

Modem-Converter

E1 - L/S

19-inch 1U High Version

Installation and Operating Manual

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Safety Precautions



An exclamation point enclosed in a triangle warns the user about important operations and maintenance instructions for the device.

It is mandatory to observe the existing safety rules during installation, operation, and maintenance of the device. Installation, maintenance, and repair operations must be performed only by qualified and certified personnel. Installation, maintenance, and repair operations may not be performed by the operator or the user.

The E1-L equipment has been tested in the Communications hardware and systems testing center of CNIIS of the Ministry of Communications of the Russian Federation and in the *Sviaz'-Certificat* quality systems certification centre and has been acknowledged to comply the following technical specifications:

- «Technical requirements for the hardware of the flexible multiplexor (multifunctional channelizing equipment with flexible configuration ability)», approved by the Ministry of Communications of the Russian Federation at February 20, 1997;
- GOST R ISO 9001-96.

The E1-L equipment is admitted to be used in domestic and intrazone communication networks of the Russian Federation as a multifunctional channelizing equipment.

This document describes the E1-L/S version of the E1-L Modem. The E1-L/S version is the 1U high rack mount device for the standard 19-inch cabinet.

This document corresponds to the models with the firmware revision as follows:

Model identification	Firmware revision
E1-L/S - ETV	revision F, 13/04/2005
E1-L/S - V	revision F, 13/04/2005
E1-L/S - M	revision F, 13/04/2005

Cronyx reserves the right to make changes to technical characteristics and design of the device without the prior notification of customers.

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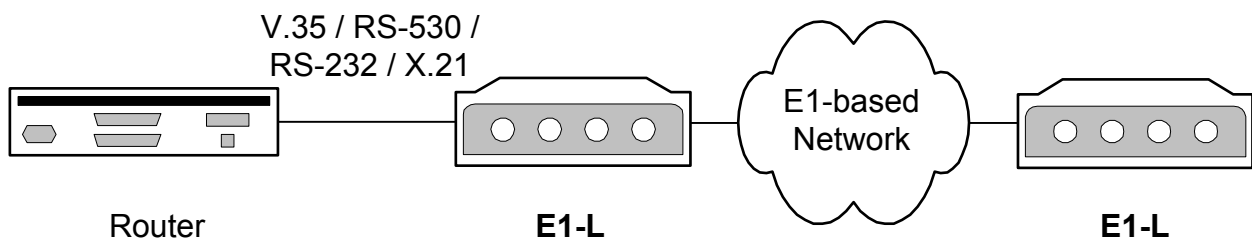
Chapter 1. Introduction

1.1. Application

The E1-L device is a modem-converter for E1-based networks.

Note. Hereinafter the term «E1» is used for a designation of the data link having the interface at nominal bit rate of 2048 kbps in conformity with the ITU-T Recommendation G.703, and operated in both framed mode in conformity with the ITU-T Recommendation G.704 (or with the IKM-30) and unframed (transparent) mode.

This document describes the E1-L/S version of the E1-L Modem. The E1-L/S version is the 1U high rack mount device for the standard 19-inch cabinet. E1-L device is also available as stand-alone unit (E1-L/B), as a card for 19-inch 3U Cronyx rack (E1-L/R) and as a card for Intel-compatible computers (Tau-PCI/E1).



The E1-L device accepts digital interface data at any multiple rate of 64 kbps up to 2048 kbps and places it into E1 frame using required number of timeslots or (in unframed mode) the whole bandwidth of 2048 kbps.

The E1-L device may be ordered with Ethernet10/100Base-T, RS-530, RS-232, V.35 or X.21 interfaces with standard connectors.

Note. Hereinafter the term «Ethernet 10/100Base-T» is used for a designation of the data link having switcheble or autodetecting LAN interface 10BASE-T or 100BASE-T (physical level 100BASE-TX) in conformity with the IEEE 802.3 Standard.

Multi-standard interface option with HDB44 connector is also available. The type of interface in this case is determined by adapter cable: RS-232, RS-530, RS-449, RS-442, V.35 or X.21.

This document describes the E1-L/S version of the E1-L Modem. The E1-L/S version is the 1U high rack mount device for the standard 19-inch cabinet.

E1-L device is also available as stand-alone unit (E1-L/B), as a card for 19-inch 3U Cronyx rack (E1-L/R) and as a card for Intel-compatible computers (Tau-PCI/E1).

A pair of devices with Ethernet 10/100Base-T interface form a remote bridge for two

LANs. While in unframed mode the E1-L modem may be used together with the PCM2 modem.

VLAN support is provided by implementing of Ethernet packets with the length enlarged to 4224 bytes.

The device operation may be controlled from the console (ASCII terminal connected to the RS-232 control port). The device is equipped with the dedicated Ethernet 10Base-T port to support SNMP-based management.

The modem's front panel indicators display the channels availability, loopbacks enable and testing modes.

The built-in BER-tester allows the error level measurement in the E1 link. The measurements are performed on the fixed or pseudorandom code subject to the ITU-T Recommendation O.151 guidelines (supported length of sequence is $2^{15}-1=32767$ bits).

There is a capability of remote login to control the remote device operation from the console port of the local device (this mode may be useful if there is no service personnel on the remote end of the link). Commands are transmitted to the remote device via additional monitoring channel. This channel utilizes special bit of the timeslot 0 (in accordance with the ITU-T Recommendation G.704) or any other user selectable bit of any timeslot other than 0. The remote login capability is not supported in unframed mode of operation.

The device is equipped with an emergency alarm relay. The state of the relay on the local device depends on fault conditions detected and may be controlled from the remote device. The relay operates in «dry contacts» mode and may be used for prompt maintenance (according to the ITU-T Recommendations G.742 and G.751).

The firmware of the device may be updated by user. The instructions for updating the firmware may be found at the www.cronyx.ru web site.

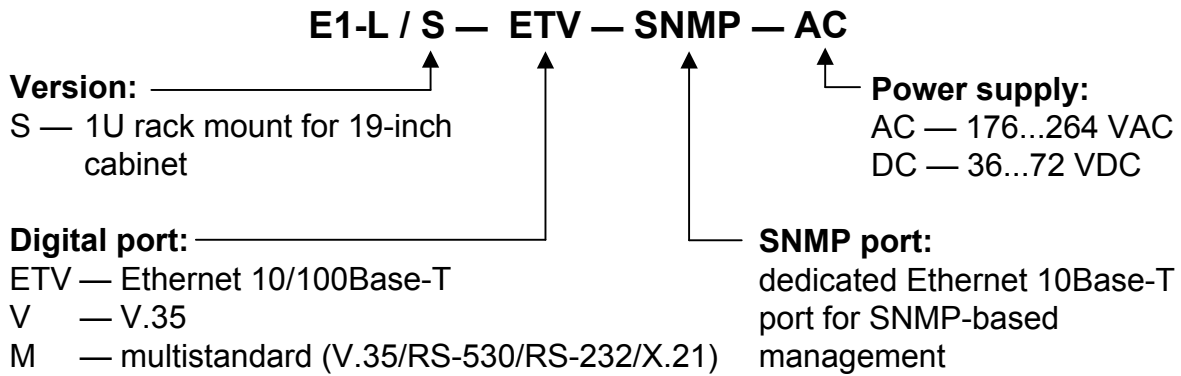
1.2. Operation

Data accepted from the digital interface port is placed into selected timeslots of the E1 stream for output through the E1 link. Unused timeslots are filled by ones.

Data retrieved from the selected timeslots of the E1 stream accepted from the E1 link is transferred to the output of the digital interface port. Unused timeslots are ignored.

User may choose to disable E1 frame structure. In this case the whole bandwidth of 2048 kbps will be used for data transfer (bit data rate at the digital interface port may be limited if required).

1.3. Ordering Information



1.4. Technical Specifications

E1 Link Interface

Nominal bit rate.....	2048 kbps
Connector.....	RJ-48 (8-wire socket)
Coding	HDB3 or AMI
Framing.....	Framed mode: frame structure in accordance with the ITU-T Recommendation G.704; multiframes: CRC4, CAS (G.704). Unframed mode: transparent stream transmission without framing
Error monitoring.....	Code violation
Frequencies offset adjustment	Controlled slip buffers on input
Transmit timing source	Internal oscillator, E1 receiver, digital interface
Line impedance.....	120 Ohm symmetric (twisted pair)
Receiver signal level	From 0 up to -43 dB
Jitter attenuation	Both in receive and transmit path, up to 120 UIpp attenuation
Surge protection.....	TVS
Over-current protection	Safety fuse

Digital Port Interface: V.35/RS-530/RS-232/X.21

Data transfer rate.....	from 64 up to 1984 kbps (N x 64 kbps) in framed mode or up to 2048 kbps in unframed mode
Clock options	TXC, RXC, ETC, ERC
Modem control signals	DTR, DSR, CTS, RTS, CD
Connector type	Multistandard interface (V.35 / RS-530 / RS-232 / X.21): HDB44 (female); V.35 interface: M-34 (female); RS-530/RS-232 interface: DB25 (female); X.21 interface: DB15 (female)

Digital Port Interface: Ethernet 10/100Base-T

Interface type	IEEE 802.3 10BASE-T/100BASE-T(100BASE-TX)
Connector type	RJ-45 (8-wire socket)
Bandwidth	from 64 up to 1984 kbps (N x 64 kbps) in framed mode or up to 2048 kbps in unframed mode
Operating mode.....	100 Mbps, full duplex; 100 Mbps, half duplex; 10 Mbps, full duplex; 10 Mbps, half duplex; autonegotiation
MAC address table size.....	15000 MAC addresses
Maximum packet size	4224 bytes, including MAC level header
Protocol.....	Transparent or Cisco-HDLC bridging IEEE protocol, selectable automatically

Alarm Port Interface

Connector type	DB-9 (female)
Relay contact current	Up to 600 mA
Relay contact voltage.....	Up to 110 VDC or up to 125 VAC

Console Port Interface

Interface type, connector type	RS-232 DCE, DB-9 (female)
--------------------------------------	---------------------------

Data transfer mode.....	Asynchronous, 9 600 baud, 8 bits per character, 1 stop bit, no parity
Modem signals.....	DTR, DSR, CTS, RTS, CD

SNMP Port Interface

Interface type	Ethernet 10Base-T
Connector type	RJ-45 (8-wire socket)

Diagnostic Modes

Loopbacks.....	Local on E1 link, remote on E1 link, local on digital port (excluding Ethernet 10/100Base-T port)
Error rate measurement.....	Built-in BER tester
Control.....	Via the console port, from a remote device, via the SNMP port

Mechanical Characteristics

Construction	1U high rack mount metal enclosure for 19-inch cabinet
Dimensions	444 mm × 262 mm × 44 mm
Weight.....	3.4 kg

Power Requirements

AC supply voltage.....	176–264 VAC, 50 Hz (for the «-AC» version)
DC supply voltage	36–72 VDC (for the «-DC» version)
Max. power consumption.....	20 VA

Environmental Characteristics

Temperature	0 to 50 °C
Relative humidity	Up to 80%, non-condensing

Section 2. Installation

2.1. Site Requirements

The device should be grounded properly before powering on. Grounding screw located on the front panel of the device.

Allow at least 10 cm clearance at the front of the device for cable connections.

The ambient operating temperature should be 0 to 50 °C, at a relative humidity of up to 80%, non-condensing.

2.2. Delivered Items

E1-L/S unit of a version as ordered.....	1 piece
Bracket for mounting the E1-L/S unit in a 19-inch cabinet	2 pieces
Self-adhesive foot for the E1-L/S unit.....	4 pieces
Power cable (for the «-AC» version).....	1 piece
3-screw removable terminal block (for the «-DC» version).....	1 piece
This Installation and Operating manual	1 piece.

2.3. Connections

All connectors are located on the front panel of the modem.

Figure below shows the front panel of the device ordered with Ethernet V.35 / RS-530 / RS-232 / X.21 digital port and identifies connector locations:

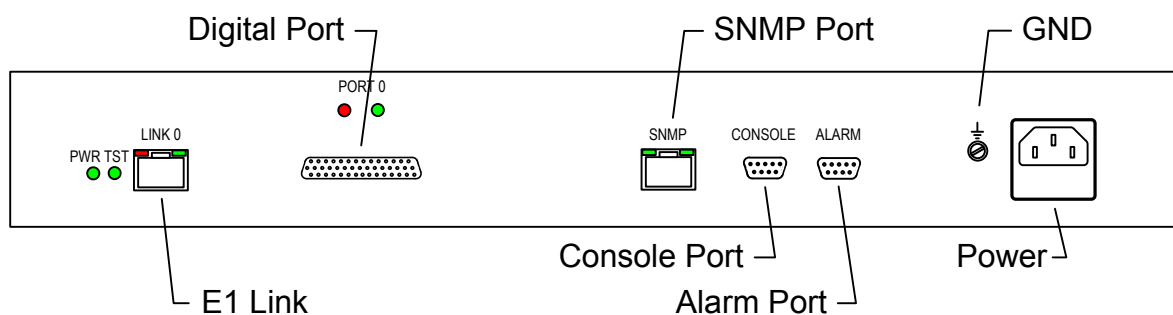
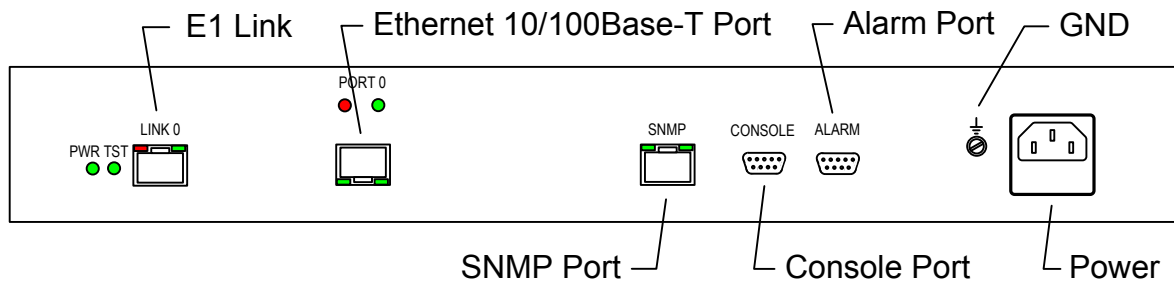


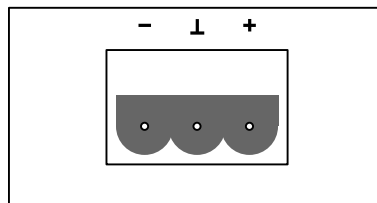
Figure below shows the front panel of the device ordered with Ethernet 10/100Base-T digital port and identifies connector locations:



Power Connection

AC power (for the «-AC» version) is supplied to the device through a standard AC power connector (IEC 320 C14). The power cable is supplied with the device.

The DC power connector (for the «-DC» version) is shown below (view from the front of the device):



The 3-screw removable terminal block is supplied with the device.

Ground Terminal

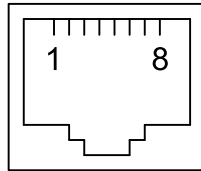
An M4 grounding screw is located on front panel of the device.



Before powering the device on and before connecting other cables, the modem unit must be properly grounded.

E1 Link Connector

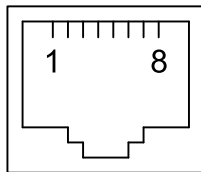
An RJ-48 socket is provided for the E1 link cable connection:



- 1 - input A
- 2 - input B
- 3 - unused
- 4 - output A
- 5 - output B
- 6 - unused
- 7 - unused
- 8 - unused

Ethernet 10/100Base-T Port and SNMP Port Connectors

An RJ-45 sockets are provided for connection cables to Ethernet 10/100Base-T port and SNMP port:

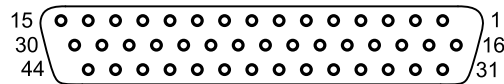


- 1 - transmit +
- 2 - transmit -
- 3 - receive +
- 4 - unused
- 5 - unused
- 6 - receive -
- 7 - unused
- 8 - unused

Use straight cable to connect the device to Ethernet hub.

Digital Port (V.35 / RS-530 / RS-232 / X.21) Connector

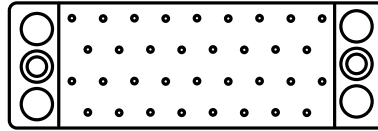
The HDB44 (female) connector is provided for connection cable to the multistandard («-M» version) digital interface port:



Pin.	V.35	RS-530	RS-232	X.21
10	TXD-a	TXD-a	TXD	Transmit(A)
25	TXD-b	TXD-b	—	Transmit(B)
8	RXD-a	RXD-a	RXD	Receive(A)
9	RXD-b	RXD-b	—	Receive(B)
6	ETC-a	ETC-a	ETC	ETC(A)
7	ETC-b	ETC-b	—	ETC(B)
2	TXC-a	TXC-a	TXC	SigTiming(A)
3	TXC-b	TXC-b	—	SigTiming(B)
5	RXC-a	RXC-a	RXC	—
4	RXC-b	RXC-b	—	—
17	ERC-a	ERC-a	ERC	—
18	ERC-b	ERC-b	—	—
14	RTS	RTS-a	RTS	Control(A)
29	—	RTS-b	—	Control(B)
11	DTR	DTR-a	DTR	—
26	—	DTR-b	—	—
13	DSR	DSR-a	DSR	—
28	—	DSR-b	—	—
15	CTS	CTS-a	CTS	—
30	—	CTS-b	—	—
12	CD	CD-a	CD	Indication(A)
27	—	CD-b	—	Indication(B)
1,16	GND	GND	GND	GND
31	SEL-0*	SEL-0*	SEL-0*	SEL-0
33	SEL-1	SEL-1*	SEL-1	SEL-1*
35	SEL-2	SEL-2	SEL-2*	SEL-2
37	SEL-3	SEL-3*	SEL-3*	SEL-3*
39	SEL-4*	SEL-4	SEL-4	SEL-4
41	SEL-5*	SEL-5	SEL-5	SEL-5
43	SEL-6*	SEL-6	SEL-6	SEL-6
32	DCE	DCE	DCE	DCE
* - Connect to GND				

Digital Port (V.35) Connector

The M-34 (female) connector is provided for connection cable to the V.35 («-V» version) digital interface port:



Pin	Signal	Direction
P	TD-a	Input
S	TD-b	Input
R	RD-a	Output
T	RD-b	Output
U	ET-a	Input
W	ET-b	Input
Y	TC-a	Output
AA	TC-b	Output
BB	ERC-a	Input
Z	ERC-b	Input
V	RC-a	Output
X	RC-b	Output
C	RTS	Input
H	DTR	Input
E	DSR	Output
D	CTS	Output
F	DCD	Output
A	CGND	—
B	SGND	—

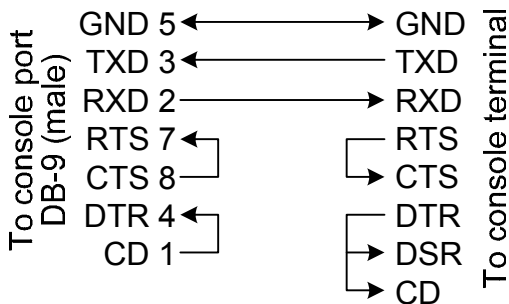
Console Port Connector

Device operation may be controlled from the ASCII terminal (the console). DB-9 (female) connector is used to connect the console. Console port has a standard RS-232 DCE interface and should be used in asynchronous operating mode, 9600 bps rate, 8 bit per character, 1 stop bit, no parity. Use straight cable to connect to the computer COM port.



An RTS signal (for flow control) from the console terminal is required for proper operation.

The following cable wiring schemes are recommended:



Cable without modem control

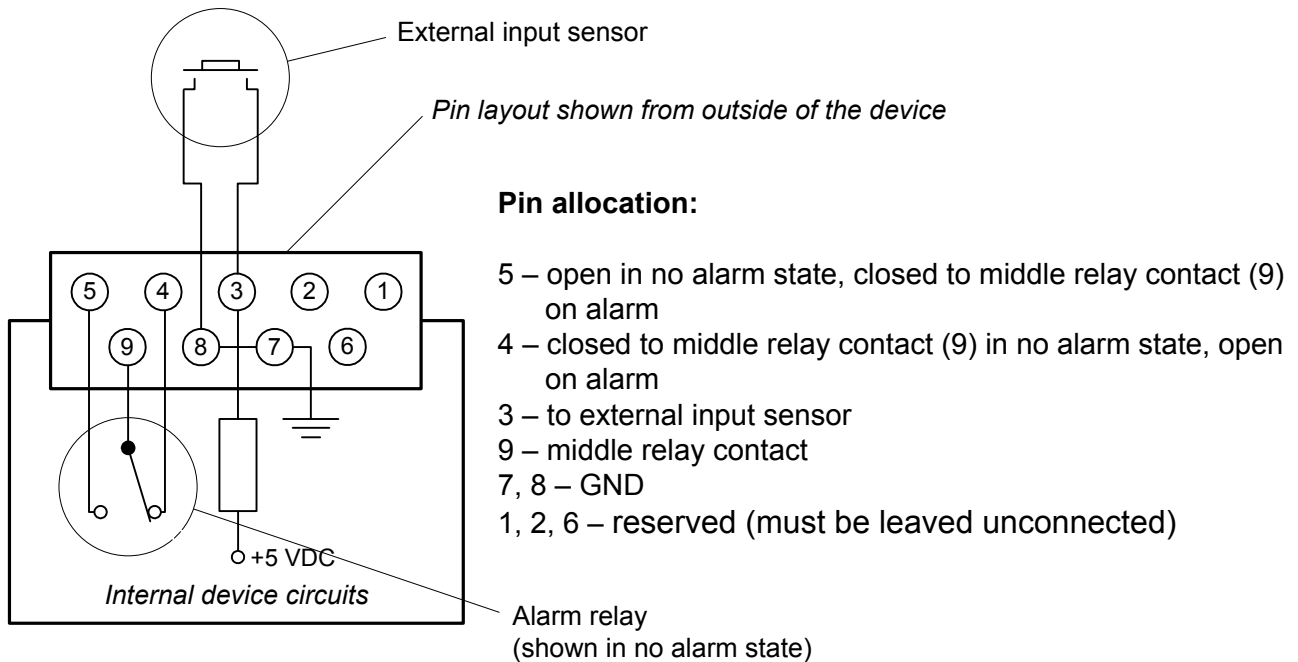


Cable with modem control

Use straight cable to connect to the COM port of the computer.

Alarm Port Connector

A DB-9 (female) connector is used for alarm port connection:



 The external input sensor connected to the modem must be isolated from other electrical circuits. Failure to comply with this requirement may lead to modem breakdown.

Chapter 3. Operation

3.1. Front Panel Indicators

The indicators displaying the unit status are located on the front panel. The list of indicators and their purpose are shown in the table. The reference numbers on the figures correspond to the numbers in the table.

Figure below shows the front panel of the device ordered with V.35 / RS-530 / RS-232 / X.21 digital port and identifies indicator locations:

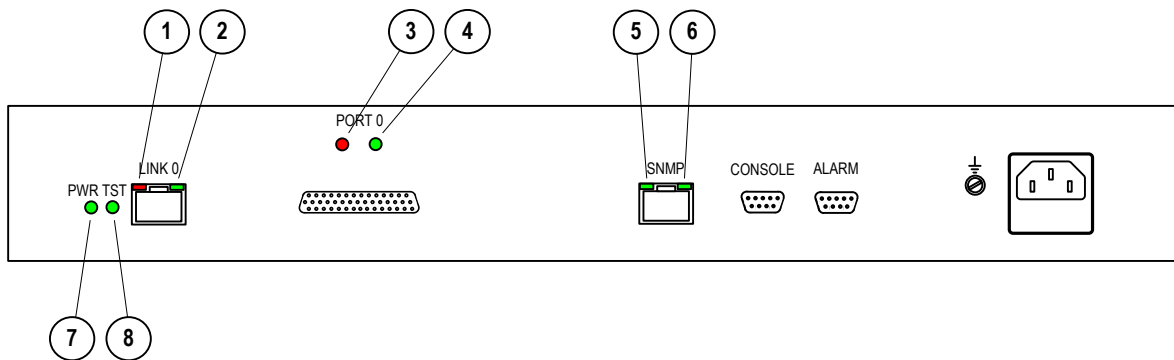
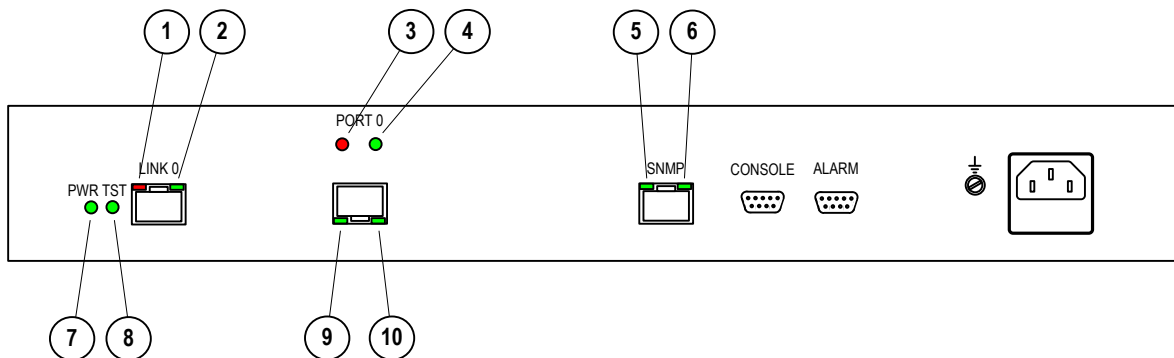


Figure below shows the front panel of the device ordered with Ethernet 10/100Base-T digital port and identifies indicator locations:



No.	Indicator	Color	Function/Light State
1	LINK LOS	Red	<p>E1 link errors:</p> <ul style="list-style-type: none"> • ON if E1 link input carrier is lost or if there is no frame or multiframe synchronization; • ON when the AIS signal is being received at the input of the E1 link; • flashes in case of HDB3 coding errors of the E1 link; • flashes if there is no frame synchronization at the remote device (bit A of the timeslot 0).
2	LINK STATE	Green	<p>E1 link operating mode:</p> <ul style="list-style-type: none"> • ON on normal operation; • flashes if local loopback is enabled; • flashes in double flashes if remote loopback is enabled.
3	PORT LOS	Red	<p>V.35 / RS-530 / RS-232 / X.21 digital port error (ON or flashes):</p> <ul style="list-style-type: none"> • RTS line is off; • ETC line is off (if external synchronization is selected) • FIFO data buffer error; • coding error (when operating not at maximum data rate). <p>Ethernet 10/100Base-T port error:</p> <ul style="list-style-type: none"> • ON if cable is not connected to the 10/100Base-T Ethernet port; • flashes if packet with wrong checksum received or packet is lost because of insufficient throughput of the channel.
4	PORT STATE	Green	<p>V.35 / RS-530 / RS-232 / X.21 digital port state:</p> <ul style="list-style-type: none"> • ON if RTS line is on; • flashes if digital loopback is enabled. <p>Ethernet 10/100Base-T port state:</p> <ul style="list-style-type: none"> • ON if Ethernet cable is connected; • OFF if Ethernet cable is not connected.
5	SNMP EACT	Green	Flashes during Ethernet 10Base-T data transmission via the SNMP port.

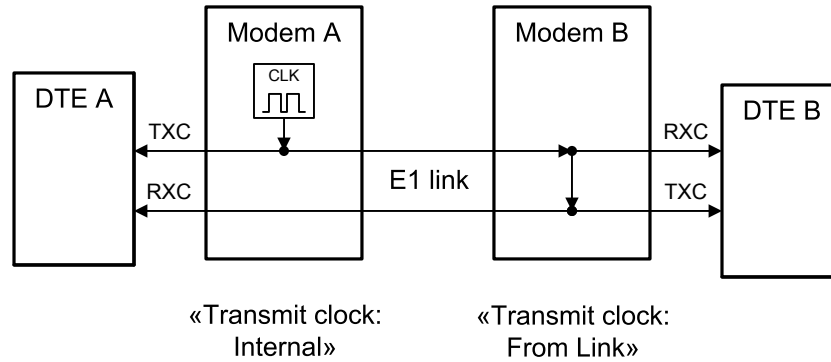
No.	Indicator	Color	Function/Light State
6	SNMP ELINK	Green	ON if Ethernet 10Base-T cable is connected to the SNMP port.
7	PWR	Green	On when power is switched on.
8	TST	Green/ red	Test mode indicator. ON if BER tester is enabled: <ul style="list-style-type: none"> • lights green if no errors detected; • lights red on errors.
9	ETH FAST	Green	Ethernet 10/100Base-T port mode: <ul style="list-style-type: none"> • ON in the 100Base-T mode; • OFF in 10Base-T mode.
10	ETH LINK	Green	Ethernet 10/100Base-T port state: <ul style="list-style-type: none"> • ON if cable is connected; • flashes during Ethernet data transmission is in progress.

During the normal operation, the indicators must be in the following states:

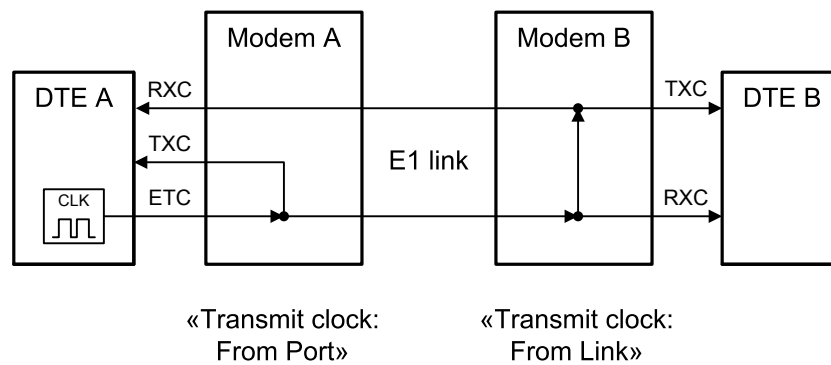
Indicator	Color	Light State at Normal Operating Condition
PWR	Green	ON
TST	Green/red	OFF
LINK LOS	Red	Off
LINK STATE	Green	ON
PORT LOS	Red	OFF
PORT STATE	Green	ON
ETH FAST	Green	ON in 100 Mbps mode of the Ethernet 10/100Base-T port.
ETH LINK	Green	ON if cable is connected to the Ethernet 10/100Base-T port; flashes during Ethernet data transmission is in progress.
SNMP EACT	Green	Flashes during Ethernet 10Base-T data transmission via the SNMP port.
SNMP ELINK	Green	ON if Ethernet 10Base-T cable is connected to the SNMP port.

3.2. Synchronization Modes

For E1 channel, the single clock source is used as a rule. The source of clock signal may be an internal oscillator of any E1 modem or external clock signal of any DTE. Examples are shown in figures below.



Single clock source from modem A



Single clock source from DTE A

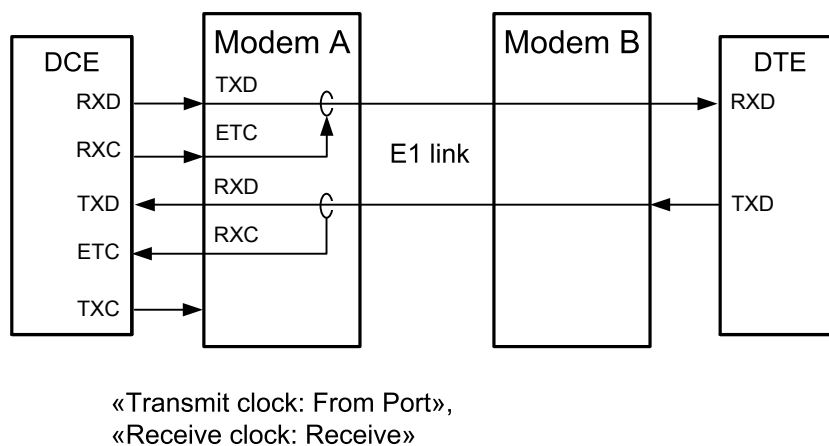
DTE Emulation

There are two input clock sources for receive and transmit data (ERC and ETC) used by connecting the E1-L device to DCE via RS-232, V.35, RS-530 digital port in synchronous mode.

If internal oscillator of the E1-L modem is chosen as a clock source then conformance of output phase jitter and frequency accuracy to the appropriate ITU-T recommendations is guaranteed by the design the E1-L modem. If clock signal is originated from the device connected to the digital port of the E1-L modem («Transmit clock: From Port» mode) then it is necessary to ensure that its parameters are in conformance with the ITU-T recommendations.

DTE emulation, external transmit clocks

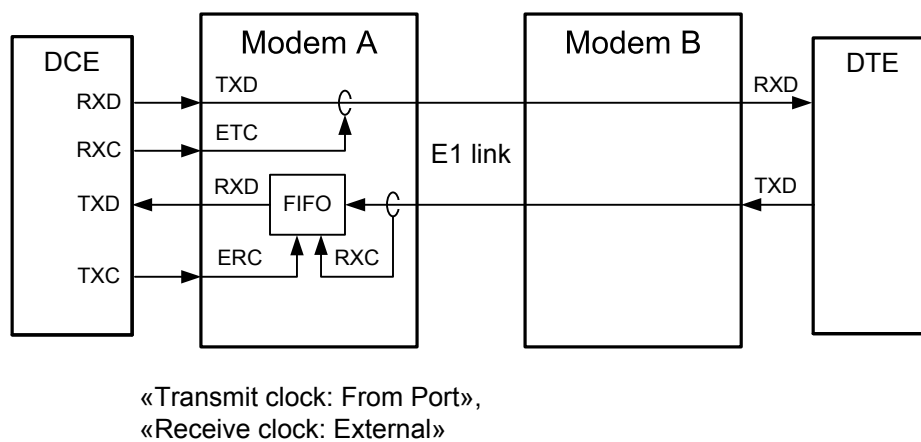
The «Receive clock: Receive» mode is used when connecting to DCE devices receiving external clock signal (ETC) from the digital port. In this case the pair of devices connected by digital ports (RS-232, V.35, RS-530, X.21) translates the clock frequency transparently.



DTE emulation mode with external transmit clocks

DTE emulation, external transmit and receive clocks

The «Receive clock: External» mode is used when connecting to DCE devices which do not support an external synchronization from a digital port (RS-232, V.35, RS-530). In this case E1-L device receives data at the digital port using clock signal from ETC input line and transmits data using clock signal from ERC input line. The phase equalization of data at the RXD output line of the digital port for ERC clocks is executed using FIFO buffer. To ensure the correct buffer operation (with no overruns/underruns) the frequency of clocks received from the line should equal to the frequency at ERC input. This condition is met when the data link has a single clock source. Otherwise, recurrent errors will occur due to overruns or underruns of FIFO buffer. The rate of such errors depends on the difference between the two frequencies.



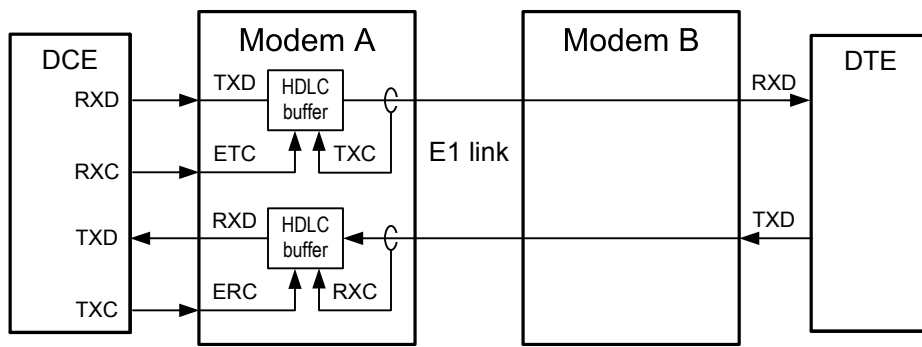
DTE emulation mode with external transmit and receive clocks

If the data transmitted in the link is in HDLC format you can compensate the frequencies offset enabling HDLC buffer mode.

HDLC Buffer Mode

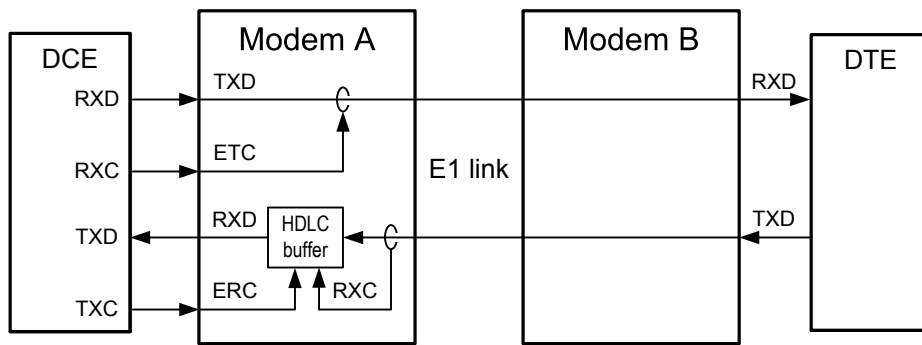
HDLS buffer mode is used when connecting digital port to the arbitrary DCE device (e.g., device which uses independent clock source or uses separate transmit and receive clock sources). In this case two external clock sources are used for ETC and ERC input lines of the digital port. The TXC and RXC output lines are disabled.

The receive and transmit data paths contain intermediate data buffers for converting the clock frequency by inserting or deleting HDLC flags. The data stream must contain HDLC packets with the number of delimiting flags not less than 2. Maximum available difference of frequencies is about 200 ppm.



«Transmit clock: Internal» or
 «Transmit clock: From Link»,
 «HDLC buffer: Enabled»

DTE emulation mode with HDLC buffers enabled,
 independent clock sources



«Transmit clock: From Port»,
 «HDLC buffer: Enabled»

DTE emulation mode with HDLC buffer enabled,
 single clock source

3.3. Alarm Conditions

The device is equipped with an alarm interface.

The alarm relay is used for turning on an external alarm unit (e.g. bell, buzzer, control panel indicator, etc.) during an emergency situation.

The alarm relay is used in «dry contacts» mode (that is, its contacts are isolated from any electrical circuits of the device).

Alarm conditions are as follows:

- Power failure.
- Loss of signal or there is no frame synchronization in the E1 link.
- No cable connected to the digital port (RS-232, V.35, RS-530, X.21 or Ethernet 10/100Base-T).
- Alarm signal generated by the external input sensor at the remote device is being received.

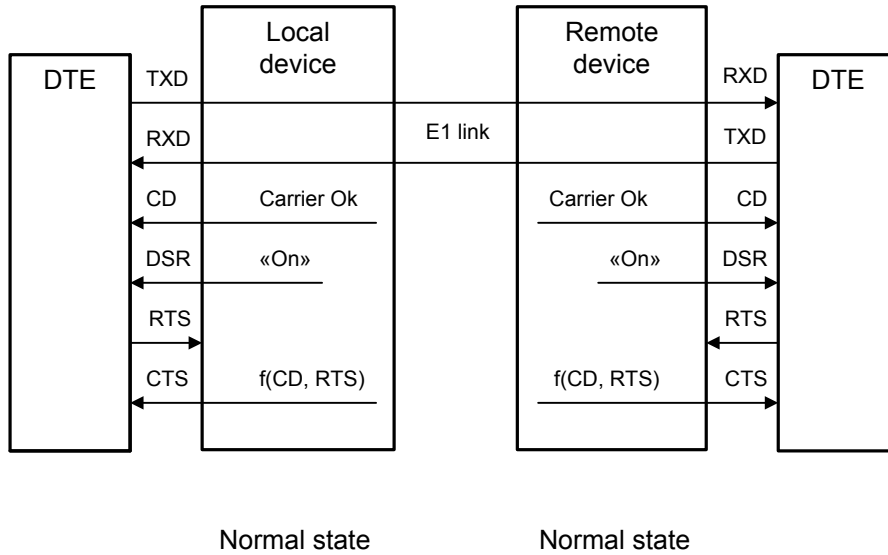
The external input sensor has two modes of generation of the alarm signal to be transmitted to the remote device: closing-sensitive (set by default) and opening-sensitive. The mode may be changed from the console (see para. «*Sensor input*» *Command* at the chapter 4.7 «*Configure*» *Menu* below).

If the device is installed in a non-serviced room, the input sensor contacts may be driven, for example, by remote climate sensors, door opening sensors, etc.

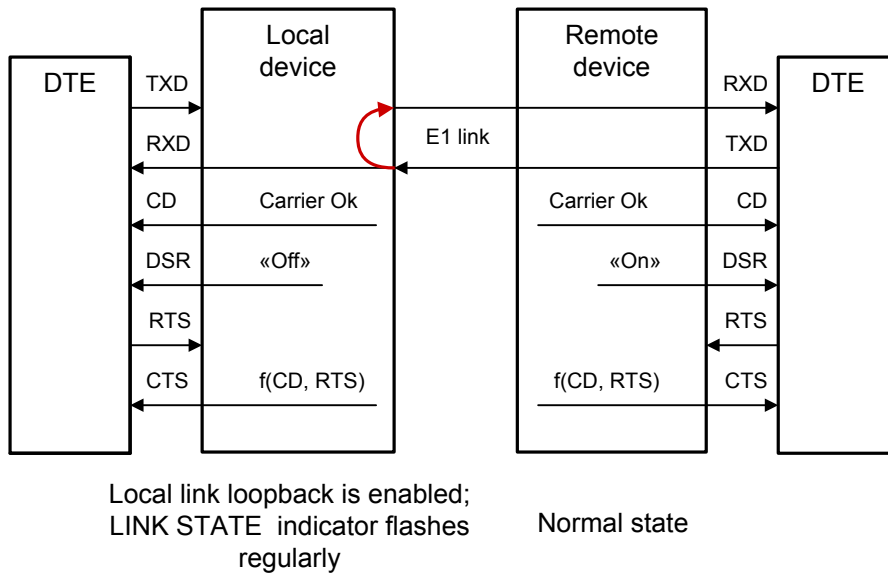
For more details please see the schematics at para. *Alarm Port Connector* of the chapter 2.3. *Connections* above.

3.4. Loopbacks

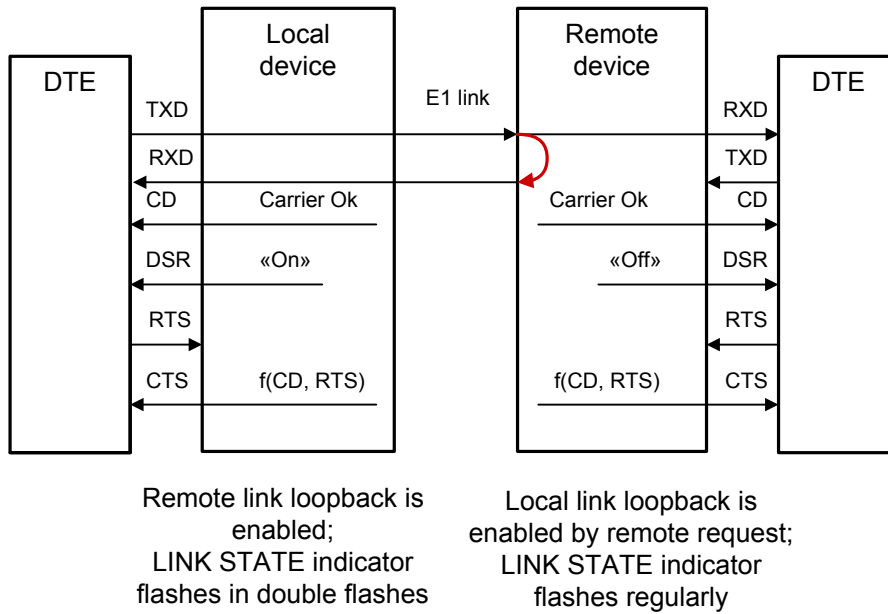
Normal State (No Loopbacks Enabled)



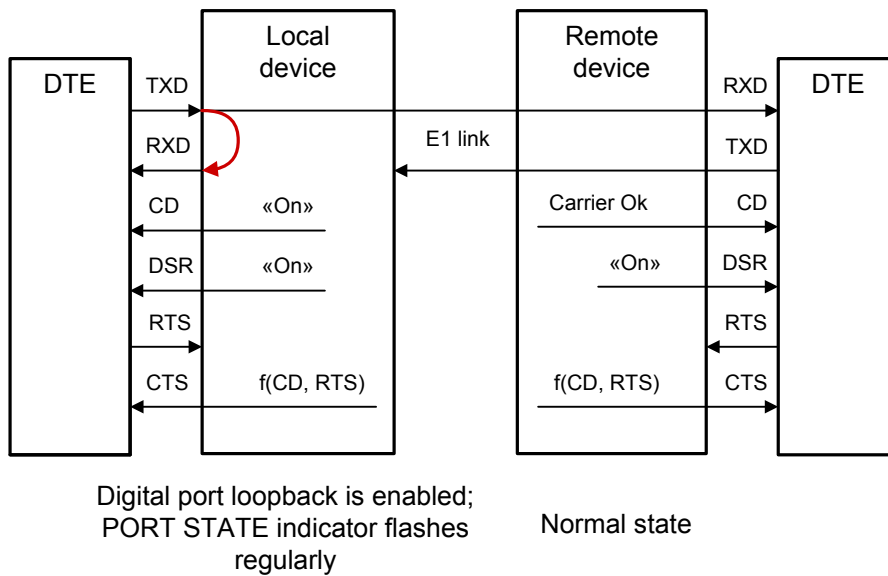
Local Link Loopback



Remote Link Loopback



Digital Port Loopback



3.5. Built-in BER Tester

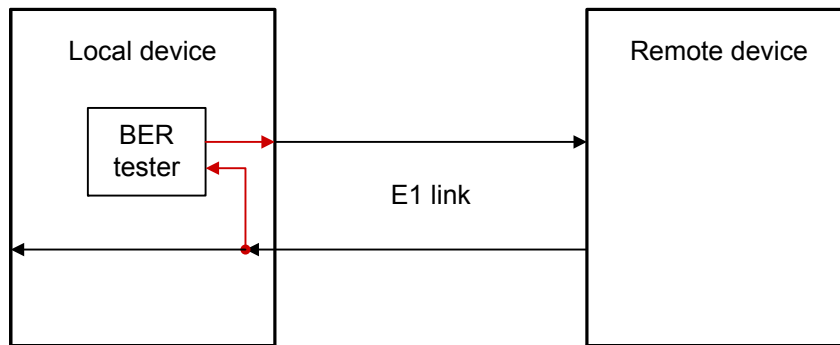
The device is equipped with a built-in BER tester, which allows to measure the error rates in the E1 link. Measurements are performed using pseudo-random code according to the ITU-T Recommendation O.151 (pattern length equals to $2^{15}-1=32767$ bits),

or pseudo-random code with pattern length of $2^3-1=7$ bits (i.e., using pseudo-random 7 bit code sequence), or fixed 8 bit code sequence selected by user. The BER tester is controlled from the console (see the «Test» Menu section).

The operation of the BER tester assumes that the data transmitted to the link is identical to the data received from the link.

Warning

The «Test pattern not detected» diagnostic message is displayed on the console if BER tester is enabled on local device (and transmits test sequence to the E1 link) and there is no same data receiving from the E1 link. This situation is shown on a figure below:



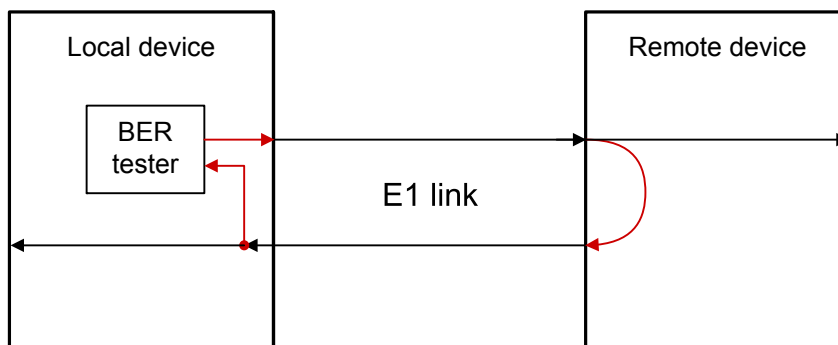
BER tester is enabled. No test data is being received from E1 link. «Test pattern not detected» message is displayed on console. TST indicator lights red

Normal state

Shown below are two useful examples of the BER tester application.

Link Testing: Remote Link Loopback Enabled

A BER tester is enabled on the local device, and an E1 link loopback is enabled on the remote device:

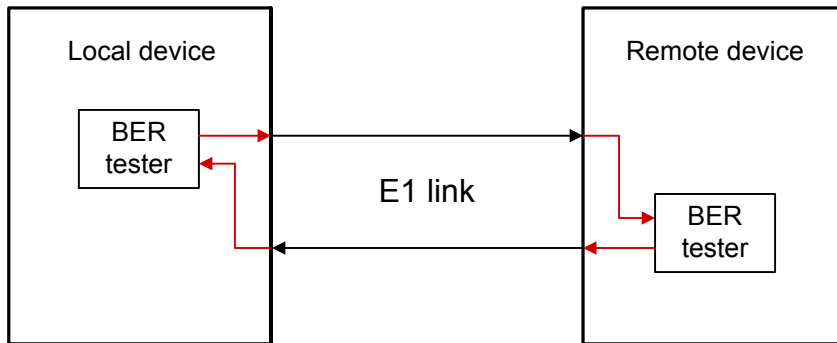


BER tester is enabled. TST indicator lights green in case of no errors detected and red on errors

E1 link loopback is enabled

Link Testing: Two Ber Testers Enabled Against Each Other

When there is a need to test the E1 link separately in opposite directions, BERTs at both ends of the link may be enabled simultaneously:



BER tester is enabled. Indicator TST lights green in case of no errors detected and red on errors

BER tester is enabled. Indicator TST lights green in case of no errors detected and red on errors

Section 4. Control From the Console

4.1. Upper Level Menu

The console interface is designed as a simple hierarchical menu. To select a command, you must enter its number. To return to the upper level menu, you must press <Enter> (or <Return>). An example of the main menu is given in the figure below:

```

Cronyx E1-L /ETV-SNMP revision F, 13/04/2005

Mode: Normal, Sensor=Open
Link: Framed, Sync=Int, High gain, HDB3, Use16, CRC4=Gen, Mon=Sa4
Port: 1984 kbps, 100Base-T, Full Duplex
      1 3 5 7 9 1 3 5 7 9 1 3 5 7 9 1
Port timeslots: #####

  1. Statistics
  2. Event counters
  3. Loopback...
  4. Test...
  5. Configure...
  6. Link remote login
  0. Reset

Command: _

```

The upper line of the screen shows the device model identification, revision code and firmware date.

The «Mode» line below on the screen shows the alarm state of the device and the state of the external input sensor:

- «Normal» or «Alarm» – normal (no alarm) state or alarm state;
- «Sensor= ...» – state of contacts of the external input sensor: «Open» or «Closed»; if «Sensor input: Alarm on open» is configured then the state of contacts will be followed by the message «Alarm on open».

For more information please see the «Alarm Conditions» chapter.

The «Link» line below on screen shows the mode of E1 link:

- «Framed» or «Unframed»;
- «Sync= ...» – the transmit clock source for the E1 link:
 - «Int» – Internal, from the internal oscillator;
 - «Link» – From Link, from the E1 link receiver;
 - «Port» – From Port, from the digital port.

Clock source from the Ethernet port is not available.

- «High gain» or «Low gain» – receive sensitivity: high (-43 dB) or low (-12 dB); receive sensitivity influences the E1 link length;
- «HDB3» or «AMI» – line coding format.

In «Framed» mode there are additional fields shown on screen:

- «Use16» or «Skip16» – timeslot 16 assignment mode:
«Use16» – enable the data transmission via timeslot 16;
«Skip16» – the timeslot cannot be used for data transmission (is used for transmitting of standard CAS clock signals in accordance with the ITU-T Recommendation G.704).
- «CRC4= ...» – the CRC4 mode of checking of multiframe alignment:
«Gen» – Generate, CRC4 is generated and transmitted, but no checking is performed on receive;
«Check» – Generate and check, CRC4 is generated, transmitted, and checking is performed on receive (CRC4 error will cause the loss of synchronization state);
«Off» – Disabled, CRC4 checking disabled;
- «Mon=...» – selection of the E1 frame bit to be used for the monitoring channel implementation (for service data exchange between the two interconnected E1-L devices). Possible values are as follows: «Sa4», «Sa5», «Sa6», «Sa7» or «Sa8», – bit S_{a4} , S_{a5} , S_{a6} , S_{a7} or S_{a8} of the timeslot 0 is used (usage of these bits is in accordance with the ITU-T Recommendation G.704) or the value in the «TsMbN» form, where M is for the timeslot no. (from 1 up to 31), and N is for the bit no. (from 1 up to 8) of the timeslot selected; «Off» – monitoring channel disabled.

The preceding fields may be followed by additional information as follows:

- «Loop» or «Remote loop» – indication of local or remote E1 link loopback enabled;
- «Test» – this indication is present if the BER tester for the E1 link is enabled.

The «Port» line below on screen shows the operational mode of the digital port.

For V.35/RS-530/RS-232/X.21 interfaces the fields as follows will be displayed:

- «... kbps» or «... baud» – data rate in synchronous (sync) or asynchronous (async) mode, kbps or baud accordingly;
- «8n1», «8p1» or «7p1» – character transmission format (for the asynchronous mode only);
- «CTS=...» – mode of the CTS signal generation;
- «Cable ...» – type of the cable attached, e.g.: «Cable direct V.35». If no cable attached then the «No cable» message will be displayed. Cables may be of type «direct» or «cross» (direct – for connection to DTE; cross – for connection to DCE) and V.35, RS-530, RS-232 or X.21.

Next line on screen shows the state of interface signal lines (DTR, RTS, ETC, ERC, DSR, CTS, CD, TXC, RXC in synchronous mode or DTR, RTS, DSR, CTS, CD in asynchronous mode).

For more information please refer to the «Port» Menu chapter.

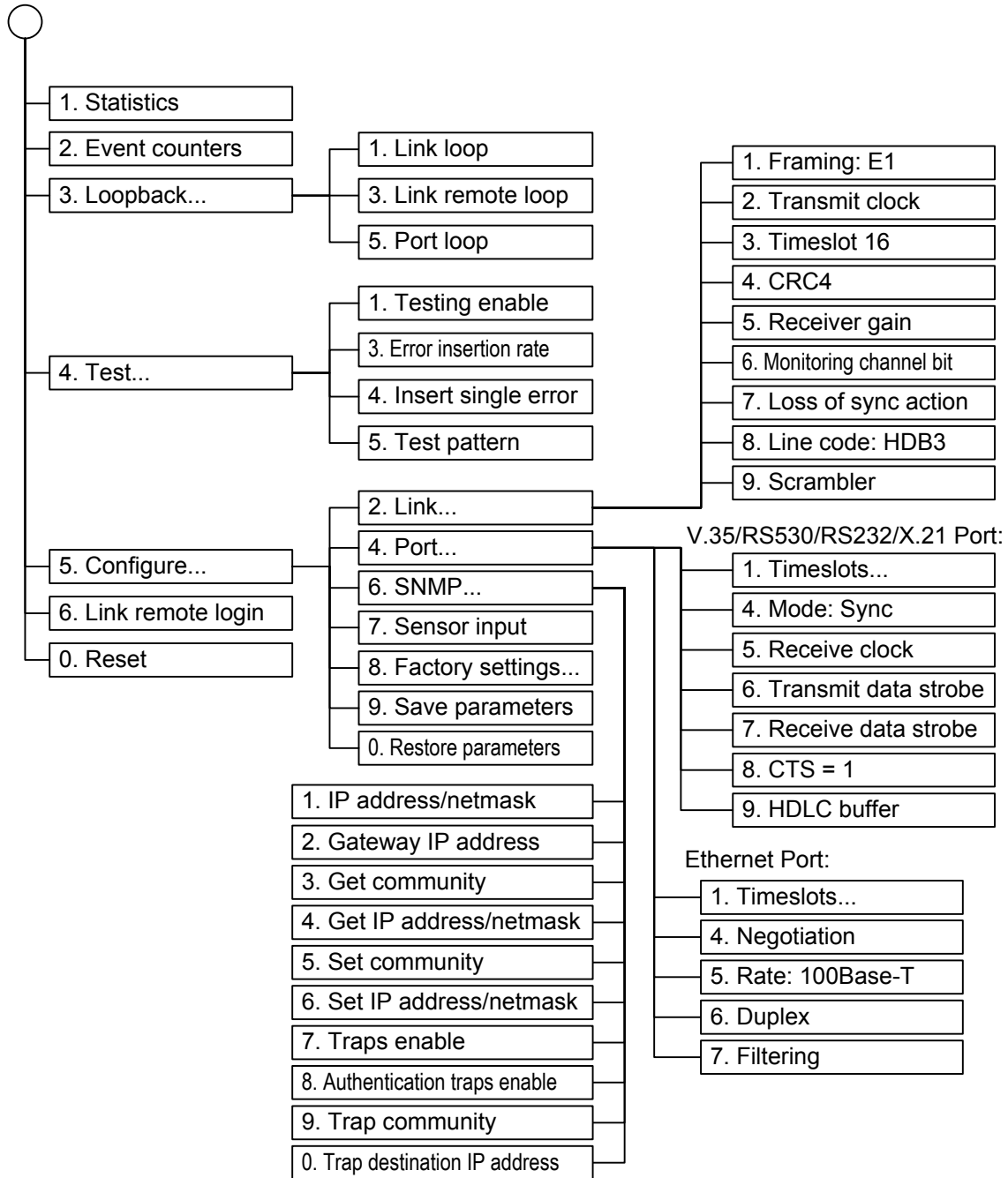
For the Ethernet 10/100Base-T port the fields as follows will be displayed:

- «... kbps» – Ethernet bandwidth;
- «100Base-T» or «10Base-T» – Ethernet port mode: 100 Mbps (100BASE-TX) or 10 Mbps, twisted pair;
- «Full duplex» or «Half duplex» – duplex mode.

If no cable attached then the «No cable» message will be displayed.

Next to these lines on screen there is the «Port timeslots» line showing the timeslot 1 up to 31 assignments. Presence of the «#» symbol indicates that the given timeslot is used for transmission of the digital port data. Unassigned timeslots are marked by dots. When in «Skip16» mode, timeslot 16 is reserved for CAS transmission and is marked by the «*» symbol.

4.2. Menu Structure



4.3. «Statistics» Command

The «Statistics» screen shows local and remote E1 link status and statistics counters values of the E1 link and local port.

```

Statistics: Session #4, 0 days, 0:28:50

Mode: Normal, Sensor=Open
Link: Framed, Sync=Int, High gain, HDB3, Use16, CRC4=Gen, Mon=Sa4
Port: 1984 kbps, 100Base-T, Full Duplex
      1 3 5 7 9 1 3 5 7 9 1 3 5 7 9 1
Port timeslots: #####

          -----Err.seconds-----
Link:      BPV      Receive Data   Event   Status
remote:    0        0         0       0       ok
Port:      -        -         0       0       ok

C - clear counters, R - refresh mode, any key to break....

```

The information on the screen is refreshed every two seconds. To toggle refresh style between overlapping and redraw, press «R» (in the overlapping mode, the screen will not be cleared before displaying new information). To clear the local device statistics counters, press «C». Press any other key to return to the upper level menu.

The «Statistics» line on screen contains the current session number and time (days, hours: minutes:seconds). The session number is incremented after each restart of the device. Session time is the time from last modem restart (by powering on or using the «Reset» command).

The «Mode» line shows the operating mode and the state of the device (see the «Upper level menu» section for more detail on Mode and State).

The information located in the top part of the screen has been detailed in the «Upper Level Menu» section above.

This common information on screen is followed by lines entitled as «Link» and «Port» showing states of the channels of the local device and associated statistics counters. Next to the «Link» line the line entitled as «remote» for the remote E1 link information may be shown (if this information is available).

The «BPV» column shows numbers of bipolar violations (for E1 link only);

Statistics counters columns shown under the subtitle «Err. seconds» (errored seconds) shows times in seconds during which various error conditions have been encountered. These are as follows:

- «Receive» – for errored states of the E1 link: LOS, LOF, AIS, LOMF;
- «Data» – for E1 link: CRC errors (in «Framed» mode) or code violations (in «Un-

framed» mode);

for the V.35/RS-530/RS-232/X.21 port: loss of ETC synchronization;

for the Ethernet 10/100Base-T port: packets checksum errors or loss of packets because of insufficient throughput of the channel.

- «Event» – for the E1 link: overruns or underruns of controlled slip buffers; for the V.35/RS-530/RS-232/X.21 port: FIFO data errors; for the Ethernet 10/100Base-T port: collisions.

The Status column shows channels state as a set of flags.

The flags available for the E1 link are as follows:

- «Ok» – normal state, frame synchronization is Ok.
- «LOS» – loss of signal.
- «LOF» – loss of frame synchronization.
- «SLIP» – controlled slip.
- «AIS» – alarm indication signal (the «all ones» code) is being received.
- «LOMF» – loss of CAS or CRC4 multiframe synchronization.
- FARLOF – loss of frame synchronization at the remote device.
- «AIS16» – signalling alarm indication is being received (alarm indication signal received in timeslot 16).
- «CRCE» – CRC4 error.
- «RDMA» – remote alarm (the A bit of the timeslot 0).
- «Test Ok» – BER tester is enabled, no errors detected.
- «Test Error» – BER tester is enabled, there are errors.

The flags available for the digital port are as follows:

- «Ok» – normal state.
- «No carrier» – loss of carrier.
- «No cable» – no cable connected.
- «No DTR» – DTR line is off (for the V.35/RS-530/RS-232/X.21 port only).
- «Passive» – the port is disabled because of loss of signal or loss of frame synchronization in the E1 link.

4.4. «Event counters» Command

Use «Event counters» command to get more detailed information about counters:

```
Alive: 0 days, 0:03:58 since last counter clear

Link counters

0 - counter of HDB3 encoding violations
0 - total HDB3 encoding violations

0 - receive errored seconds
0 - frame alignment signal errors

0 - seconds with CRC4 errors or unframed encoding violations
0 - total CRC4 errors (lights LERR)
0 - total unframed encoding violations (lights LERR)

0 - seconds with slip events
0 - total slip full events (lights LERR)
0 - total slip empty events (lights LERR)

Press any key to continue...
```

The E1 link counters are as follows:

- counter of HDB3 encoding violations — number of HDB3 encoding violations (16 bit counter with saturation).
- total HDB3 encoding violations — total number of code violation (32 bit cycling counter).
- receive errored seconds — time in seconds during which loss of signal or loss of frame/multiframe synchronization have been encountered in E1 link.
- frame alignment signal errors — number of frame synchronization errors (FAS).
- seconds with CRC4 errors or unframed encoding violations — time in seconds during which CRC4 errors or code violations have been encountered (for the Unframed mode).
- total CRC4 errors — total number of CRC4 errors.
- total unframed encoding violations — total number of (for the Unframed mode).
- seconds with slip events — time in seconds during which slip events have been encountered.
- total slip full events — total number of overflows of the slip buffer.
- total slip empty events — total number of underflows of the slip buffer.

Port counters

```
0 - seconds with ETC errors
0 - counter of ETC errors (lights SER LOS)

0 - seconds with FIFO errors
0 - transmit FIFO overflows (lights SER LOS)
0 - transmit FIFO underflows (lights SER LOS)
0 - receive FIFO overflows (lights SER LOS)
0 - receive FIFO underflows (lights SER LOS)

0 - seconds with HDLC events
0 - transmitter HDLC flag insertions
0 - transmitter HDLC flag deletions
0 - receiver HDLC flag insertions
0 - receiver HDLC flag deletions
```

Press any key to continue...

The V.35 / RS-530 / RS-232 / X.21 digital port counters are as follows:

- seconds with ETC errors — time in seconds during which ETC synchronization errors have been encountered.
- counter of ETC errors – ETC synchronization errors counter.
- seconds with FIFO errors – time in seconds during which data buffers errors have been encountered.
- transmit FIFO overflows – number of overflows of the transmitter data buffer.
- transmit FIFO underflows – number of underflows of the transmitter data buffer.
- receive FIFO overflows – number of overflows of the receiver data buffer.
- receive FIFO underflows – number of underflows of the receiver data buffer.
- seconds with HDLC events – time in seconds during which flag deletions or inserts in the HDLC buffer of the receiver or transmitter have been encountered.
- transmitter HDLC flag insertions – number of flag insertions in the HDLC buffer of the transmitter.
- transmitter HDLC flag deletions – number of flag deletions in the HDLC buffer of the transmitter.
- receiver HDLC flag insertions – number of flag insertions in the HDLC buffer of the receiver.
- receiver HDLC flag deletions – number of flag deletions in the HDLC buffer of the receiver.

Port counters

```
0 - seconds with receive errors
0 - counter of Ethernet errors (lights ETH LOS)

0 - seconds with collisions
0 - counter of collisions

0 - counter of watchdog resets

Press any key to continue...
```

The Ethernet 10/100Base-T port counters are as follows:

- seconds with receive errors — time in seconds during which data receive errors have been encountered.
- counter of Ethernet errors — Ethernet errors counter.
- seconds with collisions — time in seconds during which collisions have been encountered.
- counter of collisions — number of Ethernet collisions.
- counter of watchdog resets — number of resets of the bridge watchdog.

4.5. «Loopback» Menu

«Loopback» menu is used for loopbacks control:

Loopback

```
1. Link loop - disabled
3. Link remote loop - disabled
5. Port loop - disabled
```

Command: _

The following loopbacks are implemented:

- «**Link loop**» – local E1 link loopback. Data received from the optic link are fed back.
- «**Link remote loop**» – remote E1 link loopback. The request to enable the loopback on the remote device is transmitted towards the E1 link.
- «**Port loop**» – digital port loopback.

The loopback modes are not saved in the non-volatile memory.

4.6. «Test» Menu

«Test» menu is used to control the operation of BER tester:

Link Bit Error Test

```
Time total: 00:00:23
  Sync loss: 00:00:01
Bit errors: 0
Error rate: 0.0
```

1. Testing: Enabled
3. Error insertion rate: No errors inserted
4. Insert single error
5. Test pattern: 2E15-1 (O.151)

<C> - clear errors counter, <R> - refresh mode, <Enter> - exit

To clear the statistics counters, press «C». To toggle refresh style between overlapping and redraw, press «R» (the information on the screen is refreshed every two seconds; in the overlapping mode, the screen will not be cleared before displaying new information). To return to the upper level menu, press <Enter> (or <Return>).

The «**Testing**» command enables or disables the test data sequence generation.

The «**Error insertion rate**» command selects the error insertion rate, from 10^{-7} up to 10^{-1} errors per bit, or disables error insertion (when disabled the «No errors inserted» message will be printed in place of the error insertion rate value).

The «**Insert single error**» command inserts a single error.

The «**Test pattern**» command allows to select the test pattern:

- «2E15-1 (O.151)» – pseudo-random test pattern based on polinom of the length of $2^{15}-1=32767$ bit (in accordance to the ITU-T Recommendation O.151).
- «2E3-1» – polinom of the length of $2^3-1=7$ bits (i.e., constant 7 bit pattern).
- «Binary» – constant 8 bit code (in this case the additional field «**Binary test code: ...**» for binary code entering will be displayed).

Test results information is displayed in the following lines:

- «Time total» – total time of testing.
- «Sync loss» – the time during which the test pattern synchronization loss has been detected.
- «Bit errors» – data error counter.
- «Error rate» – error rate in the received data, 10^{-8} up to 10^{-1} , or «Test pattern not de-

ected» if the test pattern is not detected in the received data.
BER tester modes are not saved in the nonvolatile memory.

4.7. «Configure» Menu

The «Configure» menu is used to set modem operating modes:

Configure

2. Link...
4. Port...
6. SNMP...
7. Sensor input: Alarm on closed
8. Factory settings...
9. Save parameters
0. Restore parameters

Command: _

«Link» Menu

The «Link» menu is used to set the E1 link operating mode:

Link

1. Framing: E1
2. Transmit clock: Internal
3. Timeslot 16: Use
4. Crc4: Generate
5. Receiver gain: High
6. Monitoring channel bit: Sa4
7. Loss of sync action: Remote Alarm
8. Line code: HDB3
9. Scrambler: Disabled

Command: _

The «**Framing**» command sets the framing mode:

- «E1» – use of the frame structure according to the ITU-T Recommendation G.704.
- «Unframed» – no frame structure used.

The «**Transmit clock**» command sets the E1 link transmit clock source:

- «Internal» – from internal oscillator.
- «From Link» – from the E1 link.
- «From Port» – from the ETC line of the digital port.

The «**Timeslot 16**» command sets the timeslot 16 assignment mode (in «Framing: E1» mode only):

- «Use» – use timeslot 16 for data transmission.
- «Skip» – use timeslot 16 for generation of standard CAS signals.

Timeslot 16 can be used for generation of standard CAS clock signals and signal bits (abcd=1111, xyxx=1011) in which case the timeslot cannot be used for data transmission.

The «**Crc4**» command sets the check of multiframe alignment on CRC4 mode (in «Framing: E1» mode only):

- «Generate» – generate CRC4 multiframe alignment using the S_i bit of the timeslot 0, but don't check it.
- «Generate and check» – generate CRC4 multiframe alignment and check its presence on input. Loss of the CRC4 multiframe alignment will cause the loss of synchronization on remote device.
- «Disabled» – set the S_i bit to 1.

The «**Receiver gain**» command sets the receiver gain of the E1 link:

- «Low» – low gain (12 dB);
- «High» – high gain (43 dB).

The «**Monitoring channel bit**» command sets the bit to be used for monitoring channel (in «Framing: E1» mode only). Monitoring channel is used for the remote device control and statistics data transmission. By default, the S_{a4} bit of the timeslot 0 is used for monitoring channel in accordance with the ITU-T Recommendation G.704. It's possible to select any bit of any timeslot other than timeslot 0 for monitoring channel.

The «**Auto remote loopback**» command enables or disables the ability of automatic loopback activation by request from the remote device (in «Framing: Unframed» mode only).

The «**Loss of sync action**» command sets the type of response to a loss of E1 link synchronization:

- «AIS» – in case of loss of signal or loss of frame synchronization AIS («blue code») is transmitted to the port.
- «Remote Alarm» – set bit A of the timeslot 0.

The «**Line code**» command toggles the line code mode between HDB3 and AMI.

The «**Scrambler**» command enables or disables the scrambler. The scrambler is used to eliminate long sequences of zeroes and ones in G.703 output signal.

«Port» Menu for V.35 / RS-530 / RS-232 / X.21 Digital Port

The «Port» menu sets the modes of the digital port. For the V.35 / RS-530 / RS-232 / X.21 port the following parameters should be set:

Port

1. Timeslots...
4. Mode: Sync
5. Receive clock: Receive
6. Transmit data strobe: Normal (data valid on falling edge)
7. Receive data strobe: Normal (data valid on falling edge)
8. HDLC buffer: Disabled
9. CTS = 1

Command: _

The «Timeslots» command assigns timeslots of the data port (in «Framing: E1» mode only).

The «CTS» command selects one of the four rules of generating of the CTS output line state: «1», «RTS», «CD» or «RTS*CD».

Synchronous Mode

In the synchronous («Mode: Sync») mode the following parameters should be set:

- «Receive clock» - input clock source of the digital port.
- «Transmit data strobe» – TXC line inversion;
- «Receive data strobe» – RXC line inversion;
- «HDLC buffer» – enable or disable the HDLC buffer.

The «Receive clock» command sets the input clock source of the digital port: from the E1 link («Receive»), from external clock signal (ETC) of the digital port or from ERC external clock signal («External»). External clock source is used when connecting to DCE devices which do not support an external synchronization from a digital port (RS-232, V.35, RS-530). In this case the device transmits data using clock signal from ERC input line. The phase equalization of data at the RXD output line of the digital port for ERC clocks is executed using FIFO buffer. To ensure the correct buffer operation (with no overruns/underruns) the frequency of clocks received from the line should equal to the frequency at ERC input. This condition is met when the data link has a single clock source. Otherwise, recurrent errors will occur due to overruns or underruns of FIFO buffer. The rate of such errors depends on the difference between the two frequencies.

When «Internal» or «From Link» synchronization mode is used, data signal TXD is delayed in relation to TXC clock. Summary delay is formed by cable delay and digital interfaces delay of modem and connected device. As a result of this delay errors can oc-

cur at some data rates. There are several ways to solve the problem:

- inverting the transmit clock signal (TXC) at the device connected to the modem;
- changing the length of the cable;
- swapping the TXC-a and TXC-b lines at one of the interface cable connectors;
- setting inversion of the TxC signal.

The same problem may achieve by using external receive clock (ERC) signal. The methods of the problem solving are the same:

- changing the length of the cable;
- swapping the ERC-a and ERC-b lines at one of the interface cable connectors;
- setting inversion of the ERC signal.

To set the clock signals inversion there are commands as follows:

- «**Transmit data strobe**» – strobing the data transmitted: «Normal (data valid on falling edge)» or «Inverted (data valid on rising edge)».
- «**Receive data strobe**» – strobing the data received: «Normal (data valid on falling edge)» or «Inverted (data valid on rising edge)».

The «**HDLC buffer**» command controls the HDLC buffer operation: «Enabled» or «Disabled».

Asynchronous Mode

In the asynchronous mode («**Mode: Async**») the following parameters should be configured:

```
...
4. Mode: Async
5. Baud rate: 115200
6. Char format: 8n1
...

Command: _
```

- «**Baud rate**»: «115200», «57600», «38400», «19200», «9600», «4800», «2400», «1200»;
- «**Char format**» – the character transmission format is set by the 3-character abbreviation for the parameters as follows:
 - 1) number of data bits;
 - 2) parity bit: «p» - even or odd parity, «n» - no parity;
 - 3) number of stop bits. Possible combinations are as follows: «8n1», «8p1», «7p1».

«Port» Menu for Ethernet 10/100Base-T Port

The «Port» menu sets the modes of the Ethernet port operation:

Port 1

1. Timeslots...
4. Negotiation: Manual
5. Rate: 100Base-T
6. Duplex: Half
7. Filtering: Enabled

Command: _

The «**Timeslots**» command allocates the data port timeslots (in «Framing: E1» mode only).

The «**Negotiation**» command selects the «Rate» and «Duplex» parameters setting mode: «Automatic» or «Manual».

The «**Rate**» command sets the Ethernet port mode: «100Base-T» or «10Base-T» (available in «Negotiation: Manual» mode only).

The «**Duplex**» command sets the duplex mode: «Full» or «Half» (available in «Negotiation: Manual» mode only).

The «**Filtering**» command sets the packet filtering mode: «Enabled» or «Disabled».

«SNMP» Menu

The «SNMP» menu is used for setting network IP addresses and SNMP protocol parameters:

SNMP

Mode: Normal; Sensor=Open
Link: Ok
MAC address: 00-09-94-ff-ff-ff

1. IP address/netmask: 144.206.181.187 / 24
2. Gateway IP address: 144.206.181.254
3. Get community: public
4. Get IP address/netmask: 144.206.181.0 / 24
5. Set community: cronyx
6. Set IP address/netmask: 144.206.181.0 / 24
7. Traps: Enabled
8. Authentication traps: Disabled
9. Trap community: alert
0. Trap destination IP address: 144.206.181.72

Command: _

The following parameters should be set for the operation of the SNMP port:

- IP address/netmask – the IP address of the Ethernet port, and the length of the netmask.
- Gateway IP address – the IP address of the routing gateway.

The following parameters must be set for managing the device over the SNMP protocol:

- Get community – information query access password.
- Get IP address/netmask – the IP address and the netmask length for the restriction of information query access.
- Set community – access password for parameter setting.
- Set IP address/netmask – the IP address and the netmask length for the restriction of access to parameter setting.
- Traps – enable/disable sending SNMP traps (events reports).
- Authentication traps – enable/disable sending traps about unauthorized access attempts.
- Trap community – password for sending traps.
- Trap destination IP address – the destination IP address where to send traps to.

«Sensor input» Command

The «Sensor input» command toggles the input alarm contacts mode. The external sensor has two operating modes: «Alarm on closed» – closing-sensitive (default), and «Alarm on open» – opening-sensitive. In the «Alarm on closed» mode the remote device goes into the alarm status when the contacts are closed. (See the 3.3. «Alarm Conditions» section for more details).

«Factory settings» Command

For fast configuring it is available to choose one of the predefined factory settings combinations then tune some of parameters if needed:

Factory settings

1. E1 mode, skip TS16 (CAS framing)
2. E1 mode, use TS16 for data
3. Unframed mode, 2048 kbps

Command: _

The «Factory settings» command does not influence the IP and SNMP parameters settings (see the «SNMP» Menu section).

Settings combinations are as follows:

- «E1 mode, skip TS16 (CAS framing)» – G.704 frame synchronization mode, CAS multiframe alignment will be used:

```
Mode: Normal, Sensor=Open
Link: Framed, Sync=Int, High gain, HDB3, Skip16, CRC4=Gen, Mon=Sa4
Port: 1920 kbps, 100Base-T, Full Duplex
      1 3 5 7 9 1 3 5 7 9 1 3 5 7 9 1
Port timeslots: #####*#####
```

- «E1 mode, use TS16 for data» – G.704 frame synchronization mode, timeslot 16 will be used for data transfer:

```
Mode: Normal, Sensor=Open
Link: Framed, Sync=Int, High gain, HDB3, Use16, CRC4=Gen, Mon=Sa4
Port: 1984 kbps, 100Base-T, Full Duplex
      1 3 5 7 9 1 3 5 7 9 1 3 5 7 9 1
Port timeslots: #####
```

- «Unframed mode, 2048 kbps» – the unframed mode:

```
Mode: Normal, Sensor=Open  
Link: Unframed, Sync=Int, High gain, HDB3  
Port: 2048 kbps, 100Base-T, Full Duplex
```

«Save parameters» Command

When some parameters are modified (or after execution of the «*Factory settings*» command) it's necessary to save their values in the non-volatile memory (NVRAM) of the device by the «*Save parameters*» command. In this case the parameters saved will be restored at the device restart time.

«Restore parameters» Command

If some parameters was modified and the «*Save parameters*» command was not executed then their previous values may be restored from the NVRAM by the «*Restore parameters*» command.

4.8. «Link remote login» Command

The «Link remote login» command allows connecting to the remote device menu. An example of the remote menu is given below. To disable the remote menu, press ^X (Ctrl-X).

```
Remote login...
(Press ^X to exit)

Cronyx E1-L /ETV-SNMP revision F, 13/04/2005

Mode: Normal, Sensor=Open
Link: Framed, Sync=Int, High gain, HDB3, Use16, CRC4=Gen, Mon=Sa4
Port: 1984 kbps, 100Base-T, Full Duplex
      1 3 5 7 9 1 3 5 7 9 1 3 5 7 9 1
Port timeslots: #####

1. Statistics
2. Event counters
4. Test...
5. Configure...
0. Reset

Remote (^X to exit): _
```

In the remote login mode it is possible to monitor the device operating modes, channels state and view values of error statistics counters. The configuring of the device operation parameters is also available.

4.9. «Reset» Command

The «Reset» command causes the modem to reset. The device modes stored in the non-volatile memory (NVRAM) will be in effect after reset.

Section 5. SNMP-based Management

The modem is equipped with an SNMP port. It is possible to view the current device modes, port and link states, local and remote error statistics accessing the device by SNMP.

5.1. SNMP Parameters Setting

The following parameters must be set from the console to provide access to the device over the SNMP protocol:

- IP address/netmask – the IP address of the Ethernet port, and the length of the netmask.
- Gateway IP address – the IP address of the routing gateway.
- Get community – information query access password.
- Get IP address/netmask – the IP address and the netmask length for the restriction of information *query* access.

Information query access is permitted only for the hosts, whose IP addresses equal to the one specified by the «Get IP address» parameter. The higher-order N bits are used for IP address comparison. The value of N is specified by the “Netmask” parameter.

Additional parameters must be specified for access to parameter settings:

- Set community – access password for parameter setting.
- Set IP address/netmask – the IP address and the netmask length for the restriction of access to parameter *setting*.



The access rights to set the parameters must be granted to trusted hosts only.

In case of emergencies, the device is able to send SNMP events reports (traps). The following parameters must be specified to enable this:

- Traps – enable/disable to send SNMP traps.
- Authentication traps – enable/disable to send SNMP traps about unauthorized access attempts.
- Trap community – password for sending SNMP traps.
- Trap destination IP address – the IP address of the recipient of traps sent.

SNMP traps are sent when the following events occur:

- Modem power-on or reset causes the device to send the COLD START trap.
- Unauthorized access attempt over the SNMP protocol – the AUTHENTICATION FAILURE trap.
- Loss of signal or framing on the E1 link – the LINK DOWN trap.

-
- Switch of the E1 link to the normal mode – the LINK UP trap.

5.2. Management Information Blocks (MIBs)

The following management information blocks (MIBs) are implemented in the modem:

- SNMPv2-MIB – a standard management information block, including common system parameters (system), network interfaces (if), the IP protocol (ip, icmp), the UDP protocol (udp), and SNMP protocol statistics (snmp).
- CRONYX-E1XL-MIB – a device-specific management information block for monitoring state of E1 links and data ports.

The CRONYX-E1XL-MIB management information block specification files are available from the www.cronyx.ru web site.

Web: www.cronyx.ru

E-mail: info@cronyx.ru