

E800

Reference Guide

Edition 1.3

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1. Release notes for E800 SW rev. 1.3.

Telindus continues its development efforts in the ISDN based service multiplexers and releases a new SW version for the E800.

This SW supports a range of useful features, each of which are based on actual customer requirements. The list below sums up the main enhancements and corresponding benefits compared to the previous version.

Nr	Description	User benefits
1.	Implementation of a private MIB	The user now can view all configuration, status and history attributes of the E800 with an SNMP management station through a E800 private MIB.
2.	LAPD can be disabled / enabled	By disabling the datalink, the user effectively can disable a specific interface without rebooting the device.

2. Operators.

2.1. Overview

There are three basic ways to access the E800:

- Locally via the control port.
This gives access to the E800 HI (ANSI Human Interface).
- Remotely via TCP/IP through LAN interface.
- Remotely via TCP/IP through ISDN interface.

The last two access types give you the opportunity to access the device through:

- Telnet.
- SNMP.
- Web browser.

Any access to the E800 requires validation of the operator. This validation consists of:

- Identification of the operator by means of a login sequence.
- Verification of the operator's access rights when reading, writing, executing or performing special actions.

Multiple operators can be logged in simultaneously, according to the following rules:

- Only one operator at a time can use the local serial port.
- Only one operator at a time can be associated with a given IP address. The association between the operator and the IP address is made dynamically through the login sequence. When logged in, the operator is allowed to use SNMP and Telnet (if enabled): no separate login for these facilities is needed. The same rule holds for the logout sequence.
- Access to the E800 HI is restricted to a single operator, either local or remote.

Remark that only one Telnet session can be used at a time. Only three HTTP sessions may be active at a time.

2.2. Login sequence.

The login sequence consists of identification of the operator by a shorthand operator name, and validation through a password check. Login is possible through either HI or SNMP using their respective facilities to pass commands.

The following rules apply concerning the login sequence:

- Access to the HI is granted only if no other operator is currently logged in.
- A local operator is logged out automatically after an inactivity of up to 4 minutes.
- A Telnet session is disconnected automatically after a configurable inactivity period, thus allowing a local operator to access the HI
- A login will effectuate a logout of the preceding operator in order to assure that no more than one operator is associated with an IP or local port.

The following rules apply for the definition of operators:

- The E800 comes with a default Administrator which is defined as:

Name:	ADM
Password:	ADM
Rights:	x7777

- The ADM password can be modified by using the SET PSW command. It is important not to forget this password, because the only way to recover access in that case is to force a configuration erase (local maintenance!).
- Definition of new operators (names and rights) requires the highest write level. When defining a new operator, the E800 will automatically assign a password, which is equal to the name. This password can be modified using the SET PSW command. It is not possible to reverse calculate a password: If this password is forgotten, then changing the name of the operator will re-create the entry.

- User names and passwords are always treated as uppercase strings, even if they are entered in lowercase. This means that a username entered as 'adm' will always be interpreted as 'ADM'.

2.3. Operator's Access rights

Access rights are classified into:

- R: Read rights (access to configuration and status items).
A numeric value 0-7. Value comparison occurs when verifying the rights.
- W: Write rights (access to configuration item).
A numeric value 0-7. Value comparison occurs when verifying the rights.
- X: Execute rights (access to commands).
A numeric value 0-7. Value comparison occurs when verifying the rights.
- P: Protocol rights (access to special protocols).
A bitmap value. Bit comparison occurs when verifying the rights.
Current values are:
 - 1: PPP access allowed
 - 2: HTTP access allowed

Note that numeric values larger than 7 can be specified. These values are provided for maintenance and should not be granted elsewhere. The representation of the access rights is as follows: `xPXWR`

The following actions are taken when the operator has insufficient rights:

- insufficient Read rights:
 - strings are shown as `*****`
 - numbers are shown as `"-1"`
- insufficient Write rights:
 - Editing of the item is disabled in the HI
- insufficient Execute rights:
 - The error message "Denied" is returned and the command is ignored
- insufficient access rights:
 - The error message "Access denied" is returned, or the access is ignored.

2.4. Required access levels.

Description tables throughout this guide contain a column that indicates the required access levels for configuration items, status items, command execution and protocol use.

The required access levels are represented by the numbers p, x, w, r, which are compared to the operator access rights PXWR :

- If $R \geq r$ then the operator has read access to the corresponding field.
- If $W \geq w$ then the operator has write access to the corresponding field.
- If $X \geq x$ then the operator has the right to execute the corresponding command.
- If $P \geq p$ then the operator has the right to use the corresponding protocol.

3. Configuration databases and procedures.

3.1. Overview

The E800 makes use of three copies of the configuration:

- **SAVED Database:** Non-volatile copy of the configuration (stored in Flash).
- **EDT Database:** Copy of the configuration, used during edition.
- **RUN Database.** Copy of the configuration and status items used by the E800 for actual operation.

The EDT database can be modified using the screen oriented human interface (WIN CFG command).

The RUN database can be inspected using the WIN STS and WIN HISTORY command.

It is important to realise that editing the configuration will not have any influence on the running configuration until explicitly confirmed with an activation command (CFG RUN). All manipulations with databases are grouped in the CFG command class (See section "Commands").

3.2. Reconfiguration procedure (Activation)

Before enabling the use of a physical element, a number of checks are performed first.

The results of these checks is shown in the *Sts* (Status) field of the Status Database for the respective element, using the following configuration status codes:

- **INIT:** Initial setting
- **HW:** A hardware problem was detected for the particular device or the device is not present
- **KEY:** A software key is required to activate the device
- **IDLE:** The device is not configured for use
- **ACT:** The device is configured and functions properly
- **RES:** A reset is required to activate the device
- **CFG:** A configuration error was detected for the device

3.3. Effects of reconfiguration.

Sometimes it is not possible to ensure that configuration changes can be resolved without risk for the consistency of the system. In this case, the configuration changes are not handled, and the *Sts* field indicates RES. A restart (RESET SYS) must then be performed.

Note however that a warm restart of the hardware may lead to problems with attached equipment (especially ISDN network when reconfiguration is done while calls are in an active state). A safe method for performing a warm reset consists of physically disconnecting the ISDN interface. This is also the reason of the existence of the FailSafe activation timer while booting the system. Its default value is set to 20 seconds. This is the time needed for a network to return to a known idle state.

The warm restart is discussed in the Command Section (RESET SYS).

4. The ANSI Human Interface

4.1. Overview

The ANSI human interface can be accessed locally via the serial port, or remotely via a Telnet session, as described in the 'Operators' section.

This interface provides 3 main facilities:

- A Screen (window) oriented interface for configuration, status and history.
- A Line oriented interface for commands (including status and logging).
- File transfer with X-modem.

4.2. Screen interface

This interface is activated using a line command

- WIN Top level menu.
- WIN CFG EDT Databases (configuration screens)
- WIN STS RUN Databases (status screens)
- WIN HISTORY RUN Database (history screens)

The screen interface allows to edit the configuration, and to inspect the status of the system. It does not allow the execution of commands.

The following keystrokes are interpreted:

Key (c- = control-)	Action
Single ESC	Confirm the current entry - if any – and return to the higher menu level. Note: on some PC keyboards, ESC cannot be sent when Caps-Lock is on. In that case, use c-X.
ANSI F1 c-K	In WIN STS only: switch between status and running configuration view.
ANSI F2 c-W	Switch between Browse and Record view
c-B	Page-Up ("Back")
c-D, ANSI cursor down	Cursor Down
c-F	Page-Down ("Forward")
c-H	Back-space: Cursor back or go to previous field. Does not erase.
c-I	Tab (goes to next field)
c-L, ANSI cursor left	Cursor Left
c-M (Enter)	Enter
c-N	Immediate refresh when in status screen
c-Q	Abort edition of current record (all modifications to record are ignored)
c-R, ANSI cursor right	Cursor Right
c-T	Back Tab
c-U, ANSI cursor up	Cursor Up
c-V	View link to other database. This allows to copy field contents between related fields: Pressing c-V again in the viewed database will copy the field contents to the edited field. Any other key will abort the view without copy.
c-X	Confirm the current entry.
c-Z	Abort edition of current record (all modifications to record are ignored)

4.3. Line interface

This is the default interface when logging into the system.

The line interface allows to issue commands and to inspect the status of the system. It does not allow editing the configuration.

The line interface features a command history of 500 characters.

The following keystrokes are interpreted:

Key (c- = control-)	Action
c-B	Top of history
c-D, ANSI cursor down	Next in history
c-F	End of history
c-H	Back-space: Does not erase.
c-I	Tab is ignored
c-L, ANSI cursor left	Cursor Left
c-M (Enter)	Enter, confirm command
c-N	Linefeed is ignored
ANSI home	Start of Line
ANSI end	End of line.

4.4. X-modem interface

The standard X-modem protocol is implemented, and the following extensions are supported:

- CRC instead of Checksum.
- Abort with double cancel (c-X c-X).
- Transmission is fully driven by receiver.

The X-modem file transfer is activated using the commands "CFG XMSEND <file>" or "CFG XMRECV <file>", where <file> stands for *CFG.TXT*, *ROUTE.TXT*, *STS.TXT*, or *HISTORY.TXT*. These files denote the transferring of respectively the whole configuration, the ISDN route and clip configuration, the status information, and history information.

Transmission is done using either Checksum or CRC, as required by the receiver.

Reception is done using either Checksum or CRC. First CRC is requested 6 times (1 minute), then CHK is requested for another 3 times (30 sec).

Upon completion, the number of transferred blocks and retries is shown, and the final result. The possible result codes generated on an Xmodem error are:

- NoData: no data was received from the remote side
- BadData: the remote side is consistently sending protocol-foreign data
- BadSeq: an unrecoverable sequence error occurred
- RemoteAbort: the transfer was aborted by a double c-X.
- LocalAbort: the application on the E800 aborted the X-Modem (due to reading an end of file)

Other error messages are generated due to parsing errors of the text configuration file (only for the upload of text configurations). These error messages are listed in the paragraph on text configuration (see par. 7.1).

5. The World Wide Web based Human Interface

The WWW human interface can be accessed using a Web browser on a TCP/IP link to the E800. This TCP/IP link can be locally established (through the LAN Ethernet port), or remotely (through a PPP dial-up session). The E800 web server is HTTP 1.1 compliant, but is compatible with HTTP 1.0 clients. The HTTP server listens on TCP port 80 for incoming HTTP connections.

The number of simultaneous HTTP connections is limited to 6. As most browsers use one connection for the download of the HTML page, and one for graphics, this implies that at most 3 concurrent connections are supported.

The WWW interface provides the following facilities:

- HTTP 1.0 authentication. The user entered should be one of the users defined in the operator database.
- A configuration, status and history view through a set of HTML tables (similar to the human ANSI human interface).
- A simulated view of the frontpanel of the E800, containing a picture of the status of the LEDs.
- An HTML page for uploading and downloading a *text* configuration. The configuration syntax of the file is described in chapter 6.
- A button for launching a direct Telnet session to the E800.

The E800 WWW server is compatible with Internet Explorer 4 and higher versions, and Netscape Communicator 4.7.

6. The IP-Router software module.

The IP-Router software module allows the E800 to be configured as a basic IP router. The IP-Router software module has the following features:

Connectivity:

- 64 kbps ISDN dialup
- up to 512 kbps FE1 leased line
- Link protocol: Point To Point protocol (PPP) on HDLC
- dial on demand routing on the dialup link
- dial-in is supported.
- possibility for a dial backup link in leased line configuration

Security:

- If Masquerading is selected, incoming IP connections are forbidden.
- Calling Line Identification (CLI) verification in dialup mode.
- PPP negotiation with PAP authentication. For incalls and leased line configuration, PAP authentication to the E800 is required. The username/password used in the PAP authentication process must be an operator with PPP rights.

Address Translation:

- Masquerading (NAPT) translation with up to 1400 simultaneous IP connections. The masqueraded packets have port numbers in the range of 63000 to 64400.
- Support for ICMP, UDP and TCP connections
- Support for passive and active FTP connections. Other applications, containing IP addresses in their PDUs are not guaranteed to work. Examples are RealAudio, H.323 (i.e. Microsoft Netmeeting), Quake.
- Port Forwarding (access to internal TCP servers) for up to 10 internal servers when Masquerading is active.
- If Port Forwarding is configured, only passive FTP connections to an internal FTP server are supported.

IP features:

- Dynamic IP address negotiation and assignment on WAN link
- Provision for the configuration of up to 10 static routes. No routing protocols, such as RIP or OSPF are supported.

7. Text Configuration Syntax

7.1. Database configuration syntax

The syntax used for the configuration of the Edit database in text format is based on the LISP language, and is built up of nested lists of values, enclosed within brackets.

It follows the following scheme:

```
(Database,
  (<dbase1>, ( ( [<fieldtag1>, ...]),
                ( [<field1>, ...]),
                ( [<field2>, ...]),
                ...
              ),
    ( ( [<fieldtag2>, ...]),
      ( [<field1>, ...]),
      ( [<field2>, ...]),
      ...
    ),
    ...
  ),
  (<dbase2>, ( ( [<fieldtag1>, ...]),
                ( [<field1>, ...]),
                ( [<field2>, ...]),
                ...
              ),
    ( ( [<fieldtag2>, ...]),
      ( [<field1>, ...]),
      ( [<field2>, ...]),
      ...
    ),
    ...
  ),
  ...
)
```

The following is a concrete example:

```
(Database,
(Misc,
  (
    (N, Type, Trp, TLogOff, TFailSf, ClkSlve, AlmTime, HttpRef, RCNetIP, RCMask),
    (1, E800, 50, 0, 0, AUTO, 00:00:00, 0, 000.000.000.000, 000.000.000.000)
  )
),
(LAN,
  (
    (N, IP, SubMask, Gateway),
    (1, 192.168.100.230, 255.255.255.000, 000.000.000.000)
  )
),
(WAN,
  (
    (N, InCDN, InCLI, OutCDN, OutCLI, OutLine, TimeOut, LLine, LLStrTS, LLEndTS),
    (1, *99, *, , , -----, 0, L5, 1, 16)
  )
),
(Line,
  (
    (N, Type, Name, Act, Sgn, Tei, NT, Crc4),
    (1, PR, L1, On, Isdn, 64, NT, NoCRC4),
    (2, PR, L2, On, Isdn, 64, NT, NoCRC4),
    (3, PR, L3, On, Isdn, 64, NT, NoCRC4),
    (4, PR, L4, On, Isdn, 64, NT, NoCRC4),
    (5, PR, L5, On, None, 0, TE, NoCRC4)
  )
),
(DataPort,
  (
    (N, Act, Line, StartTS, NrTS, PContrl),
    (1, On, L1, 1, 1, -----)
  )
),
(FixN64,
  (
    (N, Act, Name, NrTS, LineIn, TSIn, LineOut, TSOOut),
    (1, Off, F1, 0, NONE, 1, NONE, 1),
    (2, Off, F2, 0, NONE, 1, NONE, 1),
    (3, Off, F3, 0, NONE, 1, NONE, 1),
    (4, Off, F4, 0, NONE, 1, NONE, 1),
    (5, Off, F5, 0, NONE, 1, NONE, 1),
    (6, Off, F6, 0, NONE, 1, NONE, 1),
  )
)
```

```

(7, Off, F7, 0, NONE, 1, NONE, 1),
(8, Off, F8, 0, NONE, 1, NONE, 1),
(9, Off, F9, 0, NONE, 1, NONE, 1),
(10, Off, F10, 0, NONE, 1, NONE, 1)
),
(Route,
(
(N, Act, LineIn, Search, Replace, LineOut, Calltyp, FailMin, CliProf),
(1, On, 1234-, *, *, ----5, -----, 0, ),
(2, On, ----5, *, *, 1234-, -----, 0, ),
(3, Off, -----, , , -----, -----, 0, ),
(4, Off, -----, , , -----, -----, 0, ),
(5, Off, -----, , , -----, -----, 0, ),
(6, Off, -----, , , -----, -----, 0, ),
(7, Off, -----, , , -----, -----, 0, ),
(8, Off, -----, , , -----, -----, 0, ),
(9, Off, -----, , , -----, -----, 0, ),
(10, Off, -----, , , -----, -----, 0, )
)
),
(Clip,
(
(N, Act, Label, Search, Replace),
(1, Off, , , ),
(2, Off, , , ),
(3, Off, , , ),
(4, Off, , , ),
(5, Off, , , ),
(6, Off, , , ),
(7, Off, , , ),
(8, Off, , , ),
(9, Off, , , ),
(10, Off, , , )
)
),
(Operator,
(
(N, Name, Rights, Info),
(1, ADM, x7777, ),
(2, SUP, x7766, ),
(3, SYS, x0222, ),
(4, USR, x0111, ),
(5, , x0000, ),
(6, , x0000, ),
(7, , x0000, ),
(8, , x0000, )
)
),
(Features,
(
(N, IPRoute, Masq, MasqIP),
(1, On, Off, 000.000.000.000)
)
),
(SNMP,
(
(N, Name, Contact, Locatn, SNMPMgr, RdComm, WrComm, TrpComm),
(1, E800, , , 000.000.000.000, public, netman, trap)
)
),
(PPP,
(
(N, IPAddr, RemUser, RemPwd),
(1, 192.168.003.001, ADM, ADM)
)
),
(Routes,
(
(N, Act, NetAddr, NetMask, Gateway, Intface),
(1, On, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(2, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(3, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(4, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(5, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(6, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(7, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(8, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(9, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN),
(10, Off, 000.000.000.000, 000.000.000.000, 000.000.000.000, WAN)
)
),
(PortFW,
(
(N, Act, DstPort, Address),
(1, Off, 0, 000.000.000.000),
(2, Off, 0, 000.000.000.000),
(3, Off, 0, 000.000.000.000),
(4, Off, 0, 000.000.000.000),
(5, Off, 0, 000.000.000.000),
(6, Off, 0, 000.000.000.000),
(7, Off, 0, 000.000.000.000),
(8, Off, 0, 000.000.000.000),
(9, Off, 0, 000.000.000.000),
)
)
)

```

(10, Off, 0, 000.000.000.000)

)
)

The format of text configuration file follows the following syntax rules:

The configuration should start with the 'Database' tag, and end with a bracket. The database tag denotes that what follows between brackets are configuration items for the Edit Database of the E800.

Each field in the 'database' section is a configuration of a particular database of the E800.

A particular database configuration has the following syntax:

Starts with the database name, a comma, and an opening bracket.

Within brackets, the various field names of the database to be configured, separated by commas. The field names are the same as those used in the Human Interface of the E800.

Within brackets, the values of one or more records, corresponding to the fields referred to by the previous list of field names, separated by commas. The format for the values reflects the format as used in the Human Interface of the E800.

If necessary, one can continue the configuration of a particular database by repeating steps 2 and 3. As such, configurations of different field arrays can be done in an easy way (as an example, see the line configuration in previous example).

Close the configuration of the particular database with a closing bracket.

Everything following a semicolon (;) character on the same line is considered as comment.

When writing a configuration, one should pay attention to the following syntax items:

An opening bracket always has to be followed by a closing bracket.

Items enclosed within brackets have to be separated by commas.

Whitespace characters (space, tab or newline) are ignored, except if they are enclosed by double quotes ("). Whitespace characters only serve to enhance readability and have no syntactical meaning.

Configuration values that contain whitespace characters, such as strings, *must* be enclosed by double quotes (").

Each record to be configured must start with the index of the record (the 'N' field).

Database and Field tags are case-insensitive.

On an upload of a text configuration to the E800, the syntax of the configuration will be verified by the E800 for errors. The following errors can be generated:

Error	Warning/Error	Explanation
Unexpected opening bracket	Error	An unexpected opening bracket was encountered
Expected opening bracket	Error	An opening bracket was expected
Expected closing bracket or comma	Error	A closing bracket or comma was expected on the specified line
Unrecognized field <tag>	Warning	A field name was encountered that is not equal to the field names pertaining to the database that is being parsed
Index field missing	Error	The index field must be the first field in the description of the record to be configured.
Field too long	Error	The length of the field supplied exceeds 80 characters
Bad Index <index>	Error	The record index used is out of range for the database that is being configured
Bad field contents <field value> or insufficient rights	Warning	The value of the field is invalid or not recognized, or you have insufficient rights. This can be because of: <ul style="list-style-type: none">▫ The syntax doesn't correspond to the type of field being configured

		<ul style="list-style-type: none"> ▫ The value is out of range for the particular field ▫ For a field that represents an enumerated list, the value doesn't match one of the items in the enumerated list ▫ The operator with which you logged in has insufficient rights to write to this field
Values cnt doesn't match fields cnt	Error	The number of values in the record doesn't match the number of field types listed
Invalid Tag	Error	The Tag supplied was not 'Database' or 'Command'
Unrecognized dbase name <db name>	Error	The database name supplied is not recognized as a E800 database.

An occurrence of an error will cause the E800 to abort the upload in progress. In this case, the E800 will return a description of the error encountered, together with the line number on which the error was detected. A non-critical error (warning) causes the E800 to ignore the configuration item that caused the warning, and the parsing of the configuration will continue. At the end of the upload, the E800 will return a description of the *last* warning encountered, together with the line number.

7.2. Command syntax

The possibility exists to add commands to the configuration file. In this way, you can execute commands, together with the configuration of the device. The syntax is the following:

```
(Command, "command1", "command2", ...)
```

The following is a concrete example:

```
(Command, "cfg run", "reset sys")
```

Following rules apply for commands:

Commands are executed in the same order as they appear in the configuration file.

Commands are only executed when the complete configuration is read, and is regardless of the relative position of the command section with respect to the database section.

If an error is encountered during the parsing of the database section, then no commands will be executed.

8. Configuration screens

The edit copy of the configuration can be accessed in the HI by using the command
WIN CFG

Note that the screens show the record number (index) on the top-right of the window, unless only 1 record number exists. Note that capital letters and/or numbers should be used for names.

The configuration screens shown below are for an E800 with all software keys installed (i.e. the IP-Route key). Also, the configuration screens contain the fields that are visible in expert mode (enabled with the *set expert on* command).

8.1. Interfaces Configuration

8.1.1. LAN Configuration

This database configures the TCP/IP settings for the LAN interface

```
-LAN-----  
N          1  
IP         192.168.100.230  
SubMask   255.255.255.000  
Gateway   000.000.000.000
```

Nr	Item	r,w	Description
2	IP	1,7	IP address assigned to the E800 for remote control via LAN interface.
3	SubMask	1,7	IP submask for the E800
4	Gateway	1,3	IP address of the default gateway for the E800

8.1.2. WAN Configuration

This database configures the parameters for establishing a WAN link on one of the BRI or PRI lines. The settings here are relevant in the following situations:

- Incoming Remote Control connections, i.e. access to the E800 with Telnet or Web browser through an ISDN dialup-connection.
- Outgoing Alarm Calls (i.e. for sending trap messages) to a management station not located on the local LAN of the E800.
- Dial on Demand connections or leased line connections to a remote router when the IP-Router functionality is activated (i.e. when the WIN.CFG.IP.FEATURES.ROUTES field is set to on)
- Incoming PPP connections from a remote router, when the IP-Router functionality is activated (i.e. when the WIN.CFG.IP.FEATURES.ROUTES field is set to on)

Remark that only *one* WAN connection at the same time is allowed.

```
-WAN-----  
N          1  
InCDN     *99  
InCLI     *  
OutCDN    031234567  
OutCLI  
OutLine   -2-----  
TimeOut   0  
LLine     L1  
LLStrTS   1  
LLEndTS   8
```

Nr	Item	r,w	Description
2	InCDN	1,7	Special assigned ISDN phone number for incoming PPP ISDN calls. The number specified can contain wildcards (* and ?) which will be matched against the called phone number of the remote control call. If this field is left blank, incoming PPP connections via ISDN will be disabled.
3	InCLI	1,7	Calling Line Identifier for incoming PPP connections via ISDN. This ISDN number will be checked against the ISDN phone number of the calling entity of the remote control call. The number can contain wildcards (* and ?).
4	OutCDN	1,7	Telephone number of the remote router, i.e. for an Internet connection to an ISP, this will be the telephone number of the ISP's Point Of Presence (POP)
5	OutCLI	1,7	Your telephone number. You only need to supply the number here if the ISDN network does not supply the CLI, and a security check is done on the CLI by the remote router.
6	Outline	1,3	Bitmask of lines that can be used for initiating a dialup connection The first available line will be used for the WAN connection
7	TimeOut	1,3	Idle timeout. If no IP packets have been received on the WAN connection during this time, the dialup connection will be dropped.
8	LLine	1,3	Line to be used for initiating a leased line connection. Remark that only primary rate lines can be used. If both Outline and LLine are filled in, then a leased line connection will first be tried. If the leased line connection fails, a backup dialup connection will be tried.
9	LLStrTS	1,3	The first time slot of the leased line that will be used for the connection
10	LLEndTS	1,3	The last time slot of the leased line that will be used for the connection. Remark that a maximum of 8 timeslots can be used for the leased line connection, giving a total bandwidth of maximum 512 kbps.

8.1.3. Line Configuration

This database configures the PRI lines

```

-Line-----0001--
N      1
Type   PR
Name   L1
Act    On
Sgn    Isdn
Tei    0
X25Tei 64
NT     NT
Idle   x49
Crc4   NoCRC4
StrInc 0
EndInc 0
StrOutg 0
EndOutg 0
AlmFrom -----
Options -----

```

Nr	Item	r,w	Description
1	N	0,8	Index. This corresponds to the record number, and is used to identify the line (as L1,L2,..) in loggings and in commands
2	Type	1,8	Type of line interface (PR=Primary Rate)
3	Name	1,2	Name given to the line interface.
4	Act	1,2	Line Enabling (Off, On).
5	Sgn	1,3	Signalling protocol PR : None=Ts16 for data; ISDN=Ts16 for LapD
6	Tei	1,3	Terminal Equipment Identifier. Should be 0 (fixed). In case TEI is 0, physical and data-link activation of the line will continuously be attempted, for BRI as well as PRI lines. As a consequence, a line with

			configured TEI == 0 and with no physical activation is considered 'dead' and won't be selected during the route selection process.
7	X25Tei	1,3	TEI value for X.25 connections that are to be switched (see also par 8.4)
8	NT	1,3	Specifies if the line interface is defined as a TE (Terminal Equipment), or as an NT (Network Terminator).
8	Idle (expert mode)	1,2	IDLE code sent in a none-active timeslot. To specify as hex, precede the value with 'x'. For PR lines: Advised code for ISDN connection is x49.
10	Crc4	1,2	Specifies if 2MB frame CRC procedure should be enabled. On: CRC is enabled. Off: CRC is disabled. Auto: automatic detection of the usage of the CRC procedure by the remote device. Use of CRC is advised unless not supported by the ISDN network
11	StrInc (expert mode)	1,3	First B Channel to be used for incoming calls, if a B Channel is requested by the remote end. StrInc can range from 0 to 31 (0 defining the first B-channel). Remark that it doesn't make sense to select B-channel 0 as the starting channel, as it is the framing channel on PR and the D-channel on BR.
12	EndInc (expert mode)	1,3	Last B Channel to be used for incoming calls, if a B Channel is requested by the remote end. If StrInc and EndInc both are set to zero, then the default assignment of channels is taken, i.e. assignment of channels in ascending order. EndInc can range from 0 to 31 (0 defining the first B-channel)
13	StrOutg (expert mode)	1,3	First B Channel to be used for outgoing calls, if a B Channel can be assigned by the E800 (i.e. if the line is an NT line, or the line is set in exclusive mode, i.e. the first bit in the Line Options field is set). StrOutg can range from 0 to 31 (0 defining the first B-channel). Remark that it doesn't make sense to select B-channel 0 as the starting channel, as it is the framing channel on PR and the D-channel on BR.
14	EndOutg (expert mode)	1,3	Last B Channel to be used for outgoing calls, if a B Channel can be assigned by the E800 (i.e. if the line is an NT line, or the line is set in exclusive mode, i.e. the first bit in the Line Options field is set) If StrOutg and EndOutg both are set to zero, then the default assignment of channels is taken, i.e. assignment of channels in descending order. EndOutg can range from 0 to 31 (0 defining the first B-channel)
15	AlmFrom (expert mode)	1,2	Specifies lines that may force a datalink error on this line. - The datalink on this line will be forced down when one of the indicated lines detects a persistent deactivation condition. When the line gets activated again, then the alarm is cleared. This is a special feature which is not needed in most cases.
16	Options (expert mode)	1,2	Options Bitmask. Following bits are defined: Bit 1: If set, the E800 will force the other end to accept the proposed B-Channel in the ISDN Setup message. Bit 2: By default, the E800 will send a 'Call Proceeding' message in response of a 'Setup message', if both the source and destination of the call are configured as TE (i.e., the lines selected on the E800 for the route are configured as NT). If bit 2 is set, then the E800 will NOT send a 'Call proceeding' message in this case. Bit 3: If set, the E800 will verify the state field in a Status message. If the state doesn't correspond with the internal state, then the call will be released. If not set, the verification is not done, and subsequently, Status message will be ignored.

8.2. TDM Configuration

8.2.1. Fixn64 Configuration

This database describes the configuration of TDM cross-connects.

```
-FixN64-----0001--
N      1
Act    Off
Name   F1
NrTS   0
LineIn NONE
TSIn   1
LineOut NONE
TSOut  1
```

Nr	Item	r,w	Description
1	N	0,8	Index. This corresponds to the record number, and is used to identify the Port (as P1,P2,..) in loggings.
2	Act	1,3	Activates the fixed channel.
3	Name	1,2	Name given to the Port. This name is used in the port definition.
4	NrTS	1,3	Number of consecutive 64kbit/s timeslots that are to be cross-connected from LineIn to LineOut.
5	LineIn	1,3	The incoming line (L1-L8).
6	TSIn	1,3	The position of the first timeslot on the incoming line at which the port starts. Remark: timeslot 16 is excluded from a port if ISDN is enabled on the line.
7	LineOut	1,3	The outgoing line (L1-L8).
8	TSOut	1,3	The position of the first timeslot on the outgoing line at which the port starts. Remark: timeslot 16 is excluded from a port if ISDN is enabled on the line.

8.3. ISDN Configuration

8.3.1. ISDN Route Configuration

This database configures the ISDN call routing tables.

```
-Route-----0001--
N      1
Act    On
LineIn 1-----
Search *
Replace *
LineOut -2-----
Calltyp -----
FailMin 0
CliProf
```

Nr	Item	r,w	Description
1	N	0,8	Index. This corresponds to the record number, and is used to identify the route (as R1,R2,..) in loggings.
2	Act	1,3	De/Activation of the current route.
3	LineIn	1,3	The set of incoming lines which are to be taken in account for this route. Multiple input lines are selectable.
4	Search	1,3	The incoming CDN ¹ is matched with the value of 'Search'. If equal, the CDN is replaced with 'Replace' else the next route in the table is checked.

¹ CDN : Called Dial Number

			<p>Some special features are :</p> <p>* : this symbol is a group wildcard. If placed in front, the last numbers of the CDN make the difference. If placed last, the first numbers of the CDN make the difference.</p> <p>Example : Search = 02* & Replace = 5552*</p> <p>The incoming CDN=023128 becomes CDN=55523128.</p> <p>? : this symbol is a single wildcard. The '?' can be a value between 0 and 9.</p> <p>Example : Search = 023?2 & Replace = 02302</p> <p>The incoming CDN=02372 becomes CDN=02302.</p>
5	Replace	1,3	The total/partial replacement for the Search value. See Search above.
6	LineOut	1,3	<p>The outgoing line(s) where the call has to be forwarded. If the route is considered as valid.</p> <p>If multiple lines are selected (hunting groups), the calls are forwarded in a round robin manner. This means the first call is forwarded to the first available line, the second call to the second available line, If the last line in the route is reached and a new call is coming in, the call is forwarded back to the first line, the next call to the second line,..... . If the line is configured for a TEI value of 0, or the line is a PRI line, the hunting group algorithm will skip the line if it is unavailable (i.e. if its level 1 or level 2 (LAPD) is down).</p> <p>If all lines are occupied, the next route in the table is taken.</p>
7	Calltyp	1,3	<p>Bitmask defining the call types to be verified during route selection. The bitmask is based on the CIP (Connection Identification Profile) mask as defined in the CAPI standard. It defines the following bits:</p> <p>Bit 1: Speech call</p> <p>Bit 2: Unrestricted digital information call</p> <p>Bit 3: Restricted digital information call</p> <p>Bit 4: 3.1 kHz audio call</p> <p>Bit 5: 7 kHz audio call</p> <p>Bit 6: video call</p> <p>Bit 7: packet mode call</p> <p>Bit 8: call with 56 kBit/s rate adaptation</p> <p>Bit 9: unrestricted digital information with tones/announcements call</p> <p>Only calls with a bearer capability corresponding to the bit fields set will be selected for the route.</p> <p>If no bits are set in this field, the Calltyp field will be ignored.</p>
8	FailMin	1,3	<p>If specified (non-0), the route may be temporarily disabled during the specified number of minutes depending on the cause of the latest call failure. The following causes will disable the route:</p> <p>class 2: 34,38,41,42,43,44,47</p> <p>class 3: ,49,50,57,58,63</p> <p>class 4: 65,66,69,70,79</p> <p>class 5: 81,82,83,84,85,86,88,91,95</p>
9	CliProf	1,3	This is a character string that is looked up in the CLIP table (matching the Label field) to identify the applicable CLIP checks.

8.3.2. ISDN CLIP Configuration

This database configures the ISDN CLI (Calling Line Identification) search and replace feature.

```

-Clip-----0001--
N          1
Act       On
Label     t1
Search    015333000
Replace   2222

```

Nr	Item	r,w	Description
----	------	-----	-------------

1	N	0,8	Index. This corresponds to the record number, and is used to identify the Clip in loggings.
2	Act	1,3	Activates/Deactivates the current CLIP entry
3	Label	1,3	ASCII string defining the label of the CLI profile. This label is linked to the 'CliProf' label field in the route configuration. Multiple CLI profiles with the same label can be configured in the Clip database. The database will be searched for a certain label in consecutive order from top to bottom. If no CLI profile is found with a certain label, the call will be refused with cause 21 (Call Refused).
4	Search	1,3	The incoming CLI is matched with the value of 'Search'. If equal, the CLI is replaced with 'Replace' else the next Clip in the table is checked. Some special features are : * : this symbol is a group wildcard. If placed in front, the last numbers of the CLI make the difference. If placed last, the first numbers of the CLI make the difference. Example : Search = 02* and Replace = 5552* The incoming Cli=023128 becomes Cli=55523128. ? : this symbol is a single wildcard. The '?' can be a value between 0 and 9. Example : Search = 023?2 & Replace = 02302 The incoming Cli=02372 becomes Cli=02302.
5	Replace	1,3	The total/partial replacement for the Search value. See Search above.

8.4. X.25 Configuration

The X25 Config table allows you to define the switching of D-channel X.25 connections between two BRI or PRI lines. This allows X.25 over ISDN user equipment to be attached to the ISDN public network through the E800. The E800 only provides support for X.25 connectivity as described in ITU recommendation X.31 case B: 'ISDN virtual circuit service on D-channel'. This implies that only permanent fixed TEI values (defined at subscription time) are supported for an X.25 connection.

```

-X25-----0001--
N          1
Act       Off
LineIn    NONE
TEIIn     0
LineOut   NONE
TEIOut    0

```

Nr	Item	r,w	Description
1	N	0,8	Index number.
2	Act	1,3	Activates/Deactivates the current X.25 switching entry
3	LineIn	1,3	Incoming line for which X.25 data will be switched
4	TEIIn	1,3	TEI value of the LAPD X.25 connection (i.e. TEI value of the SAPI 16 LAPD connection) on the incoming line that will be switched. The value should be between 0 and 63.
5	LineOut	1,3	Outgoing line to which X.25 data will be switched.
6	TEIOut	1,3	TEI value of the LAPD X.25 connection (i.e. TEI value of the SAPI 16 LAPD connection) on the outgoing line to which X.25 packets will be switched. The value should be between 0 and 63.

8.5. IP Configuration

8.5.1. IP Features Configuration

This database configures various global settings of IP features, such as routing and masquerading. This database is only visible if the IP Route key is installed.

```

-Features-----
N          1
IPRoute   On
Masq      Off
MasqIP    000.000.000.000
RCNet1    000.000.000.000
RCMask1   000.000.000.000
RCNet1    000.000.000.000
RCMask1   000.000.000.000

```

Nr	Item	r,w	Description
2	IPRoute	1,7	This flag will enable or disable the ip-router function. If this flag is set, incoming packets not destined for a local interface will be routed to a gateway as specified in the IP routes table.
3	Masq	1,3	Activation of the Masquerading function. Only valid if routing has been enabled (through the IPRoute flag). When this flag is set, private internal IP addresses of to be routed packets will be translated to a unique Internet address
4	MasqIP	1,3	This is the IP-address that will be used for translating internal IP-addresses to the external IP-address. If this field is empty (000.000.000.000) and if Masquerading is enabled, then the masquerading address will be the IP address of the WAN interface (as defined in the PPP configuration table, or negotiated through PPP).
5	RCNet1	1,7	First Network for which remote control is allowed. If filled in, the IP address denotes the network address from which remote access (telnet or HTTP access) to the E800 is allowed. A zero entry is ignored.
6	RCMask1	1,7	First Network Subnet mask for which remote control is allowed. Subnet mask of the RCNet1 address. A zero entry is ignored.
7	RCNet2	1,7	Second Network for which remote control is allowed. If filled in, the IP address denotes the network address from which remote access (telnet or HTTP access) to the E800 is allowed. A zero entry is ignored.
8	RCMask2	1,7	Second Network Subnet mask for which remote control is allowed. Subnet mask of the RCNet2 address. A zero entry is ignored.

8.5.2. IP SNMP Configuration.

This database configures the SNMP parameters of the E800.

```

-SNMP-----
N          1
Trp        50
SNMPMgr    000.000.000.000
Name       E800
Contact
Locatn
RdComm    public
WrComm    netman
TrpComm   trap

```

Nr	Item	r,w	Description
2	Trp	1,3	Trap threshold level: 0-99. All events with level equal or greater than this threshold will generate traps.
3	SNMPMgr	1,3	IP address of the SNMP manager station. This station will receive traps from the E800.
4	Name	1,3	MIB-II System Name
5	Contact	1,3	MIB-II Contact parameter
6	Location	1,3	MIB-II Location parameter
7	RdComm	1,3	The SNMP Community String which allows Read-Only.

			A valid login with read rights is additionally required
8	WrComm	1,3	The SNMP Community String which allows Read/Write. A valid login with write rights is additionally required
9	TrpComm	1,3	The Community String sent along with SNMP Traps

The field 'Name' is used to define the MIB-II System group. Note that this field cannot be directly modified in the MIB-II group, but only indirectly via the field defined here. As a consequence, only a validated operator is able to change the MIB-II System group contents.

Note also that the MIB-II System description is read-only and contains the manufacturer, product and serial number identification.

8.5.3. IP PPP Configuration

This database configures the PPP specific parameters

```
-PPP-----
N          1
IPAddr    192.168.003.001
Netmask   255.255.255.000
RemAddr   192.168.003.002
RemUser
RemPwd
Authen    PAP
```

Nr	Item	r,w	Description
2	IPAddr	1,3	IP address assigned to the E800 when establishing a WAN link (established through a leased line or dialup link). If the IP address filled in is 000.000.000.000, then the other end will assign an IP address to the E800 for this PPP link
3	Netmask	1,3	Netmask address assigned to the WAN link
4	RemAddr	1,3	IP address assigned to the remote end of the WAN link. If the IP address filled in is 000.000.000.000, then the remote end will assign an IP address to its own.
5	RemUser	3,6	User name of the remote device, used in the PPP authentication process. If not filled in, then no authentication towards the remote will be done.
6	RemPwd	3,6	Password of the remote device, used in the PPP authentication process. If not filled in, then no authentication towards the remote will be done.
7	Authen	3,6	Type of authentication demanded towards the E800 <ul style="list-style-type: none"> if set to PAP, then PAP authentication is required to the E800 for an incall or leased line. If set to NONE, then no authentication is required towards the E800.

8.5.4. IP Routes Configuration

This database configures static IP routes. This database is only available when the IP Routing key is enabled.

```
-Routes-----0001--
N          1
Act        On
NetAddr    000.000.000.000
NetMask    000.000.000.000
Gateway    000.000.000.000
Interface  WAN
```

Nr	Item	r,w	Description
1	N	0,8	Index number

2	Act	1,3	Enables or disables the routing entry.
3	NetAddr	1,3	The destination address of a to be routed packet is matched against the value of "NetAddr". If the destination address belongs to the defined network, the entry will be taken as the route. Remark that the matching process is from top to bottom. Therefore, the most general routes should be placed at the bottom.
4	NetMask	1,3	Network mask of the defined NetAddr
5	Gateway	1,3	Address of the host to which packets will be forwarded. Can be 000.000.000.000 if the destination interface is the WAN. In this case, the Gateway will be the IP address of the remote device on the WAN link.
6	Intface	1,3	The interface on which routed packets need to be sent (LAN or WAN)

8.5.5. IP PortFW Configuration

This database describes the configuration of the Port Forwarding feature, allowing incoming TCP connections when Masquerading is active. This database is only available when the IP Routing key is enabled.

```
-PortFW-----0001--
N      1
Act    Off
Prtoocl tcp
DstPort 0
Address 000.000.000.000
```

Nr	Item	r,w	Description
1	N	0,8	Index.
2	Act	1,3	Enables or disables the Port Forwarding entry
3	Prtoocl	1,3	Defines the protocol (UDP or TCP) for which Port Forwarding will be applied
4	DstPort	1,3	TCP port for which Port forwarding will be applied, i.e. each incoming TCP or UDP connection (depending on field 3) with this port will be forwarded to the host with address as specified in field 5. If this field is set to zero (0), then all incoming connections will be routed to the address specified in field 5.
5	Address	1,3	Address of the host to which TCP packets will be forwarded.

8.6. System Configuration

8.6.1. System Misc Configuration.

This database configures miscellaneous system parameters.

```
-Misc-----
N      1
Type   E800
TLogOff 0
TFailsf 0
ClkSlve AUTO
AlmTime 00:00:00
HttpRef 0
```

Nr	Item	r,w	Description
2	Type	1,8	System type (E800).
3	TlogOff	1,3	Telnet and Local control port will be logged off after TlogOff seconds (0=disable auto logoff). Note that SNMP is not logged off: The logout

			command must be issued to logoff SNMP
4	TfailSF	1,3	Delay taken into account before the failsafe relays are activated when the power down condition is fulfilled.
5	ClkSlve	1,3	Preferred ISDN Line on which clock slaving will be attempted, FreeRun (internal clock source), or AUTO if there is no preference. If AUTO is selected, the first PRI line that can be slaved on will be selected. If a line is chosen to slave on, and there is no slaving possible on this line, then the E800 will revert back to auto slaving.
6	AlmTime	1,3	Time of Day on which an alarm remote control outcall will be attempted to the ISDN number as specified in the PPP configuration table. A value of 00:00:00 disables this feature.
7	HttpRef	1,3	Refresh rate of the web server pages in seconds. If zero, no refreshing of web pages will be applied. A change of this field will only become effective after the browser refreshed a web page.

8.6.2. Operator Configuration.

This database configures the operator settings.

```

-Operator-----0001--
N      1
Name   ADM
Rights x7777
Info

```

Nr	Item	r,w	Description
1	N	0,8	Index. This corresponds to the record number, and is used to identify the operator (as O1,O2,..) in loggings and in commands
3	Name	3,7	Short-Name for the operator
4	Rights	3,7	Hex-map specifying the operators access rights: <ul style="list-style-type: none"> ▪ mask x000F : read rights (0-7) ▪ mask x00F0 : write rights (0-7) ▪ mask x0F00 : execute rights (0-7) ▪ mask xF000 : protocol rights (0-7) The following levels are advised (see Ref. Manual for rights-lists): <ul style="list-style-type: none"> ▪ USR: x0111 (loc,telnet R=1 W=1 X=1) ▪ SYS: x0222 (loc,telnet R=2 W=2 X=2) ▪ SUP: x7766 (ppp, http, loc,telnet R=6 W=6 X=7) ▪ ADM: x7777 (all rights)
5	Info	3,3	User Info field

9. Status Screens

The status screens can be accessed using the command WIN STS.

9.1. System Status

```

-System-----
N          1
Sts       ACT
Date      2001/01/01
Time      03:10:40
ClkSrc    5
Trc       20
LED       gG-----G-----
  
```

Nr	Item	r,w	Description
2	Sts	1,8	INIT : entry is not checked ACT : entry passed checks and is active RES : entry has been changed and a reset system is required to activate the changes
3	Date	1,8	Current date
4	Time	1,8	Current time
5	Clksrc	1,8	Specifies which interface is used as a provider for clock synchronisation for all lines. 0=free run.
6	Trc	1,8	Current trace level
7	LED	1,8	LED status. As on front panel. R=Red,G=Green,Y=yellow, '-'=not illuminated.

9.2. Line Status

```

-Line-----0001--
N          1
Sts       ACT
L1State   F3los
PH        Down
DL        Down
L2State   4
TEI       0
X25Stat   0
BConn     -----
AlmFrom   --
Trc       20
ChInUse   0
  
```

Nr	Item	r,w	Description
1.	N	1,8	Index. This corresponds to the record number, and is used to identify the entry (as L1,L2,..) in loggings and in commands
2.	Sts	1,8	Gives the status of the entry INIT : entry is not checked HW : hardware error related with this entry KEY : entry is not activated by the key option IDLE : entry passed checks and is ready but not active ACT : entry passed checks and is active RES : entry has been changed and a reset system is required to activate

			the changes CFG : entry has been changed but configuration error occurs
3.	DLSts	1,8	Gives the status of the datalink of PRI line. This status can be triggered with the command: set datalink L<n> {active idle} ACT: the datalink is enabled and functional IDLE: the datalink is disabled and non-functional
4.	L1State	1,8	State of the line according to the I430/I431 protocols
5.	PH	1,8	Up : physical layer is up Dn : physical layer is down
6.	DL	1,8	External state of the data link Up : datalink is up Down : datalink is down
7.	L2State	1,8	State of the data link, according to the Q921 protocol
8.	TEI	1,8	The current TEI value assigned to the datalink of this line. The field will show 127 if no TEI is assigned
9.	X25Stat	1,8	Shows the status of the X.25 LAPD connection, according to the Q.921 protocol.
10.	Bconn	1,8	Bitmap indicating connected Timeslots. For ISDN, this corresponds to the connected B channels <ul style="list-style-type: none"> • O = Outgoing connection on the indicated timeslot (as seen from the E800) • I = Incoming connection on the indicated timeslot (as seen from the E800) • N = Nailed- up timeslot. • W = timeslot in use by the WAN leased-line connection. • - = Available timeslot
11.	AlmFrom	1,8	Specifies lines that may force a datalink error on this line. The datalink on this line will be forced down when one of the indicated lines detects a persistent deactivation. When the line goes into physical activation again, the alarm is cleared. This is a special feature that is in most cases not needed.
12.	Trc	1,8	Current trace level
13.	ChInUse	1,8	The number of channels currently in use.

9.3. WAN Status

```

-WAN-----
N          1
Sts       ACT
WANConn   Leased
LocIP     192.168.003.001
RemIP     192.168.003.002
MsqAddr   000.000.000.000
MsqSess   0

```

Nr	Item	r,w	Description
2	Sts	1,8	Gives the status of the entry IDLE: entry passed checks, and WAN link is not configured. ACT: entry passed checks, and WAN link is configured for leased line or dial-out. RES : entry has been changed and a reset system is required to activate the changes CFG : entry has been changed but configuration error occurs
3	WanConn	1,8	Denotes the type of access you have to the Internet. Values are <i>Off</i> (no connection established), <i>Dialup</i> and <i>Leased</i> .
4	LocIP	1,8	IP address assigned to the local interface of the WAN link.
5	RemIP	1,8	IP address assigned to the remote interface of the WAN link.

6	MsqAddr	1,8	This is the address to which all source addresses of outgoing packets are translated to.
7	MsqSess	1,8	Gives an indication on the number of Masquerading sessions. Each TCP connection results in a Masquerading sessions. A maximum of 1400 sessions is supported.

9.4. FixN64 Status

```
-FixN64-----0001--
N          1
Sts       IDLE
```

Nr	Item	r,w	Description
1	N	1,8	Index. This corresponds to the record number, and is used to identify the entry (as P1,P2,..) in loggings and in commands.
2	Sts	1,8	Gives the status of the entry IDLE: entry passed checks, and FixN64 Cross-connect is not active. ACT: entry passed checks, and FixN64 Cross-connect is active. RES : entry has been changed and a reset system is required to activate the changes CFG : entry has been changed but configuration error occurs

9.5. Route Status

```
-Route-----0001--
N          1
Sts       IDLE
State     Ok
Date      0000/00/00
Time      00:00:00
Cause     0
CDN
LineOut   0
```

Nr	Item	r,w	Description
1	N	1,8	Index. This corresponds to the record number, and is used to identify the entry (as R1,R2,..) in loggings and in commands.
2	Sts	1,8	Gives the status of the entry INIT : entry is not checked HW : hardware error related with this entry KEY : entry is not activated by the key option IDLE : entry passed checks and is ready but not active ACT : entry passed checks and is active RES : entry has been changed and a reset system is required to activate the changes CFG : entry has been changed but configuration error occurs
3	State	1,8	OK : route is possible WAIT : route has failed and fail timer was started for this route. The indication remains until the next time that the route is tried.
4	Date	1,8	Date of last use of this route.
5	Time	1,8	Time of last use of this route. If in Wait state, then attempts to use this route will fail until Time+WaitMin

6	Cause	1,8	Latest ISDN cause received on this route
8	CDN	1,8	Full called number on this route.
9	Lineout	1,8	Indicates the line that was selected.

9.6. Clip Status

```
-Clip-----0001--
N          1
Sts       ACT
```

Nr	Item	r,w	Description
1	N	1,8	Index.
2	Sts	1,8	Gives the status of the entry INIT : entry is not checked IDLE : entry passed checks and is ready but not active ACT : entry passed checks and is active CFG : entry has been changed but configuration error occurs

9.7. Operator Status

```
-Oper-----0001--
N          1
Sts       ACT
Intf      LAN
Time     12:27:56
Date     2001/02/02
IP       192.168.100.045
BadPsw   0
Logins   6
```

Nr	Item	r,w	Description
1	N	1,8	Index. This corresponds to the record number, and is used to identify the entry (as O1,O2,..) in loggings and in commands.
2	Sts	1,8	Gives the status of the entry INIT : entry is not checked IDLE : entry passed checks and is ready but not active ACT : entry passed checks and is active RES : entry has been changed and a reset system is required to activate the changes CFG : entry has been changed but configuration error occurs
3	Intf	1,8	LOCAL : connected via control port. LAN : connected via lan interface. PPP : connected via remote control.
4	Time	1,8	Time of last login/logout
5	Date	1,8	Date of last login/logout
6	IP	1,8	Current or Last used IP address
7	BadPsw	1,8	Number of unsuccessful logins. Reset when changing password
8	Logins	1,8	Number of successful logins.

10. History Screens

The history screens can be accessed using the command WIN HISTORY.

```

-Line-----0001--
N          1
AMaxIn    0
AMaxOut   0
AMinFre   2
APHDown   0
ACRCErr   0
AFrmErr   0
AConTim   0
ErrSec    0
SErrSec   0
UnvlSec   0

```

10.1. Line History.

Nr	Item	r,w	Description
1	N	1,8	Index. This corresponds to the line number for which history info is printed
2	AmaxIn	1,8	Maximum number (high watermark) of channels occupied by incoming calls on this line since reset of the E800
3	AmaxOut	1,8	Maximum number (high watermark) of channels occupied by outgoing calls on this line since reset of the E800
4	AminFre	1,8	Minimum number (low watermark) of free channels on this line since reset of the E800
5	APHDown	1,8	Total time in seconds level 1 went down on this line since reset of the E800
6	ACRCErr	1,8	Number of CRC errors occurred since reset of the E800
7	AfrmErr	1,8	Number of framing errors occurred since reset of the E800
8	AConTim	1,8	Total connection time for all calls on this line since reset of the E800. The connection time is counted from the moment the B-channels are connected through
10	ErrSec	1,8	G.821 Errored Second statistics. Denotes the number of seconds with at least one bit error.
11	SErrSec	1,8	G.821 Severely Errored Second statistics. Denotes the number of seconds with at least one bit error out of thousand bits (Bit Error Ratio of 10^{-3}).
12	UnvlSec	1,8	G.821 Unavailable Seconds statistics. Denotes the number of seconds with at least 10 consecutive Severely Errored Seconds..

10.2. Route History.

```

-Route-----0001--
N          1
ACllAtt   0
AScCall   0
AFlCall   0
AConTim   0
ADblCnt   0
  
```

Nr	Item	r,w	Description
1	N	1,8	Index. This corresponds to the route record index for which history is printed.
2	ACllAtt	1,8	Number of call attempts made on this route since reset of the E800
3	AScCall	1,8	Number of successful calls made on this route since reset of the E800. Each call resulting in a successful 'connect through' of B-channels is considered as a successful call.
4	AFICall	1,8	Number of failed calls made on this route since reset of the E800. A call is considered failed if for some reason the connection was dropped before both ends B-channels were connected through.
5	AConTim	1,8	Total connection time for all calls made on this route since reset of the E800. The connection time is counted from the moment the B-channels are connected through.
6	ADblCnt	1,8	Number of times this route has been disabled since reset of the E800

11. Commands

11.1. Features

- Commands can be abbreviated. The first match will be used.
- When a command is incomplete, then an error message is displayed according to the following logic:
 - the recognised and accepted part is shown
 - the offending remainder of the input is replaced by a question mark
 - the question mark is followed by the expected input pattern (or alternatives list).
- When a command can be executed, then either the result of the command is returned or a message indicating that the command has been processed.

11.2. Syntax conventions

<x> indicates a variable argument
 [] denotes optional arguments
 { | } denotes alternatives
 CAP capitals denote keywords

11.3. Command organisation and required access.

Command	x	Action
LOGIN <name> [<psw>]	0	Login sequence. If <psw> is not specified, then it is requested by the HI. In that case, the password is not echoed to the screen, and is not saved in the command history. When doing a login via SNMP, <psw> must be specified.
LOGOUT	0	Logout the current operator. When the command is issued via the serial port, the local operator is logged out. When the command is issued via TCP/IP (Telnet or SNMP), then the remote operator associated with the IP address is logged out (effectively disabling SNMP and Telnet until new login).
WIN [{ CFG STS HISTORY }]	1	Telnet or Local only (Error for SNMP and other). Provide access to the screen interface
SHOW {..}	1	Telnet or Local only (Error for SNMP and other).
SHOW TIME	1	Show the current time and date (hh:mm:ss,yyyy/mm/dd)
SHOW {CONFIG STATUS HISTORY} {<menu> ...} <table> [<from> [<to> [<dt>[X]]]	1	Show a sequence of records of a config, status or history table (from the RUN database) in browse format. <ul style="list-style-type: none"> ▪ {<menu> ...} : list of menu options that leads to the table to be viewed. This follows the same structure as the interactive menu structure. Remark that these menu options may be abbreviated if the abbreviation has a unique equivalent. ▪ <table> : name of the table to be viewed. ▪ <from>,<to> : specifies the first and last record to be viewed. If not specified, then the full table is shown. ▪ <dt> : specifies an optional time interval in seconds for repeated showing If X is specified, extended information will be shown. In this case, all fields are shown for the specified records. In the other case, the fields shown are the same as can be found in the screen browser. <i>Example:</i> SHOW CON INT LIN 1 2; shows the line configuration table in the interfaces menu.

SHOW ID	1	Show identification of the components of the E800 firmware and hardware : <ul style="list-style-type: none"> ▪ Global FW code and revision ▪ Pcode : HW product code and revision ▪ Model : or product name ▪ SerNr : serial number ▪ MacAdr : Mac address
SHOW ID X	1	Show identification extended : in addition to SHOW ID the following identification is displayed : <ul style="list-style-type: none"> ▪ Options:P<p>,H<h>,S<s>,K<kkkkkkkkkk> activated options where <p> is product option, <h> HW option, <s> SW option, <k...> keycode. ▪ FW release date ▪ L2+L3 FW component code and revision ▪ L1 FW component code and revision ▪ XW component code, revision and release date
SHOW INTERFACE [LOOPBACK LAN WAN]	1	Shows the status of the IP interfaces. If no interface is supplied, then all interfaces are shown. The command returns the IP address and netmask of the interface, the MTU, the status (up/down), and received and transmitted packets.
SHOW KEYS	0	Show installed hardware keys and software keys in plain text format.

CFG {..}	2	Access to manipulation of databases.
CFG RUN	2	Copy EDT database to SAVED database. Validates EDT database and copy EDT database to RUN database. (Re)Activate the RUN database
CFG SAVE	2	Copy EDT database to SAVED database. No further actions are done
CFG LOAD	2	Copy SAVED database to EDT database. No further actions are done
CFG ACTIVATE	2	Validates and (Re)Activate the RUN database
CFG DEFAULT	2	Erase the EDT database, and fill with factory defaults. No further actions are done
CFG XMSEND { CFG.TXT ROUTE.TXT STS.TXT HISTORY.TXT}	2	Sends various info to a PC using X-modem: <ul style="list-style-type: none"> ▪ CFG.TXT: the EDT database will be sent in text format (see also chapter 5 on page 7). ▪ ROUTE.TXT: the route configuration will be sent in text format. ▪ STS.TXT: the status information will be sent in text format ▪ HISTORY.TXT: the history information will be sent in text format.
CFG XMRCV CFG.TXT	2	Receive the EDT Database from a PC using X-modem. The EDT database will be sent in text format (see also chapter 5 on page 7). Note that a CFG RUN is needed to activate the received database.

SET {..}	2	Operational settings.
SET PSW	1	This command can only be executed Locally or via Telnet. The old password is requested and verified, then the new password is requested and verified.
SET TIME hh:mm:ss [,yyyy/mm/dd]	2	Set the current time and optionally the current date
SET EXPERT {ON OFF}	3	Enables or disables 'Expert mode'. In Expert mode, configuration fields are accessible which are generally only to be used by 'experts', i.e. these are fields that are infrequently needed and require a certain level of expertise to use.
SET TRACE <for> <level>	2	Set an extended tracing level for either a specific Line (L<n>) or for global traces (G). If <n> is omitted, then the setting is made for all lines.
SET DATALINK L<n> {IDLE ACTIVE}	2	Activates or de-activates the datalink for a specific Line (L<n>). Upon de-activation, calls will be torn down and the Layer 2 status will be brought to state 1 (TEI unassigned). No further calls on this line will be possible

RESET {..}	2	Reset commands
------------	---	----------------

RESET SYS	2	Execute a warm system restart.
RESET HISTORY	2	Reset the history database to initial values
REM {..}	1	A remark line. The REM command is not interpreted by the command shell. Its only purpose is to add comments in the tracing info.
MAINT MAINT OPTION	3 3	Start maintenance operations. See user manual. Allows to change the software or hardware keys of the device. See user manual for further details.
MAINT REMUPGRADE MAINT RESTART <line>	3 3	Starts a remote software upgrade. See user manual for details Sends a Q931 Restart request on the specified line. This command is only valid for permanent point to point links, i.e. for Primary Rate lines, or for Basic Rate lines with a TEI of 0. This command will bring all Q931 links back to a state of 0, causing all ongoing calls to be dropped, and all B-channels on the line to be freed.

12. Tracing and Traps.

12.1. Overview

The occurrence of specific events may be signalled as follows:

- Trace messages on the local or telnet interface.
The trace message appears when the operator is not entering data (cursor at beginning of line). While the operator is performing commands (e.g.: edition, file transfer,...), traces are temporarily stored, to be shown when the operator finishes the respective command. Up to 100 events can be remembered in this way.
- Sent to an SNMP station as traps. Every traced event can be sent in this way.

Each event has an associated level. This level is compared with the configured trace and trap levels to determine whether the event should be traced and/or trapped. This is done according to the following logic:

- If the event level is higher than the SNMP.TRAP level, then a trap is generated for this event.
- If the event level is higher than the trace level (SET TRACE command), then the event is traced. Tracing is enabled only while the operator is logged in.

The advised level for trapping is 50.

The events which trigger the above actions are classified in different classes.

- Line related events:
 - ISDN Physical, Datalink, and Call Control events
- Route related events:
 - Routed calls events (connection/disconnection)
- Other events:
 - LAN related events
 - IP / PPP related events
 - Internally detected error conditions (bugs or recoverable unexpected conditions).

12.2. Trap and message format

The traps and messages share a number of common properties in order to simplify treatment by management software.

12.2.1. Message format.

Some examples of typical messages are shown below.

```
16:20:1850 L4 PH DI
```

```
18:00:0042 TIME 18:00:00,2001/01/03
```

The message format consists of:

- Event time (referred to the real time of the E800), in the format HH:MM:nnnn where nnnn is the time in 1/100 seconds
- Space
- Class identifier followed by relevant record number:
Ln = Line defined in record number n
<underscore><subclass> = other events.
- Space
- Sub classification (see list below)
- rest of message.

The use of this message format allows to perform pattern matching on the contents of the message.

12.2.2. Traps.

To further simplify treatment by SNMP based managers, the trap message contains the following elements:

- The Trap time stamp refers to the number of 1/100 seconds since power-up as required.
- The message is sent as a string 'varbind'.
- The record number is also sent separately as an integer 'varbind'.

For each class, a separate Trap type is defined.

12.3. Overview of Line Messages.

12.3.1. Physical layer events (PH)

- L<n> PH DI = signals loss of physical activation
- L<n> PH AR = signals higher layer activation request
- L<n> PH AI = signals achievement of physical activation

12.3.2. Q921 Datalink events (DL)

The DL tracing is comparable to the tracing obtained by a Q921 analyser. In addition, the internal working of the Q921 layer can be verified. This tracing is generally useful for specialists only.

- L<n> DL R <lapd-type> <bytes> = reception of Q921 packet
- L<n> DL T <lapd-type> <bytes> = transmission of Q921 packet

Tracing of Q921 message exchanges in the D channel.

<lapd-type> = {INFO | RR | RNR | REJ | SABME | DM | UINFO | DISC | UA | FRMR | XID}

<bytes> = shows the first few bytes of the packet.

- L<n> DL ST<nr> <primitive> <code> = Q921 primitive

Refer to the Q921 specification for a list of the primitives.

In the case of MDL primitives, the respective type is shown as an integer value in code.

12.3.3. Q931 Call Control events (CC)

The CC tracing is comparable to the tracing obtained by a Q931 analyser. In addition, the internal working of the Q931 layer can be verified. This tracing is generally useful for specialists only and may help to identify protocol problems with non-ETSI networks.

- L<n> CC R CR=<crv> ST<state> <messagetype> (<cause>)
- L<n> CC T CR=<crv> ST<state> <messagetype> (<cause>)

Reception and Transmission of Q931 packets.

<crv> = Call reference value.

<state> = State of the Q931 entity before receiving/sending the message

<messagetype> = message type as specified in ETSI Q931.

<cause> = cause value if sent in message. Else unspecified.

- L<n> CC CR=<crv> ST<state> Err-Abort (err <err_nr>)
- L<n> CC CR=<crv> ST<state> Err-Disc (err <err_nr>)
- L<n> CC CR=<crv> ST<state> Err-release (err <err_nr>)

Recovery of network interaction problems according to Q931. These traces show abnormal events during interaction with the ISDN network, which have been identified are remedied (either by aborting the call, by sending a disconnect, or by sending a release).

Refer to the Q931 norm for interpretation of these errors.

Class	Error	Description	
Abort	3	Datalink release indication	
	4	Reception of release complete after outgoing call	
	5	Datalink release in state 2	
	6	Datalink release indication	
	7	Call not in state 0 as expected by network	
	8	T309 expired	
	9	T303 expired	
	10	Release received in state 19	
	12	T308 expired	
	13	Status error in state 19	
	Disc	1	DL establish indication during overlap
		2	T304 expired
		3	T310 expired
5		T313 expired	
7		T301 expired	
Release	4	State error	
	6	N322 error	

12.3.4. ISDN Protocol Errors (ERR)

- L<n> ERR<nr> at <unit>.<line>

This message is internally generated when a condition is detected which is unexpected or which cannot be handled according to the ETSI norms.

Signal these errors to your local Telindus representative, if possible accompanied by a detailed line trace.

12.4. Overview of Route Messages.

- R<n> Connect <cdn>

This message is generated when a route is established between two ISDN lines. The <cdn> indicates the Called Party Number of the call

12.5. Overview of General and Internal Messages

12.5.1. IP / PPP related messages.

- Alarm Call 1 from <cgn>

This message is generated when an 'alarm message' is sent to the Trap Manager, i.e. when the SYSTEM.MISC.ALMTIME time is reached. The <cgn> indicates the calling party number.

- PPP <origin> login: Invalid user/pwd

This message is generated when an invalid username or password is detected when PPP authentication takes place. <origin> stands for 'local' or 'remote', i.e. 'local' means that a login to this E800 failed due to an invalid username/password; 'remote' means that a login to the remote device failed due to an invalid username/password

- PPP disconnected: PAP Auth required

This message is generated when a remote device attempts to reject the required PAP authentication.

- <cnt> Failed Login attempts for <operator>

This message is generated when more than 3 invalid login attempts are made for operator <operator>

- <Dialup | Leased Line> WAN link <connected | disconnected>

This message is generated when a dialup or leased line WAN link was established or disconnected.

12.6. List of messages and their levels.

Class	Trap	Level	Message format
General	Yes	1	CHK<nr> at <module>.<line>
Line		6	L<n> DL ST <nr> <primitive>
Line		8	L<n> DL R <lapd-type> <bytes>
Line		8	L<n> DL T <lapd-type> <bytes>
General		8	Tracer Error (index <nr>)
General	Yes	10	S<n> PATH L<n>T<ts>=L<n>T<ts>
Line	Yes	10	L<n> PH_BCHAN <n> st<status>
General	Yes	11	CLI<n> CGN= <cgn>
Line		20	L<n> CC R CR=<crv> ST<state> <messagetype> (<cause>)
Line		20	L<n> CC T CR=<crv> ST<state> <messagetype> (<cause>)
Line	Yes	22	L<n> MDL Error <code>
Line	Yes	22	L<n> MDL TEI = <nr>
Line	Yes	22	L<n> MDL TEI Removed
Line	Yes	30	L<n> PH DI
Line	Yes	30	L<n> PH AI
Line	Yes	30	L<n> PH AR
General		40	R<n> Connect <cdn>
General		40	Alarm Call 1 from <cgn>
General		40	PPP <remote local> login: Invalid user/pwd
General		40	Link disconnected: PAP Auth required
General	Yes	40	<cnt> Failed Login attempts for <operator>
General		40	<Dialup Leased Line> WAN link <connected disconnected>
		50	--- Advised level for traps
General		60	TIME <hh:mm:ss>
General	Yes	99	ERR<nr> at <module>.<line>

12.7. ISDN call clear causes

Following ISDN cause values are defined in ITU-T Q931:

Normal class	Class 0		
		1	Unallocated (unassigned) number
		2	No route to specified transit network
		3	No route to destination
		6	Channel unacceptable
		7	Call awarded and being delivered in an established channel
	Class 1	16	Normal call clearing
		17	User busy
		18	No user responding
		19	No answer from user (user alerted)
		21	Call rejected
		22	Number changed
		26	Non-selected user clearing
		27	Destination out of order
		28	Invalid number format (address incomplete)
		29	Facility rejected
		30	Response to STATUS ENQUIRY
		31	Normal, unspecified
Resource unavailable class	Class 2	34	No circuit/channel available
		38	Network out of order
		41	Temporary failure
		42	Switching equipment congestion
		43	Access information discarded

		44 47	Requested circuit/channel not available Resource unavailable, unspecified
Service or option not available class	Class 3	49 50 57 58 63	Quality of Service not available Requested facility not subscribed Bearer capability not authorised Bearer capability not presently available Service or option not available, unspecified
Service or option not implemented class	Class 4	65 66 69 70 79	Bearer capability not implemented Channel type not implemented Requested facility not implemented Only restricted digital information bearer capability is available Service or option not implemented, unspecified
Invalid message (e.g. parameter out of range) class	Class 5	81 82 83 84 85 86 88 91 95	Invalid call reference value Identified channel does not exist A suspended call exists, but this call identity does not Call identity in use No call suspended Call having the requested call identity has been cleared Incompatible destination Invalid transit network selection Invalid message, unspecified
Protocol error (e.g. unknown message) class	Class 6	96 97 98 99 100 101 102 111	Mandatory information element is missing Message type non-existent or not implemented Message not compatible with call state or message type non-existent or not implemented Information element non-existent or not implemented Invalid information element contents Message not compatible with call state Recovery on time expiry Protocol error, unspecified
Interworking class	Class 7	127	Interworking, unspecified

13. Technical specifications.

13.1. Table top housing.

Interfaces:

- PR ISDN interfaces:
Connector: RJ-45 female
Conform to CTR4, I431, Q921 & Q931
- Control port interface:
Connector: DB9 female
Electrical: V28
Functional: V24 (CT 102, 103, 104; no XON/XOFF or RTS/CTS flow control on DTE)
Speeds: asynchronous from 9600 to 115200 bit/s
- Ethernet interface:
Connector: RJ-45 female
Recommendations fulfilled: 10Base-T, IEEE 802.3 & 802.2

Front panel:

- LED indications: HB, ALM, LAN, PR1 to PR8

Human Interface:

- Local: ANSI compatible terminal on control port
- Remote through Ethernet port: SNMP and Telnet based on TCP/IP stack
- Remote through B-channel: SNMP and Telnet based on the PPP protocol

Operating environment:

- Recommendations fulfilled:
 - Safety: EN 60950
 - EMC/EMI: EN 50081-1 & EN 50082-1
- Operating temperature: 5°C to 40°C
- Max. humidity: 15% to 80% non condensing

Power supply:

- AC power supply: Input voltage: 100-240 VAC \pm 10%, 50-60 Hz
- DC power supply: Input voltage: 36-72 VDC
- Power consumption: < 15 Watt

Mechanical data:

- W x H x D: 268 x 39 x 243 mm
- Weight: < 2 kg

13.2. Connector definitions.

13.2.1. PRI port: RJ-45 (TE pin definition).

Pin nr	Circuit name	Input/Output
1	RX 1	I
2	RX 2	I
3		
4	TX 1	O
5	TX 2	O
6		
7		
8		

13.2.2. Ethernet port: RJ-45 (10BaseT).

Pin nr	Circuit name	Input/Output
1	TX +	O
2	TX -	O
3	RX +	I
4		
5		
6	RX -	I
7		
8		

13.2.3. Control port: DB9 (V24/V28).

Pin nr	Circuit name	Input/Output
1	DCD	O
2	RXD	O
3	TXD	I
4		
5	SGND	O
6	DSR	O
7	RTS	I
8	CTS	O
9		

13.2.4. Power inlet: XLR (+5V DC).

Pin nr	Circuit name	Input/Output
1	+5V	I
2	SGND	I
3		

13.3. Cable definitions.

13.3.1. DX_C2DMM-R45-R45 (PRI straight).

Connector 1		Connector 2	
Pin number	Circuit name	Pin number	Circuit name
1	RX 1	1	RX 1
2	RX 2	2	RX 2
3	-	3	-
4	TX 1	4	TX 1
5	TX 2	5	TX 2
6	-	6	-
7	-	7	-
8	-	8	-

13.3.2. DX_C2XMM-R45-R45 (PRI crossed).

Connector 1		Connector 2	
Pin nr	Circuit name	Pin nr	Circuit name
1	RX 1	1	TX 1
2	RX 2	2	TX 2
3	-	3	-
4	TX 1	4	RX 1
5	TX 2	5	RX 2
6	-	6	-
7	-	7	-
8	-	8	-