$Id: README.icn,v 1.7 2000/08/06 09:22:51 armin Exp $

You can get the ICN-ISDN-card from:

Thinking Objects Software GmbH
Versbacher Röthe 159
97078 Würzburg
Tel: +49 931 2877950
Fax: +49 931 2877951

email info@think.de
WWW http:/www.think.de

The card communicates with the PC by two interfaces:
1. A range of 4 successive port-addresses, whose base address can be configured with the switches.
2. A memory window with 16KB-256KB size, which can be setup in 16k steps over the whole range of 16MB. Isdn4linux only uses a 16k window. The base address of the window can be configured when loading the lowlevel-module (see README). If using more than one card, all cards are mapped to the same window and activated as needed.

Setting up the IO-address dipswitches for the ICN-ISDN-card:

Two types of cards exist, one with dip-switches and one with hook-switches.

1. Setting for the card with hook-switches:

   (0 = switch closed, 1 = switch open)

S3	S2	S1	Base-address
0	0	0	0x300
0	0	1	0x310
0	1	0	0x320 (Default for isdn4linux)
0	1	1	0x330
1	0	0	0x340
1	0	1	0x350
1	1	0	0x360
1	1	1	NOT ALLOWED!

2. Setting for the card with dip-switches:

   (0 = switch closed, 1 = switch open)

S1	S2	S3	S4	Base-Address
0	0	0	0	0x300
0	0	0	1	0x310
0	0	1	0	0x320 (Default for isdn4linux)
0	0	1	1	0x330
0	1	0	0	0x340
0	1	0	1	0x350
0	1	1	0	0x360
0	1	1	1	NOT ALLOWED!
1	0	0	0	0x308

```
1  0  0  1  0x318
1  0  1  0  0x328
1  0  1  1  0x338
1  1  0  0  0x348
1  1  0  1  0x358
1  1  1  0  0x368
1  1  1  1  NOT ALLOWED!
```

The ICN driver may be built into the kernel or as a module. Initialization depends on how the driver is built:

Driver built into the kernel:

The ICN driver can be configured using the commandline-feature while loading the kernel with LILO or LOADLIN. It accepts the following syntax:

icn=p,m[,idstring1[,idstring2]]

where

p = portbase (default: 0x320)
m = shared memory (default: 0xd0000)

When using the ICN double card (4B), you MUST define TWO idstrings. idstring must start with a character! There is no way for the driver to distinguish between a 2B and 4B type card. Therefore, by supplying TWO idstrings, you tell the driver that you have a 4B installed.

If you like to use more than one card, you can use the program "icnctrl" from the utility-package to configure additional cards. You need to configure shared memory only once, since the icn-driver maps all cards into the same address-space.

Using the "icnctrl"-utility, portbase and shared memory can also be changed during runtime.

The D-channel protocol is configured by loading different firmware into the card's memory using the "icnctrl"-utility.

Driver built as module:

The module icn.o can be configured during "insmod'ing" it by appending its parameters to the insmod-commandline. The following syntax is accepted:

portbase=p membase=m icn_id=idstring [icn_id2=idstring2]

where p, m, idstring1 and idstring2 have the same meanings as the parameters described for the kernel-version above.

When using the ICN double card (4B), you MUST define TWO idstrings. idstring must start with a character! There is no way for the driver to distinguish between a 2B and 4B type card. Therefore, by supplying TWO idstrings, you tell the driver that you have a 4B installed.

Using the "icnctrl"-utility, the same features apply to the modularized version like to the kernel-builtin one.

The D-channel protocol is configured by loading different firmware into the card's memory using the "icnctrl"-utility.

Loading the firmware into the card:

The firmware is supplied together with the isdn4k-utils package. It can be found in the subdirectory icnctrl/firmware/

There are 3 files:

```
loadpg.bin   - Image of the bootstrap loader.
pc_1t_ca.bin - Image of firmware for german 1TR6 protocol.
pc_eu_ca.bin - Image if firmware for EDSS1 (Euro-ISDN) protocol.
```

Assuming you have installed the utility-package correctly, the firmware will be downloaded into the 2B-card using the following command:

```
icnctrl -d Idstring load /etc/isdn/loadpg.bin /etc/isdn/pc_XX_ca.bin
```

where XX is either "1t" or "eu", depending on the D-Channel protocol used on your S0-bus and Idstring is the Name of the card, given during insmod-time or (for kernel-builtin driver) on the kernel commandline.

To load a 4B-card, the same command is used, except a second firmware file is appended to the commandline of icnctrl.

-> After downloading firmware, the two LEDs at the back cover of the card (ICN-4B: 4 LEDs) must be blinking intermittently now. If a connection is up, the corresponding led is lit continuously.

For further documentation (adding more ICN-cards), refer to the manpage icnctrl.8 which is included in the isdn4k-utils package.