Teldat Router

SHDSL

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Chapter 1
SHDSL Technology

1. SHDSL

The G.shdsl standard (Single-Pair High-Speed Digital Subscriber Line), ITU G.991.2 recommendation describes a method for data transmission in telecommunications access networks.

Modems designed with this technology permit transmission of data at rates from 192 Kbps up to 2312 Kbps over conventional telephone pairs, partly thanks to the use of TC-PAM (Trellis Coded Pulse Amplitude Modulation) line codification.

G.Shdsl was developed from the xDSL (Digital Subscriber Line) symmetric transmission techniques.

The main characteristics of this technology are as follows:

Digital implementation

G.Shdsl is a purely digital technique. In ADSL, transmission is carried out in a similar way over the voiceband so interferences are not produced. This gives rise to performance problems at high frequencies where a higher attenuation exists in the bandwidth therefore increasing noise sensibility.

G.Shdsl uses a low frequency bandwidth in digital mode with TC-PAM codification which increases transmission speed and allows symmetry.

TC-PAM: Trellis Coded Pulse Amplitude Modulation.

The most relevant advantages of this type of codification include less complex algorithms and less latency required for voice traffic. Each symbol is codified in three bits of payload plus one redundant bit which is introduced for error control purposes. The result is a PAM 16 line code (TC-PAM 16). This type of codification achieves a gain of approximately 5 dB. In order to extract the original information at reception, a Viterbi decoder is used.

In short, this type of codification provides a reach capability of at least 30% more as well as offering an improved spectral compatibility than with the current SDSL implementations (2B1Q codification).

Variable transmission rate.

This is probably one of the main characteristics offered by the G.shdsl standard. SDSL also offers this possibility however the drawback is that the pre-activation process (where the link conditions are negotiated) is not standard but are proprietor processes therefore interoperability is not guaranteed.

The ITU standard for G.shdsl establishes a transmission bandwidth from 192 Kbps up to 2.36 Mbps with 64 Kbps granularity in North America and 8 Kbps in Europe. This possibility of varying the link rate enables the possibility to play with the rate/reach ratio as well as the enabling other forms of negotiation for operators which would not be possible with a fixed rate.

The G.handshake standard (G944.1) is defined to negotiate the link conditions for the pre-activation stage. The existence of this standard guarantees interoperability among all manufacturers. This standard has two operating modes: one terminal tells the remote terminal the link rate or this is negotiated between the two terminals depending on distance and the state of the line.

G.shdsl frame format.

The G.shdsl frame payload consists of 36 B channels each at 64 Kbps plus 7 auxiliary channels (known as Z channels) each at 8 Kbps and an 8 Kbps channel for synchronization, EOC and the bits required for the plesiochronous operation. The bit rate is given by: 8 + 8i + 64n Kbps, n being the B channels and i the Z channels.

The channel architecture enables the possibility to transmit different services and in parallel e.g. a combination of TDM and ATM.

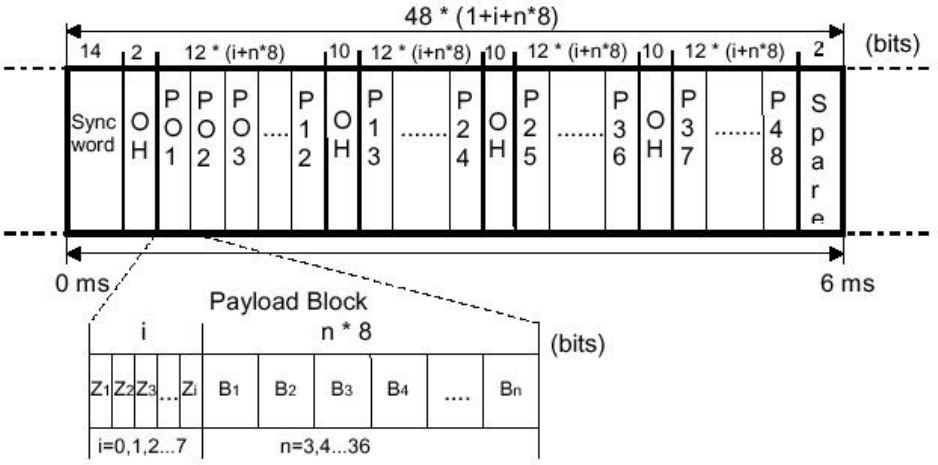


Figure 1. G.shdsl frame format

Chapter 2
Configuring SHDSL

1. Accessing the interface configuration

In order to access the configuration environment, carry out the following steps:

1. At the OPCON (*) prompt, enter PROCESS 4.

2. At the configuration prompt (`Config>`), enter NETWORK xxx**,** where xxx is the ATM interface whose physical layer is G.shdsl.

3. At the ATM interface configuration prompt (`ATM config>`), enter PHY.

4. Once the above steps have been completed, you will be in the G.shdsl physical layer configuration menu for this ATM interface (`SHDSL config>`).

Example:
You can consult the interfaces present in the device through the **LIST DEVICES** command from the configuration prompt.

```
*P 4
Config>LIST DEVICES

 Interface       Con    Type of interface            CSR     CSR2  int
 ethernet0/0     LAN1   Fast Ethernet interface   fa200e00            27
 serial0/0       WAN1   X25                       fa200a00 fa203c00   5e
 serial0/1       WAN2   X25                       fa200a20 fa203d00   5d
 serial0/2       WAN3   X25                       fa200a60 fa203f00   5b
 bri0/0          ISDN1  ISDN Basic Rate Int       fa200a40 fa203e00   5c
 x25-node        ---    Router->Node                     0             0
 atm1/0          SLOT 1 Generic ATM               f0200000            22
Config>
```

The ATM interface physical layer you wish to configure is the atm1/0 (daughter G.shdsl installed in slot 1).

```
Config>NETWORK atm1/0

-- ATM interface configuration --
ATM config>
```

The following commands can be found here:

```
ATM config>?
AAL_CONNECTION
ADD
DISABLE
ENABLE
LIST
PHY
PVC-VCC
EXIT
SET
ATM config>
```

Once located in “ATM config”, enter “PHY” in order to access the physical layer configuration menu, in this case the G.shdsl:

```
ATM config>PHY

--- SHDSL CONFIGURATION ---
SHDSL config>
```

2. Interface Configuration Commands

The G.shdsl configuration commands are described and numerated in this section. All the configuration commands must be introduced at the G.shdsl prompt (`SHDSL config>`).

Command	Functions
? (HELP)	Lists the available commands or their options.
ADVANCED	Permits you to configure the specific G.shdsl physical layer parameters. These configuration options apply to advanced users.
ANNEX	Configures the G.shdsl standard annex type (A or B). This must be the same in both terminals.
LIST	Displays all of the current G.shdsl physical layer configuration.
SPEED	Configures the link speed (Kbps | auto).
TERMINAL	Configures the type of terminal (Central or Remote).
EXIT	Returns to the *ATM Config>* prompt.

The configuration must be saved and the router restarted in order for the new configuration to take effect.

2.1. ? (HELP)

Displays a list of the available commands or their options.

Syntax:

```
SHDSL Config>?
```

Example:

```
SHDSL Config>?
ADVANCED      Configures advanced options
ANNEX         Configures ITU G.991.2 annex (A or B)
LIST          Lists current configuration
SPEED         Configures data rate (Kbps | auto)
TERMINAL      Configures terminal (central or remote)
EXIT
SHDSL Config>
```

2.2. ADVANCED

Permits you to configure specific G.shdsl physical layer parameters. These configuration options are directed to advanced users.

Example:

```
SHDSL Config>ADVANCED ?
AFE_CONFIGURATION      Configures AFE transmit gain
ATM_CONFIGURATION      Configures ATM parameters of SHDSL chipset
MODE_SELECT            Configures preactivation mode
PSD_MASK               Configures bit pump PSD mask
SPEED                  Configures parameters about data rate
SHDSL Config>
```

a) ADVANCED AFE_CONFIGURATION

Permits you to configure the transmission power of the daughter SHDSL AFE (Analog Front End). This parameter can be useful in certain scenarios in order to improve the channel's signal-noise ratio.

Example:

```
SHDSL config>ADVANCED AFE_CONFIGURATION
-1.6dBm      Configures AFE transmit gain to -1.6 dBm
0.0dBm       Configures AFE transmit gain to 0 dBm
1.6dBm       Configures AFE transmit gain to 1.6 dBm
SHDSL config>
```

There are three possible values for the AFE transmission gain, 1.6, 0, 1.6 dBm. The default value is 0 dBm.

b) ATM_CONFIGURATION

Permits you to configure advanced options for ATM data handling.

Example:

```
SHDSL config>ADVANCED ATM_CONFIGURATION
BYTE_ALIGNMENT      Enable or disable byte level alignment for the ATM block
MODE                ATM PHY interface mode (master - slave)
RX_PATH             Determines the receive path connections
TX_PATH             Determines the transmit path connections
SHDSL config>
```

· ADVANCED ATM_CONFIGURATION BYTE_ALIGNMENT

Enables (default) or disables the ATM alignment at the byte level in the ChipSet ATM functional block.

Example:

```
SHDSL Config> ADVANCED ATM_CONFIGURATION BYTE_ALIGNMENT ?
ALIGNED
UNALIGNED
SHDSL Config>
```

· ADVANCED ATM_CONFIGURATION MODE

Configures the ATM functional block in MASTER (default) or SLAVE mode.

Example:

```
SHDSL Config> ADVANCED ATM_CONFIGURATION MODE ?
MASTER
SLAVE
SHDSL Config>
```

· ADVANCED ATM_CONFIGURATION RX_PATH

Configures the internal path at reception. The options are:

- Framer Bypass → The ATM block at reception is directly connected to the DSP interface.
- Framer Aux → The ATM block at reception is connected to the framer auxiliary input. This option is used when data is simultaneously received from the UTOPIA and PCM interfaces.
- T1/E1 Mode → The ATM block at reception is directly connected to the framer PCM interface (detected value).
- General Purpose → The ATM block at reception is directly connected to the framer PCM interface. Additionally the ATM PHY TC block (Transmission Converge) is configured in a general purpose mode.

Example:

```
SHDSL Config> ADVANCED ATM_CONFIGURATION RX_PATH ?
FRAMER_AUX
FRAMER_BYPASS
GENERAL_PURPOSE
T1_E1_MODE
SHDSL Config>
```

· ADVANCED ATM_CONFIGURATION TX_PATH

Configures the internal path in transmission. The options are:

- Framer Bypass → The ATM block in transmission is directly connected to the DSP interface.
- Framer Aux → The ATM block in transmission is connected to the framer auxiliary input. This option is used when data is simultaneously transmitted towards the UTOPIA and PCM interfaces.
- T1/E1 Mode → The ATM block in transmission is directly connected to the framer PCM interface (detected value).
- General Purpose → The ATM block in transmission is directly connected to the framer PCM interface. Additionally the ATM PHY TC block (Transmission Converge) is configured in a general purpose mode.

Example:

```
SHDSL Config> ADVANCED ATM_CONFIGURATION TX_PATH ?
FRAMER_AUX
FRAMER_BYPASS
GENERAL_PURPOSE
T1_E1_MODE
SHDSL Config>
```

c) ADVANCED MODE_SELECT

Permits you to configure which terminal dictates the link conditions.

Example:

```
SHDSL config>ADVANCED MODE_SELECT
HTU-C        HTU-C sends configuration to HTU-R
HTU-R        HTU-R sends configuration to HTU-C
LOCAL        Modem uses local configuration
SHDSL config>
```

HTU-C: The central modem determines the link conditions. The remote terminal receives the configuration that it must adopt during the pre-activation phase (default configuration).

HTU-R: The remote modem determines the link conditions. The central terminal receives the configuration that it must adopt during the pre-activation phase.

LOCAL: Each modem tries to connect using their own configuration, rejecting any other sent to the other end.

So that the link condition negotiation in the pre-activity phase is satisfactory, both ends need to be configured with the same option (HTU-R, HTU-C or LOCAL). In cases of LOCAL, both ends must have the same physical interface configuration.

d) ADVANCED PSD_MASK

Permits you to configure the PSD (Power Spectral Density) mask complying with the G.shdsl standard (ITU G991.2) appendices.
By default this is configured in symmetric mode.
Example:

```
SHDSL config>ADVANCED PSD_MASK
ASYMMETRIC      Sets bit pump PSD mask asymmetric
SYMMETRIC       Sets bit pump PSD mask symmetric
SHDSL config>
```

So that the link conditions negotiation in the preactivation phase is satisfactory, both ends must have the same PSD mask configured.

e) ADVANCED SPEED

Permits you to configure the parameters related to the link speed and with the G.shdsl frame format.
Example:

```
SHDSL Config ADVANCED SPEED ?
AUTO                  Allowable number of Z-channels when auto mode configurated
INTERLEAVE_RATIO      Interleave ratio
MAPPING_FORMAT        Determines either block or interleave mapping
START_PCM             Starting PCM slot
Z_CHANNELS            Number of Z-channels when fixed speed configurated
SHDSL Config>
```

· ADVANCED SPEED AUTO

Those parameters related with the **auto** operating mode (mode where the optimum link rate is automatically determined as regards noise, attenuation, etc.) are configured in this submenu.
Example:

```
SHDSL Config> ADVANCED SPEED AUTO ?
Z_CHANNELS      Allowable number of Z-channels for auto speed
SHDSL Config>
```

· ADVANCED SPEED AUTO Z_CHANNELS

Configures the number of Z channels supported by this terminal when it is in **auto** operating mode. This parameter is ignored when the terminal is operating at a set rate.
In **auto** operating mode, the two terminals negotiate the optimum speed depending on the line conditions and the maximum number of Z channels that are compatible with the configuration of each one of the terminals independently of which one determines the final configuration.
I.e. the terminal that has the least number of supported Z channels configured will be the one that limits the number of Z channels that the link will have.
Example:

```
SHDSL config>ADVANCED SPEED AUTO Z_CHANNELS
Allow 0 Z-channels(Yes/No) [Y]? y
Allow 1 Z-channels(Yes/No) [Y]? y
Allow 2 Z-channels(Yes/No) [Y]? y
Allow 3 Z-channels(Yes/No) [Y]? y
Allow 4 Z-channels(Yes/No) [N]? n
Allow 5 Z-channels(Yes/No) [N]? n
Allow 6 Z-channels(Yes/No) [N]? n
Allow 7 Z-channels(Yes/No) [N]? n
SHDSL config>
```

In this example, we will configure a terminal to support 0, 1, 2 or 3 Z channels, any other configuration being impossible.

· ADVANCED SPEED INTERLEAVE_RATIO

Configures how to select the PCM slots that will be used. A value set to 1 implies all the PCM slots will be used; value equal to 2 implies that the PCM slots will be used alternatively. This will only be applicable when the MAPPING_FORMAT parameter is configured as INTERLEAVE. By default this is set to 1.
This parameter is only applicable when the terminal is configured at a fixed speed.
Example:

```
SHDSL config>ADVANCED SPEED INTERLEAVE_RATIO
Interleave [1-2]:[1]? 1
SHDSL config>
```

· ADVANCED SPEED MAPPING_FORMAT

Configuring this parameter in **block** mode means that all the consecutive PCM slots will be used for transfer. Configuring this parameter in **interleave** mode means that only some determined PCM slots will be used for transfer. In this case those slots determined by **ADVANCED SPEED INTERLEAVE_RATIO** will be selected. The default configuration is BLOCK.
This parameter is only applicable when the terminal is configured at a fixed speed.
Example:

```
SHDSL config>ADVANCED SPEED MAPPING_FORMAT
BLOCK
INTERLEAVE
SHDSL config>
```

· ADVANCED SPEED START_PCM

This parameter indicates the location of the first PCM slot which must be taken into account. Slot 1 is considered by default.
This parameter is only applicable when the terminal is configured at a fixed speed.
Example:

```
SHDSL config>ADVANCED SPEED START_PCM
Start PCM location: [1] 1
SHDSL config>
```

· ADVANCED SPEED Z_CHANNEL

Configures the number of Z channels supported. The default configuration is 0 Z channels.
This parameter is only applicable when the terminal is configured at a fixed speed.
Example:

```
SHDSL config>ADVANCED SPEED Z_CHANNEL
Number of Z-channels [0-3] 0
SHDSL config>
```

2.3. ANNEX

Permits you to configure the type of G.991.2 standard annex (A or B). Annex A is typically defined for North American networks while annex B is defined for European networks. Annex A is configured by default.
Both must be configured with the same type of annex so that the terminal satisfactorily connects with the remote end.

Example:

```
SHDSL config>ANNEX ?
A      ITU G.991.2 annex A
B      ITU G.991.2 annex B
SHDSL config>
```

a) ANNEX A

Configuration complying with G.991.2 Annex A.

Example:

```
SHDSL config>ANNEX A
SHDSL config>
```

b) ANNEX B

Configuration complying with G.991.2 Annex B.

Example:

```
SHDSL config>ANNEX B
SHDSL config>
```

2.4. LIST

Displays the whole of the G.shdsl physical interface configuration.

Example:

```
SHDSL config>LIST ?
INTERFACE_CONFIG
SHDSL config>
```

a) LIST INTERFACE_CONFIG

Example:

```
SHDSL config>LIST INTERFACE_CONFIG

Terminal:                remote
G.shdsl annex:           B
PSD mask:                symmetric
Mode select:             HTU-C configures HTU-R
Data rate:               auto

Fixed speed parameters:
  Number of Z-channels:  0
  Starting PCM slot:     1
  Mapping format:        block
  Interleave ratio:      1

Auto speed parameters:
  Allowed Z-channels:    0, 1, 2, 3, 4, 5, 6, 7
```

```
ATM phy configuration:
  Master/Slave mode:     master
  ATM receive path:      T1/E1 mode
  ATM transmit path:     T1/E1 mode
  ATM byte alignment:    aligned

AFE configuration:
  AFE transmit gain:     -1.6 dBm

SHDSL config>
```

2.5. SPEED

Permits you to configure the link rate.
A 0 value indicates automatic mode (default value), where this is configured at the maximum rate permitted by the line characteristics, within the speeds defined in the G.shdsl standard (192Kbps – 2304Kbps).
You can also configure a proprietary operating mode where the speed rage is defined between 2368Kbps up to 4608Kbps. To select this mode, simply introduce the required speed, with the margins and multiples of 64 Kbps. On configuring this mode, the MODE_SELECT parameter will automatically take the value LOCAL so both ends must have the same speed configured (the central terminal does not configure the remote and vice versa.)
When configuring a speed defined with the G.shdsl standard, the device will return to operate within this and the MODE_SELECT parameter will take the default value (HTU-C).
In central mode, if a value is set, the programmed values must be multiples of 64 Kbps. If the connection cannot carry out the configured rate, (for example, the line characteristics prevent connection at this rate), the device will not try to activate the link at a lower speed, it will simply not establish the link.

Example:

```
SHDSL config>SPEED
Data rate (Kbps | auto = 0) [192-4608]:[0]?0
SHDSL config>
```

2.6. TERMINAL

Permits you to configure the device as central or remote (default value).
Both ends must be configured in different modes (Mandatory), one as central and the other remote.

Example:

```
SHDSL config>TERMINAL ?
CENTRAL      Behave as central terminal
REMOTE       Behave as remote terminal
SHDSL config>
```

a) TERMINAL CENTRAL

Configures the device in central mode.

Example:

```
SHDSL config>TERMINAL CENTRAL
```

b) TERMIAL REMOTE

Configures the device in remote mode.

Example:

```
SHDSL config>TERMINAL REMOTE
```

2.7. EXIT

Returns to the previous menu.
Example:

```
SHDSL config>EXIT
ATM config>
```

2.8. SHOW CONFIG

Below, an example configuration is displayed to show how this is presented through the **SHOW CONFIG** command. In this example no default value is used so that all the configuration commands are presented.

```
SHDSL config>SHOW CONFIG
; Showing Menu and Submenus Configuration ...
; Router ATLAS 2 8 Version 10.0.0

      advanced afe_configuration 1.6dbm
      advanced atm_configuration byte_alignment unaligned
      advanced atm_configuration mode slave
      advanced atm_configuration rx_path general_purpose
      advanced atm_configuration tx_path general_purpose
      advanced mode_select local
      advanced psd_mask asymmetric
      advanced speed auto z_channels  Y N N N N N N N
      advanced speed interleave_ratio 2
      advanced speed mapping_format interleave
      advanced speed start_pcm 2
      advanced speed z_channels 2
      annex b
      speed 192
      terminal central
SHDSL config>LIST INTERFACE_CONFIG

Terminal:                central
G.shdsl annex:           B
PSD mask:                asymmetric
Mode select:             local configuration
Data rate:               192 Kbps

Fixed speed parameters:
  Number of Z-channels:  2
  Starting PCM slot:     2
  Mapping format:        interleave
  Interleave ratio:      2

Auto speed parameters:
  Allowed Z-channels:    0

ATM phy configuration:
  Master/Slave mode:     slave
  ATM receive path:      general purpose
  ATM transmit path:     general purpose
  ATM byte alignment:    unaligned

AFE configuration:
  AFE transmit gain:     1.6 dBm

SHDSL config>
```

Chapter 3
SHDSL Monitoring

1. Accessing the interface monitoring

In order to access the monitoring environment, carry out the following steps:

1. At the OPCON (*) prompt, enter PROCESS 3.
2. At the monitoring prompt (+), enter NETWORK xxx**,** where xxx is the ATM interface whose physical layer is G.shdsl which you wish to monitor.
3. At the ATM interface monitoring prompt (`ATM monitor+`), enter **P**HY
4. Once the above steps have been completed, you will be in the G.shdsl physical layer monitoring menu for this ATM interface (SHDSL Monit+).

Example:
You can check the interfaces present in the device through the CONFIGURATION of gateway command from the monitoring prompt.

```
*PROCESS 3
+CONFIGURATION

Teldat's Router, ATLAS 2 8  S/N: 403/00222
Boot ROM release:
BIOS CODE VERSION: 01.06.00B  Oct 21 2002 08:36:43
  gzip  Oct 11 2002 11:35:27
  io1  Oct 21 2002 08:36:22
  io2  Oct 18 2002 16:41:48
  io3  Oct 21 2002 08:36:22
START FROM FLASH    Watchdog timer Enabled
Software release: 10.0.0 Oct 21 2002 13:56:31
Compiled by    smolina on   SMOLINA2
Hostname:                    Active user:
Date:    Monday, 10/21/02     Time: 18:45:23

Num  Name     Protocol
3    ARP      Address Resolution Protocol
11   SNMP     SNMP

7 interfaces:
Conn   Interface       MAC/Data-Link          Hardware                Status
LAN1   ethernet0/0     Ethernet/IEEE 802.3     Fast Ethernet Interface Up
WAN1   serial0/0       X25                     SCC Serial Line- X25    Down
WAN2   serial0/1       X25                     SCC Serial Line- X25    Down
WAN3   serial0/2       X25                     SCC Serial Line- X25    Down
ISDN1  bri0/0          BRI Net                 ISDN Basic Rate Int     Up
---    x25-node        internal                Router->Node            Up
SLOT 1 atm1/0          ATM                     FireStream              Down
+
```

The ATM interface physical layer you wish to monitor is the atm 1/0 (daughter G.shdsl installed in slot 1):

```
+NETWORK atm1/0

-- ATM/0 Console --
ATM monitor+
```

You can find the following commands:

```
ATM monitor+?
CLEAR
LIST
PHY
EXIT
ATM monitor+
```

Once located in the "ATM monitor" enter "PHY" to access the physical layer monitoring menu, in this case G.shdsl:

```
ATM monitor+PHY
--- SHDSL MONITORIZATION ---
SHDSL Monit+
```

Some monitoring commands are directly sent to the daughter G.shdsl chipset. A case may arise where at the precise moment you are requesting an action from the chipset through one of these commands this may be executing an internal task. Should this occur, a message will appear on the console to inform you (Zipwire busy, command not sent). In this case, simply execute the required command again.

2. Interface Monitoring Commands

The SHDSL interface monitoring commands are described and numerated in this section. All the SHDSL interface monitoring commands must be introduced at the SHDSL prompt (`SHDSL Monit+`).

2.1. CLEAR_STAT

Deletes the internal statistics and counters. Given that the internal counters and statistics refresh every 3 – 4 seconds, the effects of these commands are not immediate (i.e. these take effect on the next refresh).

Example:

```
SHDSL Monit+CLEAR_STAT ?
ALL
OPERATIONAL
DSL_PERFORMANCE
PCM_PERFORMANCE
SYSTEM_PERFORMANCE
HISTORY
ATM_OPERATIONAL
ATM_PERFORMANCE
ATM_CELL
SHDSL Monit+
```

a) CLEAR_STAT ALL

Deletes all the statistics.

Example:

```
SHDSL Monit+CLEAR_STAT ALL
Command sent.
```

b) CLEAR_STAT OPERATIONAL

Deletes the operational statistics.

Example:

```
SHDSL Monit+CLEAR_STAT OPERATIONAL
Command sent.
```

c) CLEAR_STAT DSL_PERFORMACE

Deletes the xDSL interface performance statistics.

Example:

```
SHDSL Monit+CLEAR_STAT DSL_PERFORMACE
Command sent.
```

d) CLEAR_STAT SYSTEM_PERFORMACE

Deletes the system performance statistics.

Example:

```
SHDSL Monit+CLEAR_STAT SYSTEM_PERFORMANCE
Command sent.
```

e) CLEAR_STAT HISTORY

Deletes the interface history.

Example:

```
SHDSL Monit+CLEAR_STAT HISTORY
Command sent.
```

f) CLEAR_ STAT ATM_OPERATIONAL

Deletes the ATM statistics at the operational level.

Example:

```
SHDSL Monit+CLEAR_STAT ATM_OPERATIONAL
Command sent.
```

g) CLEAR_STAT ATM_PERFORMACE

Deletes the ATM statistics at the performance level.

Example:

```
SHDSL Monit+CLEAR_STAT ATM_PERFORMANCE
Command sent.
```

h) CLEAR_STAT ATM_CELL

Deletes the ATM statistics at the cell level.

Example:

```
SHDSL Monit+CLEAR_STAT ATM_CELL
Command sent.
```

2.2. COMMAND

Executes a series of commands that permit interaction with the SHDSL chipset or with the remote end.

Example:

```
SHDSL Monit+COMMAND ?
CLOSE
EOC
LOOPS
OPEN
RESET
TERMINAL
SHDSL Monit+
```

a) COMMAND CLOSE

Sends the command to close the session. Once this command has been sent, the device will not retry a new connection until an OPEN command has been sent.

Example:

```
SHDSL Monit+COMMAND CLOSE
Command sent.
```

b) COMMAND EOC

EOC menus (embedded operations channel). This functionality has been developed complying with the guidelines set out in the G.991.2 (G.shdsl) standard.

The EOC provides a communications channel between two G.shdsl terminals. This permits the exchange of configurations and states.
The device is configured to automatically respond to all petitions requested by the remote terminal in compliance with the standard.

Example:

```
SHDSL Monit+COMMAND EOC ?
FAREND_VERSIONS
FAREND_LOOP
LOOP
VERSION
SHDSL Monit+
```

· COMMAND EOC FAREND_VERSIONS

Displays distinct remote terminal information parameters. You need to have previously executed the COMMAND EOC VERSION command for this. This command updates the previous parameters.

Example:

```
SHDSL Monit+COMMAND EOC FAREND_VERSION

Information about far-end terminal:
SHDSL version:            1
Country ID (Hex):         A0
Vendor software version:  4.0
CLEI:                     0000000000
Vendor model:             Teldat shdsl
Vendor serial:            000000000000
Other vendor information: Zipwire plus

SHDSL Monit+
```

SHDSL version: G.shdsl standard version that the remote terminal complies with.
Country ID: remote terminal manufacturer country code, complying with the ITU T35 standard.
Vendor software version: software version running in the remote terminal.
CLEI: Unit Identification Code.
Vendor model: Information referent to the remote device manufacturer.
Vendor serial: Information referent to the remote device manufacturer.
Other vendor information: Information referent to the remote device manufacturer.

· COMMAND EOC FAREND_LOOP

Displays the loop configured in the remote end. Before consulting the remote end configuration you need to have updated this through the COMMAND EOC LOOP command.

Example:

```
SHDSL Monit+COMMAND EOC FAREND_LOOP

Loop Mode:    Toward network

SHDSL Monit+
```

The possible configuration are:
NO LOOPBACK: the remote terminal has no loop configured.
Toward network: the remote terminal has a loop configured towards the network.
Toward customer: the remote terminal has a loop configured towards the user.
Special: The remote terminal has an MTU loop configured (Maintenance Termination Unit).

· COMMAND EOC LOOP

Provides information on what loop is configured in the remote end as well as how to configure this with a specific loop.

Syntax:

```
SHDSL Monit+COMMAND EOC LOOP ?
CHECK_FAREND_LOOP
EXIT_LOOP
TOWARD_CUSTOMER
TOWARD_NETWORK
SHDSL Monit+
```

CHECK_FAREND_LOOP: checks which loop is configured in the remote end. Monitored with COMMAND EOC FAREND_LOOP.
EXIT_LOOP: Eliminates any loop at the farend.
TOWARD_CUSTOMER: configures a loop towards the user in the remote end. Depending on the end, this may provoke a drop in the line.
TOWARD_NETWORK: configures a loop towards the network in the remote end, i.e. towards our terminal.

Example:

```
SHDSL Monit+COMMAND EOC LOOP TOWARD_NETWORK
Command sent.
SHDSL Monit+
```

· COMMAND EOC VERSION

Consults the firmware and hardware versions of the remote end. In order to monitor this subsequently execute the COMMAND EOC FAREND_VERSION command.

Example:

```
SHDSL Monit+COMMAND EOC VERSION
Command sent.
SHDSL Monit+
```

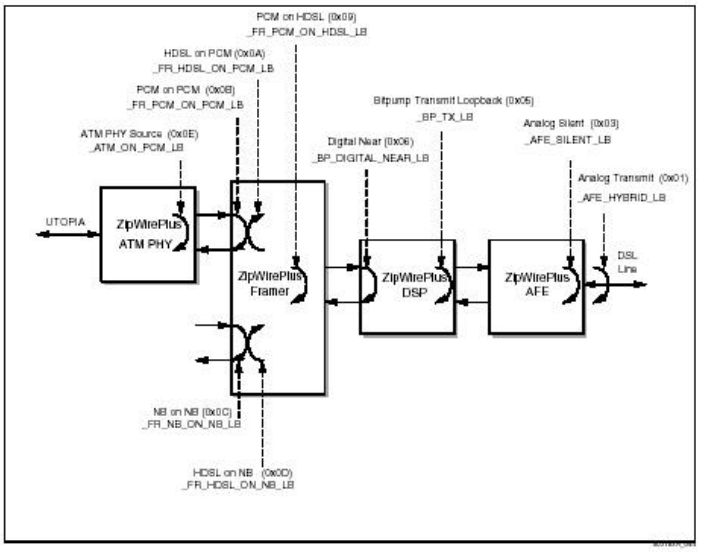
c) COMMAND LOOPS

Implements the test loops at the local end.

Example:

```
SHDSL Monit+COMMAND LOOPS ?
AFE_HYBRID_LB
AFE_SILENT_LB
ATM_SOURCE_LB
BP_TX_LB
BP_DIGITAL_NEAR_LB
FR_PCM_ON_HDSL_LB
FR_HDSL_ON_PCM_LB
FR_PCM_ON_PCM_LB
FR_NB_ON_NB_LB
FR_HDSL_ON_NB_LB
EXIT_LOOP
SHDSL Monit+
```

The localizing of the local loop is carried out complying with the following scheme:



Any configured loop is disabled with EXIT_LOOP command.

> ***When any loop is configured, the physical interface LED on the front panel of the device displays this as dropped (red) although the line is up. This occurs because when there is a loop configured, data cannot be sent or received through this interface.***

d) COMMAND OPEN

Sends the open connection command.

Example:

```
SHDSL Monit+COMMAND OPEN
Command sent.
```

e) COMMAND RESET

Sends the reset command in order to restart the SHDSL interface. The reset can be executed at the Hardware (physically this provokes reloading of the chipset firmware) or Software layer (logical).

Example:

```
SHDSL Monit+COMMAND RESET ?
HARD
SOFT
```

COMMAND RESET HARD

Example:

```
SHDSL Monit+COMMAND RESET HARD
```

COMMAND RESET SOFT

Example:

```
SHDSL Monit+COMMAND RESET SOFT
```

f) COMMAND TERMINAL

Permits you to dynamically modify the device operating mode.
If the command coincides with the actual configuration, the following response will be seen: "Modem already is configured in that mode".

Once the command has been sent, the line will close.
In order for the modem to retry the connection in the new mode, you need to send the OPEN command.

Example:

```
SHDSL Monit+COMMAND TERMINAL ?
REMOTE
CENTRAL
SHDSL Monit+
```

· *COMMAND TERMINAL REMOTE*

Example:

```
SHDSL Monit+COMMAND TERMINAL REMOTE
Command sent.
Line closed.
```

· *COMMAND TERMINAL CENTRAL*

Example:

```
SHDSL Monit+COMMAND TERMINAL CENTRAL
Command sent.
Line closed.
```

2.3. LIST

Displays the interface operation statistics.

Example:

```
SHDSL Monit+LIST ?
COUNTERS_DSL_ATM
GENERAL
LINE
STATUS
SYSTEM_PERFORMANCE
VERSION
SHDSL Monit+
```

a) LIST COUNTERS_DSL_ATM

Lists the statistics at the xDSL and ATM layer.

Example:

```
SHDSL Monit+LIST COUNTERS_DSL_ATM

DSL Counters:
-------------
Loss of sync (LOSW):....0
SEGD errors:............0
CRC errors:.............0
SEGA errors:............0
LOSD errors:............0

ATM counters:
-------------
Loss of cell delineation errors:...0
Corrected HEC errors:..............0
Uncorrected HEC errors:............0

SHDSL Monit+
```

DSL Counters:

- **Loss of sync (LOSW)**: G.Shdsl frame synchronism loss counter.
- **SEGD errors**: Segment error counter. Only applicable when there are regenerators on the connection line.
- **CRC errors**: CRC-6 error counter in the G.Shdsl frame.
- **SEGA errors**: Abnormal segment counter. Only applicable when there are regenerators on the connection line.
- **LOSD errors**: Signal loss counter, carrier.

ATM Counters:

- **Loss of cell delineation errors**: Loss of cell alignment.
- **Corrected HEC errors**: Counter for ATM cells with erroneous HEC which have been corrected.
- **Uncorrected HEC errors**: Counter for ATM cells with erroneous HEC which have not been corrected.

b) LIST GENERAL

General counter list.

Example:

```
SHDSL Monit+LIST GENERAL

General information about modem status:
---------------------------------------
DSP status:
-----------
ASM Status:.............................In progress
Fatal error:............................No
Line Quality:...........................No
Loss of sync word:......................Yes
Loss of signal:.........................Yes
NTR lock:...............................No
Dying gasp:.............................No

Framer status:
--------------
DSL sync state:.........................Out of sync
Tip/Ring reversal:......................No
RFIFO error:............................No
TFIFO error:............................No
TSTUFFerror:............................No
Invalid TNBCLK:.........................No
Invalid TPCLK:..........................No
DPLL locked (only valid in DPLL closed loop mode):Yes

ATM status:
-----------
Parity error:...........................No
Start of cell error:....................No
Overflow TFIFO:.........................No
Overflow RFIFO:.........................No
Bus conflict error:.....................No
Loss of cell delineation:...............No

Internal status:
----------------
Current task:...........................Monitor

SHDSL Monit+
```

DSP Status:

- **ASM Status:** Indicates the connection progress. Values are Idle, Normal Operation, Deactivated and In Progress.
- **Fatal Error:** Fatal error in the Chip

- **Line Quality:** Indicates the line quality as detected by the chip (No: poor line quality, Yes: good line quality).
- **Loss of Sync Word:** Indicates loss of synchronized word.
- **Loss of Signal:** Loss of carrier.
- **NTR Lock:** Indicates if the NTR (Network Timing Reference) clock frequency is enabled or not.
- **Dying gasp**: Indicates loss of power at the other end of the channel.

Framer Status:

- **DSL Sync Status**: DSL synchronization status. Values are Out of sync, Acquiring Sync, In Sync and Losing Sync.
- **Tip Ring Reversal**: Indicates polarity status in the interface (No: Direct, Yes: Inverse)
- **Receive FIFO Errors**: Indicates if errors have been detected in the receive FIFO.
- **Transmit FIFO Errors**: Indicates if errors have been detected in the transmit FIFO.
- **Transmit Stuff Errors**: Indicates if errors have been detected in the pad bits.
- **Invalid TNBCLK**: Invalid transmission clock detected in the NB (narrow band) interface.
- **Invalid TPCLK**: Invalid transmission clock detected in the PCM interface.
- **DPLL Locked**: Indicates if the PLL is synchronized or not. This is only available in cases where the terminal is configured as central.

ATM Status:

- **Parity error**: Indicates if parity errors have been detected.
- **Start of cell error**: Indicates if errors have been detected in the ATM cell header.
- **Overflow TFIFO**: Indicates if there are errors in the FIFO for cells in transmission.
- **Overflow RFIFO**: Indicates if there are errors in the FIFO for cells in reception.
- **Bus conflict error**: Indicates if there are errors in the UTOPIA interface.
- **Loss of cell delineation**: Loss of ATM cell alignment at reception.

Internal Status:

- **Current task**: Current task in the Chipset's control API.

c) LIST LINE

Line interface information.

Example:

```
SH SHDSL Monit+LIST LINE

PCM Timeslots:.............24
DSL Timeslots:.............24
Number of occupied PCM:.....24
Start PCM timeslot:.........1
```

```
Number of Z-channels:.......1
Mapping format:.............0
Interleave ratio:...........1
DSL Data Rate (Kbps):.......1544
Payload Data Rate (Kbps):...1536
Noise margin:...............59.0 dB
Output Power:...............1.6 dBm
Operational Mode:...........ITU G.991.2

SHDSL Monit+
```

PCM Timeslots: Number of PCM channels used in the connection. If the device is configured as TERMINAL REMOTE, these do not have to coincide with the configured value.
DSL Timeslots: Number of DSL channels used in the connection. If the device is configured as TERMINAL REMOTE, these do not have to coincide with the configured value.
Number of occupied PCM: Number of PCM channels used in the data transmission. The maximum value will be the PCM Timeslots.
Start PCM Timeslot: First PCM channel with data. If the device is configured as TERMINAL REMOTE, these do not have to coincide with the configured value.
Number of Z-channels: Number of Z channels used in the connection. If the device is configured as TERMINAL REMOTE, these do not have to coincide with the configured value.
Mapping format: If set to 0 this indicates Block, if it is 1 then this indicates Interleave. When in Block, this is used to consecutively transmit all the channels. If interleave, this is used alternately complying with the value indicated by the interleave ratio parameter. If the device is configured as TERMINAL REMOTE, these do not have to coincide with the configured value.
Interleave ratio: In cases where the Mapping format is Interleave (1), this indicates the channel sequence used for the data.
DSL Data rate: Connection rate on the line.
Payload Data rate: Data transmission rate on the line.
Noise margin: Signal/Noise ratio in dB detected by the chip in the line.
Output Power: Output power used in the transmission in dBm.
Operational Mode: xDSL standard used in the connection.

d) LIST STATUS

Indicates the connection status.
Example:

```
SHDSL Monit+LIST STATUS

Modem status: Not connected.
Loop Mode:    NO_LOOPBACK

SHDSL Monit+
```

e) LIST SYSTEM_PERFORMANCE

Displays information on the system counters.
Example:

```
SHDSL Monit+LIST SYSTEM_PERFORMANCE

Startup attempts:   79
Startup successful: 0
Available seconds:  0 sec
```

```
Total seconds:      4811 sec

SHDSL Monit+
```

Startup attempts: Connection attempts counter.
Startup successful: Successful connection attempts counter.
Available seconds: Total time with established connection.
Total seconds: Total time since startup.

f) LIST VERSION

Displays information on the Shdsl chipset hardware and firmware.
Example:

```
SHDSL Monit+LIST VERSION

SW Version:               4.0.0
DSP silicon type:         CX28975
DSP silicon revision:     X.3
AFE silicon type:         CX28927
AFE silicon revision:     X.5

SHDSL Monit+
```

2.4. TEST

Permits you to execute and monitor the BER and ERLE tests.
Example:

```
SHDSL Monit+TEST ?
BER
ERLE_RESULTS
ERLE_TEST
SHDSL Monit+
```

a) TEST BER

BER test monitoring and control commands
The G.shdsl chipset incorporates a BER pattern generator as well as a BER measurer. You can execute the BER test through these, with those that check if transmission errors are produced at the physical layer in the line.
The tests are executed in the following way:

- Firstly, once the test has been deployed, the initial stage is executed. This stage must complete successfully so that the test can continue executing. If this stage does not terminate successfully, the test will not execute, an event is launched (30), none of the counters is updated and you automatically exit the BER test mode. If this stage is successful then the test will begin.
- During the test various successive iterations are carried out. In each of these iterations 2^{31} bits are transmitted. The BER pattern is $2^9 - 1$. The first two

iterations are not taken into account in the global computation, as it is possible that some transmission error is produced in these.

- After the second iteration, these executed automatically accumulating the results in the global counters.
- To finalize the BER test, the EXIT_BER command is executed. This is necessary in order for the G.shdsl modem returns to its normal function.
- So that the test executes correctly, you must have the following parameters configured in the configuration menu:
    - Disable the auto mode in the rate configuration. Configure a determined rate (which you wish to use to execute the BER test).
    - The ATM byte alignment parameter must be configured as unaligned [0].

Example:

```
SHDSL Monit+TEST BER ?
EXIT_BERT
RESET_BERT
RESULT_BERT
START_BERT
SHDSL Monit+
```

· TEST BER EXIT_BERT

Finalizes the BER test execution and configures the modem for normal functioning.

Example:

```
SHDSL Monit+TEST BER EXIT_BERT
Command sent.
SHDSL Monit+
```

· TEST BER RESET_BERT

Resets the test's current iteration. This reset does not affect the total counters.

Example:

```
SHDSL Monit+TEST BER RESET_BERT
Command sent.
SHDSL Monit+
```

· TEST BER RESULT_BERT

Displays the results of the current BER test.

Example:

```
SHDSL Monit+TEST BER RESULT_BERT
Mode BERT:
----------
BERT running:       NO
Iteration:          0
BERT sync:          Failed
BIT ERRORS:         0
Time:               0

TOTAL BIT ERRORS:   0
Total time:         0
SHDSL Monit+
```

BERT running: Indicates that the BER test is currently being executed.

Iteration: Indicates the iteration number. Each iteration implies that 2^{31} bits have been sent. The first two iterations are not taken into account for the global computation.

BERT sync: Displays the current test execution state. If the initialization stage fails then Failed is displayed. If there are no problems during the test, In progress will be displayed. If any fatal errors are produced, then Failed is displayed. This test must be finalized with a TEST BER EXIT_BERT command.

BIT ERRORS: Displays the number of errors in the current iteration.

Time: Test time in the current iteration.

TOTAL BIT ERRORS: Displays the number of errors since the BER test begun.

Total time: Displays the total test time.

· *TEST BER START_BERT*

Begins to execute the BER test.

Example:

```
SHDSL Monit+TEST BER START_BERT
Command sent.
SHDSL Monit+
```

· *Implementation example*

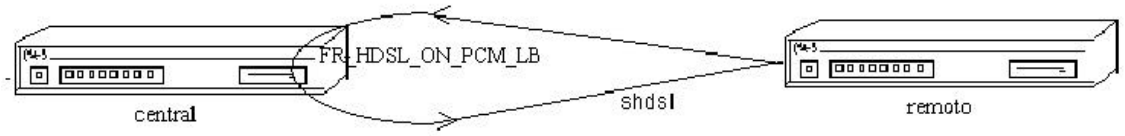
In this example, a BER test will be carried out between two terminals (one configured as the remote terminal and the other as central).

A loop is configured in one of them before executing the test, in this case the COMMAND LOOP FR_HDSL_ON_PCM_LB. This is required so that the synchronization phase at the remote end executes satisfactorily when the test is deployed.

The ATM byte aligned parameter is configured as unaligned (ADVANCED ATM_CONFIGURATION BYTE_ALIGNMENT UNALIGNED) in both terminals and the required speed is configured in the central terminal, 1024 Kbps in this example (SPEED 1024).

```
SHDSL config>LIST INTERFACE

Terminal:                central
G.shdsl annex:           A
Mode select:             HTU-C configures HTU-R
Data rate:               1024 Kbps

Fixed speed parameters:
  Number of Z-channels:  0
  Starting PCM slot:     1
  Mapping format:        block
  Interleave ratio:      1

Auto speed parameters:
  Allowed Z-channels:    0, 1, 2, 3, 4, 5, 6, 7

ATM phy configuration:
  Master/Slave mode:     master
  ATM receive path:      T1/E1 mode
  ATM transmit path:     T1/E1 mode
  ATM byte alignment:    unaligned

SHDSL config>
```

Subsequently the test is launched in the other end, TEST BER START_BERT. After two iterations, the results can be checked with the TEST BER RESULT_BERT.



b) TEST ERLE_RESULT

Presents the results of the last ERLE test carried out over the G.shdsl daughter.
Example:

```
SHDSL Monit+TEST ERLE_RESULT


ERLE Results:
-------------

NOISE = 0
SLM   = 0
FELM  = 0
SLM2  = 0
SHDSL Monit+
```

Noise: Noise presented in the input to the A/D converter.
SLM: Measures the input to the A/D converter.
FELM: Measures the echo digital canceller output.
SLM2:Measures the transmission signal power.

c) TEST ERLE_TEST

Execute the ERLE test.
To execute this test, you need to carry out the following steps:

1. Connect the terminal going to be tested with another terminal which is off.
2. Position a line simulator configured at 9000 feet between both terminals.
3. Execute the ERLE test.
4. When this has finished, an event (24) is launched if this has executed correctly. Subsequently you can see the results through the TEST ERLE_RESULT command.

Once the test has terminated, a G.shdsl daughter reset is produced. The results of the ERLE test are maintained until another test is executed or the device is switched off.
Example:

```
SHDSL Monit+TEST ERLE_TEST
Command sent.
SHDSL Monit+
```

2.5. EXIT

Exits to the previous menu.

```
SHDSL Monit+EXIT
ATM monitor+
```

Chapter 4
SHDSL Events

1. Introduction

The SHDSL interface events are described in this chapter.

In order to activate the SHDSL interface events:

From the monitoring:

```
*PROCESS 3

+EVENT

-- ELS Monitor --
ELS>ENABLE TRACE SUBSYSTEM HDSL ALL
ELS>
```

From the configuration:

```
*PROCESS 4


Config>EVENT

-- ELS Config --
ELS config>ENABLE TRACE SUBSYSTEM HDSL ALL
ELS config>
```

So that these are saved in the device configuration, the user must save the said configuration and if required, restart the device.
For further information on events activation, deactivation and configuration, please see the TELDAT Router Events manual.

2. Events

HDSL.001
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.001 ZW strt SHDSL-port *port*
Long Syntax:
HDSL.001 ZW control interface started on SHDSL port *port*
Description:
Initialization of SHDSL control interface software.

HDSL.002
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.002 ZW Got Boot Wakeup in port *port*
Long Syntax:
HDSL.002 ZW Got Boot Wakeup, waiting download in port *port*
Description:
ZW is OK, waiting operational code.

HDSL.003
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.003 ZW dload failed in port*port*
Long Syntax:
HDSL.003 ZW download failed in self test, try again in port *port*
Description:
Download of operational code failed in self test, try again.

HDSL.004
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.004 ZW dload is successful in port *port*
Long Syntax:
HDSL.004 ZW download is successful, ZW is ready in port *port*
Description:
Download is successful, ZW is operative.

HDSL.005
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.005 ZW Remote Site in port *port*
Long Syntax:
HDSL.005 ZW System enable, Remote Site in port *port*
Description:
Remote site.

HDSL.006
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.006 ZW Central Site in port *port*
Long Syntax:
HDSL.006 ZW System enable, Central Site in port *port*
Description:
Central site.

HDSL.007
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.007 ZW cnfg failed in step *step*: port *port*
Long Syntax:
HDSL.007 ZW configuration failed in step *step*, port: *port*
Description:
There was some error in configuration process.

HDSL.008
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.008 ZW cnfg OK in port *port*
Long Syntax:
HDSL.008 ZW configuration OK in port *port*
Description:
Configuration process OK.

HDSL.009
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.009 ASM enabled in port *port*
Long Syntax:
HDSL.009 ASM enabled in port *port*
Description:
Activation request enabled.

HDSL.010
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.010 ASM disabled in port *port*
Long Syntax:
HDSL.010 ASM disabled in port *port*
Description:
Activation request disabled.

HDSL.011
Level: Common informational comment, C-INFO
Short Syntax:

HDSL.011 ZW link UP port *port*

Long Syntax:

HDSL.011 ZW link up/down event, link is UP in port *port*

Description:

Link is UP.

HDSL.012

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.012 ZW link DOWN port *port*

Long Syntax:

HDSL.012 ZW link up/down event, link is DOWN in port *port*

Description:

Link is DOWN.

HDSL.013

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.013 ZW total error in port *port*

Long Syntax:

HDSL.013 ZW total error, IDLE state in port *port*

Description:

There was a total error, the state of ZW is IDLE.

HDSL.014

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.014 ZW bad ACK in port *port*

Long Syntax:

HDSL.014 ZW bad ACK executing API command in port *port*

Description:

Bad ACK executing API command.

HDSL.015

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.015 ZW Retrain in port *port*

Long Syntax:

HDSL.015 ZW link down, retrain modem OK in port *port*

Description:

Retrain modem in order to enable ASM.

HDSL.016

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.016 ZW BER start in port *port*

Long Syntax:

HDSL.016 ZW BER meter start in port *port*

Description:

BER test in progress.

HDSL.017

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.017 ZW BER reset in port *port*

Long Syntax:

HDSL.017 ZW BER meter reset in port *port*

Description:

Reset all the counters about BER.

HDSL.018

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.018 ZW chng ASM *new_state* port *port*

Long Syntax:

HDSL.018 ZW change ASM state event, current state *new_state* port *port*

Description:

There was a ZW link up/down event.

HDSL.019

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.019 ZW evnt was removed in port *port*

Long Syntax:

HDSL.019 ZW event was removed from the queue in port *port*

Description:

An event was removed from the queue of ZW in port.

HDSL.020

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.020 ZW Force Deact in port *port*

Long Syntax:

HDSL.020 ZW Force Deactivate in port *port*

Description:

Force deactivate (retrain modem) of ZW.

HDSL.021

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.021 ZW Force Deact failed in port *port*

Long Syntax:

HDSL.021 ZW Force Deactivate failed in port *port*

Description:

Force deactivate (retrain modem) of ZW failed.

HDSL.022
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.022 ZW Power On Fail: port *port*
Long Syntax:
HDSL.022 ZW Power On Failed in port *port*
Description:
ZW Power On Failed, Reset and try again.

HDSL.023
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.023 ZW Erle strt OK: port *port*
Long Syntax:
HDSL.023 ZW Erle start OK in port *port*
Description:
Erle start OK.

HDSL.024
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.024 ZW Erle finish OK: port *port*
Long Syntax:
HDSL.024 ZW Erle finish OK in port *port*
Description:
Erle finish OK.

HDSL.025
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.025 ZW Erle fail: port *port*
Long Syntax:
HDSL.025 ZW Erle failed in port *port*
Description:
Erle execution failed.

HDSL.026
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.026 ZW Deact loop OK: port *port*
Long Syntax:
HDSL.026 ZW Deactivation issue by Loop command OK in port *port*
Description:
Deactivation issue by Loop command when is a destructive loop.

HDSL.027
Level: Common informational comment, C-INFO
Short Syntax:

HDSL.027 ZW Loop OK: port *port*

Long Syntax:

HDSL.027 ZW command loop executed OK in port *port*

Description:

Command loop executed OK.

HDSL.028

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.028 ZW Chng term type, new *type*: port *port*

Long Syntax:

HDSL.028 ZW Change terminal type, current terminal *type*, port *port*

Description:

Change in terminal type, display the current configuration.

HDSL.029

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.029 ZW datarate chng: port *port*

Long Syntax:

HDSL.029 ZW data rate change in port *port*

Description:

Change in data rate OK.

HDSL.030

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.030 ZW unable BERT: port *port*

Long Syntax:

HDSL.030 ZW unable get sync in BERT in port *port*

Description:

Unable get sync in BER test, return to operational state.

HDSL.031

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.031 ZW exit BERT: port *port*

Long Syntax:

HDSL.031 ZW exit BERT mode in port *port*

Description:

The device exits Bert mode, restore default PCM mapper.

HDSL.032

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.032 ZW reset, mode *reset_mode*, port: *port*

Long Syntax:

HDSL.032 ZW reset, mode *reset_mode*, port: *port*

Description:

Reset of the SHDSL modem, reset mode 0 = SW reset, 1 = HW reset.

HDSL.033

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.033 ZW EOC rcvd: port *port*

Long Syntax:

HDSL.033 ZW EOC message received in port *port*

Description:

One EOC message received.

HDSL.034

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.034 ZW EOC API cmd with ID *ID* exed NOK,port: *port*

Long Syntax:

HDSL.034 ZW EOC API command with ID *ID* executed NOK, port *port*

Description:

EOC API command executed NOK. ID is the identifier of message. The far-end terminal will receive the NAK message.

HDSL.035

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.035 ZW EOC API Loop cmd exed OK: port *port*

Long Syntax:

HDSL.035 ZW EOC API Loop command executed OK in port *port*

Description:

EOC API Loop command executed OK. The far-end terminal will receive the ACK message.

HDSL.036

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.036 ZW EOC buffer tx full: port *port*

Long Syntax:

HDSL.036 ZW EOC buffer tx full in port *port*

Description:

EOC TX buffer full, issue reset EOC command.

HDSL.037

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.037 EOC RSP msg not sent, link down: port *port*

Long Syntax:

HDSL.037 EOC RSP message not sent, link is down, in port *port*

Description:

EOC Response wasn't sent because link is down.

HDSL.038

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.038 EOC RSP sent OK, ID = *ID* +128,port: *port*

Long Syntax:

HDSL.038 EOC RSP sent OK, with ID = *ID* +128, port: *port*

Description:

EOC response message was sent successfully.

HDSL.039

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.039 ZW cmd with ID *ID* fail farend,port: *port*:

Long Syntax:

HDSL.039 ZW command with ID *ID* failed in far-end terminal, port: *port*

Description:

Command with ID failed in far-end terminal.

HDSL.040

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.040 ZW Maintenance response rcvd,port: *port*

Long Syntax:

HDSL.040 ZW Maintenance Status Response received, port: *port*

Description:

Maintenance Status Response EOC message received

HDSL.041

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.041 EOC RQST msg not sent, link down: port *port*

Long Syntax:

HDSL.041 EOC RQST message not sent, link is down, in port *port*

Description:

EOC Request wasn't sent because link is down.

HDSL.042

Level: Common informational comment, C-INFO

Short Syntax:

HDSL.042 ZW EOC msg (Loop Conf) sent OK:port *port*

Long Syntax:

HDSL.042 ZW EOC message (Loop Config) sent OK in port *port*

Description:

EOC message with a loop command was sent successfully.

HDSL.043
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.043 ZW EOC msg (Ver Rqst) sent OK: port *port*
Long Syntax:
HDSL.043 ZW EOC message (Versions Request) sent OK in port *port*
Description:
EOC message with a versions request was sent successfully.

HDSL.044
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.044 ZW EOC API Ver cmd exed OK: port *port*
Long Syntax:
HDSL.044 ZW EOC API Versions command executed OK in port *port*
Description:
EOC API Versions command executed OK. The far-end terminal will receive the ACK message.

HDSL.045
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.045 ZW Inventory response rcvd,port: *port*
Long Syntax:
HDSL.045 ZW Inventory response received, port: *port*
Description:
Inventory response EOC message received.

HDSL.046
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.046 ZW EOC msg ID *ID* sent OK, port *port*
Long Syntax:
HDSL.046 ZW EOC message with ID *ID* sent OK, port *port*
Description:
ZW EOC message with ID sent successfully

HDSL.047
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.047 ZW loop far-end updated,port: *port*
Long Syntax:
HDSL.047 ZW loop mode in far-end terminal updated successfully, port: *port*
Description:
Loop mode in far-end terminal updated successfully.

HDSL.048

Level: Common informational comment, C-INFO
Short Syntax:
HDSL.048 ZW error exe API cmd: port *port*
Long Syntax:
HDSL.048 ZW error in execution of API command in port *port*
Description:
Error in execution of API command, current manager state ACTIVATION_MONITOR.

HDSL.049
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.049 ZW phy reset: port *port*
Long Syntax:
HDSL.049 ZW phy hardware reset completed successfully in port *port*
Description:
ZW phy hardware reset completed successfully.

HDSL.050
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.050 ZW error: phy reset failed: port *port*
Long Syntax:
HDSL.050 ZW error: phy hardware reset failed in port *port*
Description:
ZW phy hardware reset failed.

HDSL.051
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.051 ZW error: Boot Wakeup tout: port *port*
Long Syntax:
HDSL.051 ZW error: Boot Wakeup timeout in port *port*
Description:
ZW error, phy didn't wake up after reset.

HDSL.052
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.052 ZW error: code *code* state *state* dnloadst *dnloadst* cmd *cmd* othr *othr*: port *port*
Long Syntax:
HDSL.052 ZW error: code *code* state *state* dnloadst *dnloadst* cmd *cmd* othr *othr*: port *port*
Description:
ZW error, internal info.

HDSL.053

Level: Common informational comment, C-INFO
Short Syntax:
HDSL.053 *data data data data data data data data data data data data data*
Long Syntax:
HDSL.053 *data data data data data data data data data data data data data*
Description:
ZW debug, trap to debug EOC channel.

HDSL.054
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.054 ZW EOC bad ID *ID*, port *port*
Long Syntax:
HDSL.054 ZW EOC bad ID *ID*, port *port*
Description:
ZW bad ID in input request message.

HDSL.055
Level: Common informational comment, C-INFO
Short Syntax:
HDSL.055 ZW EOC msg ID = *ID* sent OK, port *port*
Long Syntax:
ZW EOC message with ID = *ID* sent OK, port *port*
Description:
ZW EOC message with ID sent ok.