EICON TECHNOLOGY

ISDN CAPI Drivers for NetWare/IntranetWare 1.04

Efficient remote access and LAN connectivity by interconnecting IntranetWare, NetWare Connect, and MultiProtocol Router over high-speed ISDN networks.

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Introduction

This manual describes how to install and configure Eicon Technology's ISDN CAPI drivers for NetWare/IntranetWare.

For information about the INSTALL and INETCFG utilities, see your Novell documentation. You can also obtain context-sensitive online help in these utilities by pressing F1.

Compatibility

The drivers are compatible with the following NetWare applications:

- IntranetWare
- NetWare Connect 2.0 (with 2.0.30 patch)
- NetWare MultiProtocol Router 3.1 (with latest patches)
- NetWare 3.12, 4.10, and 4.11

They support the following Eicon Technology ISDN hardware:

- SCOM basic rate adapter
- Quadro four-port basic rater adapter
- S2M primary rate adapter

Installation

1. Install your Eicon Technology ISDN card

Consult the installation guide provided with the ISDN card for installation instructions. Make a note of the IRQ and shared memory settings (if applicable) before installing the card.

2. Install any required NetWare software

Install the NetWare applications you plan to use with the CAPI drivers before continuing. Consult the documentation which came with this NetWare software for installation instructions.

Some special considerations apply to IntranetWare, MultiProtocol Router and NetWare Connect.

IntranetWare / MultiProtocol Router

Do not configure IntranetWare/MPR now. Install IntranetWare/MPR, then create and configure the CAPI drivers as directed in the next section.

NetWare Connect

The CAPI drivers require NetWare Connect to be upgraded to 2.0.30. This requires you to install the following Novell patches: NWC206, NWC207, and NWC208. These patches, with installation directions, are available on the Connections for NetWare CD, in **`\NOVFIX\NWC20`**, or from Novell's website, **`http:\\netwire.novell.com\`**.

After installing NetWare Connect and the patches, configure NetWare Connect as directed by its documentation before proceeding.

Note that the CAPI drivers are identical to the server drivers included with ISDN Drivers for NetWare Connect.

3. Install the CAPI drivers

If the NetWare INSTALL utility is not already running, enter the following command at a NetWare system console prompt:

```
LOAD INSTALL
```

Select Product Options, then press the Insert key (NetWare 3.12) or select Install a Product Not Listed (NetWare 4.11). A window appears prompting you to enter the installation path. The remaining steps depend on whether you are installing from CD or from floppy disk.

CD

Insert the CD in the PC's CD-ROM drive. Specify the following path, where **D** is the CD-ROM drive letter:

```
D:\ISDNCAPI\SW\DISK_1
```

Floppy Disk

Insert the installation disk labelled "Disk 1" in the PC's floppy disk drive. Specify the path leading to the root directory of the floppy disk drive.

Create and Configure CAPI Interfaces

You must create and configure a CAPI interface for each ISDN card installed in the server. The CAPI interface is closely tied to the ISDN card, especially in the following respect:

- The CAPI interface must have the same name as the ISDN card.

A few special considerations apply when configuring CAPI interfaces for the Quadro, which has four BRI ports:

- You must create a separate CAPI interface for each port.
- Each CAPI interface must have the same basic name followed by a unique suffix (a digit from 0 to 3). The basic name must be the same as the ISDN card; in the table below, the basic name is "QUAD1."

The following examples show the number of CAPI interfaces required for various combinations of cards, along with the typical interface names:

ISDN Cards installed	Interfaces	Typical Names
One S2M	23	PRIM1
One Quadro, and you plan to use CAPI on one port	1	QUAD10
One Quadro, and you plan to use CAPI on all four ports	4	QUAD10, QUAD11, QUAD12, QUAD13
One SCOM	1	SCOM1
Two SCOMs	2	SCOM1, SCOM2

This section describes in detail the procedure to create and configure a single CAPI interface. Repeat the entire procedure for each additional interface.

1. Create the CAPI driver

From INETCFG's main menu, select Boards.

- Press Insert and select WHSMCAPI, the Novell WHSMCAPI.LAN driver.
- At the Board Name prompt, enter a name to identify the CAPI board. Use the conventions described above.

2. Configure the CAPI driver

The WHSMCAPI Board Configuration panel should now be on screen.

- Select the CAPI Board Options menu. When asked whether INETCFG should automatically load the CAPI driver, answer Yes.
- When prompted to select a CAPI driver, choose the driver as follows:

Adapter	CAPI Driver
S2M	DPCAPI20
Quadro	DQCAPI20
SCOM	DSCAPI20

- The CAPI Board Configuration panel appears. To change the number of B-channels used on the adapter, modify the value of MAXPORTS. The default values are 2 for basic rate ports and 23 for primary rate ports (30 B-channels are supported on PRI lines outside North America).

  When MAXPORTS shows the desired value, press Escape to continue.

3. Configure the ISDN card

From the WHSMCAPI Board Configuration panel, select Driver Specific Configuration. The Eicon/Diehl ISDN Card Configuration panel appears.

- The first time you enter this panel, the system will offer to automatically scan for newly installed ISDN cards. Select Yes. Your ISDN cards will appear with the usual names mentioned in the introduction—for example, PRIM1, SCOM1, QUAD1.

  You must still specify the type of ISDN switch used by your service provider and enter your SPID values (NI-1 users only). To begin configuring a card, select it and press Enter.

- On subsequent visits, you must manually register newly installed cards by pressing the Insert key and entering values for the parameters listed below.

The Hardware Configuration panel appears. Enter the following parameters, or for cards which were automatically detected by the system, confirm that correct values have been selected:

- Adapter Name. Enter the same name you gave to the CAPI interface in Step 1. For the Quadro, be sure to specify just the base value, usually "Quad1." (See the introduction to this section for more information on naming conventions.)

- Adapter Type. Select the type of adapter.

- RAM Base. Enter the shared memory address selected on the adapter.

- Interrupt. Enter the interrupt request level selected on the adapter.

- ISDN Protocol. Select the ISDN protocol used by your service provider. In general, this is NI-1 for users in North America.

- TEI. For basic rate interface ports, leave this set to Automatic. For primary rate interface ports, leave this set to 0.

- NT2. In most situations this should be set to Disabled. Certain PRI setups using direct inward dialing require this to be Enabled.

- SPID. Required only for NI-1 basic rate interface lines. Enter the Service Profile IDs assigned by your service provider, along with the corresponding ISDN numbers.

Press Escape until you return to the main Internetworking Configuration panel, confirming all saves. If you installed more than one ISDN card or if you installed a Quadro, create and configure the additional CAPI interfaces now.

4. Configure IntranetWare / MPR (if applicable)

Using INETCFG, configure IntranetWare/MPR according to the directions in your MPR documentation. Here are a few tips:

- You configure each B-channel as a separate Network Interface. Set the Modem/DCE Type to ISDN (AT Controlled).
- When configuring WAN Call Destinations, enter ISDN numbers instead of telephone numbers. The ISDN number can also specify configuration information in the following format:

  nnnnnnnImmmmmmmmSaaSbbPp

  The parts of this format are explained in the table below.

ISDN Number	Description
nnnnnnn	The destination number. Required.
Immmmmmm	Your ISDN number; enter the capital **I** followed by the number. Optional.
Saa	The destination subaddress. Enter the capital **S** followed by the number. Optional.
Sbb	Your subaddress. Enter the capital **S** followed by the number. Optional.
Pp	ISDN profile. Enter **P2** for 64 Kbps, or **P8** for 56 kbps. Optional; if not provided, the lower rate is used.

Suppose the destination ISDN number is 5551000, the local number is 5552000, the destination subaddress is 01, the local subaddress is 02 and rate adaptation is required. The number is:

5551000I5552000S01S02P8

The XLOG Diagnostic Utility

This appendix describes the helpful XLOG utility, which displays the progress of your ISDN calls. Some networking knowledge is required to interpret this information.

Eicon ISDN cards log events occurring in the course of ISDN calls. The XLOG utility writes this log to the console screen or to a text file (the file is placed in the SYS:SYSTEM directory).

To load XLOG, enter the following command:

load xlog [*adapter*] [+|-] [s|d] *filename*

Brackets denote an optional parameter. Do not enter the brackets. The following parameters are used in the command line:

Parameter	Description
adapter	The name of the ISDN adapter.
+|-	Enter **+** to write continuously to the log file specified *filename* until interrupted by a keystroke. Enter **-** to write continuously to the screen until interrupted by a keystroke.
s	Type of information to record. Enter **s** to record SIG events only.
d	Type of information to record. Enter **d** to record D-channel events only.
filename	Name of the trace file. If the file already exists, it will be replaced by the new one. If you want to display the information on screen, enter a dash instead of a filename, as mentioned above.

Each line in the trace contains one event and its time of occurrence in hours, seconds, and milliseconds relative to the time the software was loaded. The lines are shown in the following format:

HHHH:SSSS:MMM - EVENT

See “ISDN Cause Codes” on page 15 for an interpretation of some of the data in the trace.

ISDN Cause Codes

This section lists ISDN cause and diagnostic codes for NI-1, EuroISDN, and 5ESS. These codes can be useful when tracing the source of problems on an ISDN connection. Note that some cause values may have further meanings in addition to the diagnostics given.

NI-1

CCITT Standardized Cause Values

Hex	Cause
01	Unallocated (unassigned) number
02	No route to specified transit network
03	No route to destination
06	Channel unacceptable
07	Call awarded, being delivered in an established channel
10	Normal clearing
11	User busy
12	No user responding
13	User alerting, no answer
15	Call rejected
16	Number Changed. Diagnostic: New Destination
1A	Non-selected user clearing
1B	Destination out of order
1C	Invalid number format (incomplete address)
1D	Facility rejected. Diagnostic: Facility ID
1E	Response to STATus ENQuiry
1F	Normal, unspecified
22	Circuit/channel congestion
29	Temporary failure
2A	Switching equipment congestion
2B	Access information discarded. Diagnostic: Info element ID
2C	Requested channel not available
2F	Resource unavailable, unspecified
32	Requested facility not subscribed
39	Bearer capability not authorized
3A	Bearer capability not presently available
3F	Service or option not available, unspecified
41	Bearer capability not implemented
45	Requested facility not implemented
4F	Service or option not implemented, unspecified

Hex	Cause
51	Invalid call reference value
58	Incompatible destination
60	Mandatory info element missing. Diagnostic: Info element ID
61	Message type non-existent or not implemented. Diagnostic: Message type
63	Info element non-existent/unimplemented. Diagnostic: Info element ID
64	Invalid info element contents. Diagnostic: Info element ID
65	Message incompatible with call state. Diagnostic: Message type
66	Recovery of timer expiry
6F	Protocol error, unspecified
7F	Interworking, unspecified

National-specific cause values

Hex	Cause
04	Vacant Code
08	Prefix 0 dialed in error
09	Prefix 1 dialed in error
0A	Prefix 1 not dialed
0B	Excessive digits received, call is proceeding

Network-specific causes

Hex	Cause
08	Call is proceeding
0D	Service denied
1C	Special Intercept Announcement
1D	Special Intercept Announcement Undefined Code
1E	Special Intercept Announcement Number Unassigned
1F	Special Intercept Announcement Call Blocked Due To Group Restriction
33	Call Type incompatible with service request
35	Service operation violated. Diagnostic: Long-term denial, short-term denial
65	Protocol error threshold exceeded

EuroISDN

Hex	Cause
01	Unallocated (unassigned) number
02	No route to specified transit network. Diagnostic: Transit network identity
03	No route to destination
06	Channel unacceptable
07	Call awarded and being delivered in an established channel
10	Normal call clearing
11	User busy
12	No user responding
13	No answer from user (user alerted)
15	Call rejected. Diagnostic: User supplied diagnostic
16	Number changed. Diagnostic: New destination
1A	Non-selected user clearing
1B	Destination out of order
1C	Invalid number format
1D	Facility rejected. Diagnostic: Facility identification
1E	Response to STATUS ENQUIRY
1F	Normal, unspecified
22	No circuit/channel available
26	Network out of order
29	Temporary failure
2A	Switching equipment congestion
2B	Access info discarded. Diagnostic: Discarded info element identifier(s)
2C	Requested circuit/channel not available
2F	Resources unavailable, unspecified
31	Quality of service unavailable
32	Requested facility not subscribed. Diagnostic: Facility identification
39	Bearer capability not authorized
3A	Bearer capability not presently available
3F	Service or option not available, unspecified
41	Bearer capability not implemented
42	Channel type not implemented. Diagnostic: Channel type
45	Requested facility not implemented. Diagnostic: Facility identification
46	Only restricted digital information bearer capability is available.
4F	Service or option not implemented, unspecified
51	Invalid call reference value

Hex	Cause
52	Suspended call exists, identified channel does not. Diagnostic: Channel ID
53	Call identity does not exist
54	Call identity in use
55	No call suspended
56	Call with requested call identity has been cleared. Diagnostic: Clearing cause
58	Incompatible destination. Diagnostic: Incompatible parameter
5B	Invalid transit network selection
5F	Invalid message, unspecified
60	Mandatory info element is missing. Diagnostic: Info element identifier(s)
61	Message type non-existent or not implemented. Diagnostic: Message type
62	Message not compatible with call state or message type non-existent or not implemented. Diagnostic: Message type
63	Info element non-existent/unimplemented. Diagnostic: Info element ID
64	Invalid ID element contents. Diagnostic: Info element ID
65	Message incompatible with call state. Diagnostic: Message type
66	Recovery on timer expiry. Diagnostic: Timer number
6F	Protocol error, unspecified
7F	Interworking, unspecified

5ESS

Hex	Cause
01	Unallocated (unassigned) number
02	No route to specified network
03	No route to specified transit network
10	Normal clearing
11	User busy
12	No user responding
13	User alerting, no answer
15	Call rejected
16	Number Changed
1B	Destination out of order
1C	Invalid number format (incomplete number)
1D	Requested facility rejected
1E	Response to STATus ENQuiry

Hex	Cause
1F	Normal, unspecified
22	No channel available
23	Call queued
29	Temporary failure
2A	Network congestion
2B	Access information discarded
32	Requested facility not subscribed
34	Outgoing calls barred
36	Ingoing calls barred
3A	Bearer capability not presently available
3F	Service or option not available, unspecified
41	Bearer capability not implemented
42	Channel type not implemented
45	Requested facility not implemented
51	Invalid call reference value
52	Identified channel does not exist
58	Incompatible destination
5B	Transit network does not exist
60	Mandatory information element is missing
61	Message type nonexistent or not implemented
62	Message not compatible with call state
64	Invalid information element contents
66	Recovery of timer expiry
6F	Protocol error, unspecified
7F	Interworking, unspecified

Technical Support

Eicon Technology Customer Services personnel are committed to providing the best possible technical support to all our customers.

Customer Services

To obtain technical support, contact either Eicon Technology or your Eicon Technology supplier, depending on your location. Please note that in some regions you can save time and long distance charges by sending a fax describing your situation instead of calling. Customer service personnel will then call you to provide a solution or to request additional information.

- In the USA, Central and South America, and western Canada (Manitoba westward), call 214-490-3270 or send a fax marked "Attn: Customer Services" to 214-239-8069.
- In Eastern Canada (Ontario eastward), call 514-745-5500 and ask for Customer Services, or send a fax marked "Attn: Customer Services" to 514-745-5588.
- In Europe, Russia, Iceland, Africa, and the Middle East, contact your Eicon Technology supplier.
- In the following Asian and Pacific countries, call +61-2-9919-7200 and ask for Customer Services, or send a fax marked "Attn: Customer Services" to +61-2-9929-6300:

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- Background information on WAN technology;

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You can get up-to-date advice and patches through the Eicon Technology forum on CompuServe. If you are already a CompuServe member, simply type “go eicon” at an ! prompt.

To open a CompuServe account, call one of the following numbers:

- In the USA or Canada, call 1-800-848-8199; ask for operator 383.
- In the United Kingdom, call 0800-289-458 or 117-976-0681.
- In Germany, call 89-0130-37-32.
- In other European countries, call +44-117-976-0681.

In any other region, call 303-894-7336 (USA); ask for operator 383.