the driver will handle all NT peculiarities by itself so you can use standard applications. The driver will even generate progress tones at the appropriate times.

When a connected terminal is picked up the application will receive a *CONNECT_IND* message. Dialed digits will be signalled using *INFO_IND* messages. When the application sends an *ALERT_REQ* message the terminal will hear a calling tone, after sending a *CONNECT_RESP* message the connection will be established. From the applications point of view this looks exactly like an inbound call on a DDI line (if your application isn't DDI capable you can even use the CAPI filtering mechanism to let it collect all digits and present the application with a complete number).

An 'outbound' call can be created by sending a *CONNECT_REQ* message. The application will receive the usual *INFO_IND* messages (i.e. when a terminal is ringing) and a *CONNECT_ACTIVE_IND* message when a terminal answers the call. The driver even handles PTMP situations where more than one terminal reacts to the call. From the applications point of view this behaviour looks exactly like an outbound call in TE mode.

Full

When set to *NT - Network Termination [full]* the above mentioned translation layer will be switched off. This way the application software can control every aspect of the connection.

Connections initiated by a terminal

A connection initiated by a terminal will be signalled with a *CONNECT_IND* message. The application must check the parameters of this message and generate a *SETUP_ACK* message on the D channel immediately (see *INFO_REQ* below). By using the *Early B3 Connect* mechanism the application can connect to the B channel before actually establishing the connection in order to send a customized dial tone.

Digits dialed by the terminal will be signalled using *INFO_IND* messages. When the application decides that the number is complete it can send a *CALL_PROCEEDING* message on the D channel (see it *INFO_REQ* below). This message informs the terminal that it must not send any more digits. Later on the application sends an *ALERT_REQ* message and again generates progress tones using *DATA_B3_REQ* messages (when enabled via *Early B3 Connect*). When the application terminates

the connection by sending a *DISCONNECT_REQ* message it has to generate a busy tone by itself, too.

Connections initiated by the application

In this case almost no special handling is necessary. Only when the application terminates the connection it has to generate a busy tone for the terminal.

Early B3 Connect

In *NT Mode* the *Early B3 Connect* mechanism can be used after receiving a *CONNECT_IND* message. As in *TE Mode* a *DISC* message on the D channel won't send a *DISCONNECT_IND* message to the application. Instead the application has to interpret the *INFO_IND* message and send a *DISCONNECT_REQ* message after a *DISC* is detected.

INFO_REQ message

The *AdditionalInfo* structure has been expanded:

- The *SendingComplete* element controls generation of additional D channel messages when used in an *INFO_REQ* message:
 - 2 sends a *SETUP_ACK* message on the D channel
 - 3 sends a *CALL_PROCEEDING* message on the D channel
 - 4 sends a *PROGRESS* message on the D channel
- The driver supports *Dynamic TEI selection* according to CAPI AK-175 V1.0 (rev.05) (09.04.2002). Because of this the *DTEIS* structure has to follow after the *SendingComplete* structure (it can be of length 0, though).
- Next is a *Progress* structure. When the application wants to generate its own progress tones this structure should contain 0x02 0x81 0x88 (i.e. length 2, data 81 88). This tells the terminal that progress tones are available.
- Last is a *Display* structure which allows the application to control the display of the terminal. ATTENTION: Be careful when using this as some PBX's tend to crash due to buggy handling of these display messages.



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