Teldat Router

ADSL

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Chapter 1
ADSL Technology

1. Introduction

The phenomenon of Internet, together with all the services that can be accessed through it, is one of the most important events in the current telecommunications panorama.
New services appear everyday which demand **wider bandwidth** or require **permanent connections** to the information services.
By using **ADSL** technology in the access network, both problems are resolved providing services with a wider bandwidth than that achieved with conventional telephony and permanent connection to the said services.
Some services that can benefit from the advantages offered by ADSL and therefore can be provided over the said technology are:

- Services and contents of data transmission and access to currently available information services at typical PTSN modem speeds (access to Internet, email, Ebusiness etc.).
- Services and contents that depend on the availability of **higher speeds**.
  The following stand out in this area:
  - Broadcasting of audio and video (radio or TV channels).
  - On demand audio and video (access to audio and video resource banks).
  - Conference audio and video. These services despite being naturally symmetrical will benefit from a wider bandwidth being available.
  - Access to documental databases.
  - Interactive applications in the network (games, demonstration SW in the network etc.).
  - TeleEducation etc.
- Services and contents that will benefit from a **permanently established connection**. For example:
  - Interconnection of Local Area Networks.
  - Virtual Private Networks.
  - Remote access and teleworkers/telecommuters.
- Generally all those applications for "remote action or supervision" taking advantage of the fact that all supervised points are permanently available. Typical examples are: telemedicine, teleaid, telesurveillance, telecontrol, telemeasured, etc.

2. ADSL

2.1. Definition

ADSL stands for **A**symmetric **D**igital **S**ubscriber **L**ine.

ADSL is a model within the **xDSL** family (HDSL, SDSL, etc.).
This is a technology which is based on a **normal** copper pair **telephone line**, converts this into a **high-speed digital line** offering broadband services.

ADSL is a **modem technology** permitting you to **simultaneously** transmit **voice** and **data** over a **conventional copper line**. Three independent channels are established for this:

- Two high-speed channels (one for data reception and the other to transmit data).
- A third channel for normal voice communications (basic telephone service).

The **transmission throughput** in User -> Network and Network -> User directions are different (**asymmetric**), and can achieve speeds of up to 8 Mbits/s in network-user direction and up to 900 Kbit/s in user-network direction.

This fact explains why ADSL can co-exist in the same subscribers loop with the telephone service, something that is not possible with a conventional modem as this operates in voiceband, the same as telephony. With ADSL, its possible to simultaneously receive and maintain a telephone call as well as transfer data without affecting either of the two services in any way.

2.2. Operating Frequencies

ADSL technology uses frequency spectrums not used to transport voice and therefore, up until now, not used by the modems in voiceband (V.32 to V.90). These latter ones only transmit over the frequency bands used in telephony (300 Hz to 3.400 Hz) while the ADSL modems operate in a much wider frequency margin, from approximately 24 KHz up to 1.104 KHz.
ADSL can also be offered over ISDN using frequency spectrums not used by ISDN.
In this case, modems of this type handle frequencies in user-network direction between 125 khz and 206 khz and from 270 khz up to 1104 khz in network-user direction.

2.3. Asymmetry

ADSL is an **asymmetric technology** which means that the transmission characteristics are not the same in both directions: **the reception speed for data is much greater than that for transmission**, therefore making this technology ideal to access the so-called information services and particularly for surfing Internet (up to 8 Mbit/s downstream and up to 900 kbit/s upstream). Normally the user receives more information from Internet than he sends, reads more emails than he writes and watches more videos than he produces.

2.4. Modems and Splitters

In order to complete an ADSL circuit, you only need to place a pair of ADSL modems, one at each end of the twisted pair telephone line. One of these is located in the user's residence connected to a PC or a set-top box device and the other or others (group of modems) are located in the local telephone central that the user depends on.
As we are dealing with a modulation where different throughputs are transmitted in User -> Network and Network -> User directions, the ADSL modem located at the **user** end (**ATU-R** or "ADSL Terminal Unit-Remote) is different to the one located at the other end of the loop, at the **local central** (**ATU-C** or "ADSL Terminal Unit-Central").
You can also see in the figure that a device (filter) known as a "**splitter**" has been located in front of each one of the modems.
This device is nothing more than a set of two filters: one high pass and one low pass. The **aim** of these filters is that of **separating or combining the high (ADSL) and low (Voice) frequency signals**, depending on the direction of the transmission (upstream or downstream). At the same time, this protects the telephone service signal (central telephone or switch) from interferences in the voiceband produced by the ADSL modems (ATUs) and in the same way protects the latter from the telephone service signals.

2.5. Modulation

The basic implementation consists of **using multiple carriers** (multitones) and not just one which is what occurs in the voiceband modems. Each one of these carriers (known as subcarriers) is modulated in Quadrature and Amplitude (QAM modulation) by one part of the total flow of data going to be transmitted. These subcarriers are separated between 4,3125 KHz and the bandwidth occupied by each modulated subcarrier is 4 KHz.
The **distribution** of the **data flow** between subcarriers is carried out **depending on the estimated Signal/Noise ratio** in the band assigned to each of them. The higher the ratio, the higher is the throughput that can be transmitted by each subcarrier, in short, **the system adapts to the channel response** (in the figure, bits/channel Ratio). This estimation of the Signal/Noise ration is carried out at the beginning, when the link between the ATU-R and the ATU-C is established, through a sequence of pre-defined training. The modulation technique used is the same for both ATU-R and ATU-C. The only difference is that the **ATU-C** has up to **256** subcarriers available while the **ATU-R** only has a **maximum of 32**.
Whichever modulation technique used, the ANSI T1.413 standard specifies that ADSL must use **Frequency Division Multiplexing (FDM)** or **Echo Cancellation** in order to achieve full-duplex communication. Both technologies reserve the lowest subchannels for analog voice.
The ANSI T1.413 standard has adopted DMT (Discrete Multitone) as the modulation technique in ADSL. DMT shows better immunity to noise, superior flexibility in transmission speed and greater facility to adapt to the line characteristics than other methods. All this translates to reliability over long distance lines.
Frequency Division Multiplexing (**FDM**) **divides the range of frequencies into two bands**, one **upstream** and the other **downstream** which simplifies the design of the modems although reducing the transmission capacity downstream, not so much because fewer numbers

of subcarriers are available but due to the fact that those with lower frequencies, those for which the copper pair attenuation is less, are not available.
Echo Cancellation eliminates the possibility of the signal in one direction being interpreted as "a signal produced by a person" in the opposite direction and therefore returned as an echo towards the source.
Therefore, separating the signals corresponding to both transmission directions permits better throughput although means greater complexity in the design of the modems.

2.6. Range

Attenuation in the line **increases with the length of the cable and the frequency** and **decreases when the cable diameter increases**. This explains why the maximum throughput that can be achieved through the ADSL modems vary depending on the loop length and its characteristics.

Transmission speeds depend on the length and diameter of the cable, however the following also has some influence:

- Presence of bridges taps.
- Conservation state of the loop.
- Noise coupling.
- Cross-talk introduced by other services (ISDN, xDSL).

The following table shows the maximum ADSL downstream capabilities for diverse cable conductors (without taking into account noise and bridges or multiple slots).

Transmission Speed (Mbps)	Type of cable (mm)	Distance (km)
1.5–2.0	0.5	5.5
1.5–2.0	0.4	4.6
6.1	0.5	3.7
6.1	0.4	2.7

The transmission capacity diminishes when the length of the loop increases.
On decreasing the loop diameter, the maximum reach also decreases.
The presence of external noise provokes a reduction in the Signal/Noise ratio that each one of the subcarriers works with. This diminution is translated, as we have already seen when discussing modulation, into a reduction of the data throughput that modulates each subcarrier and which in turn implies a reduction in the total throughput that can be transmitted through the link between the ATU-R and the ATU-C.

2.7. DSLAM

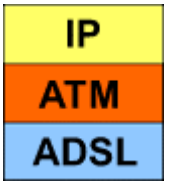
The ADSL needs a pair of modems for each user: one in the user's residence (ATU-R) and the other (ATU-C) in the local central where this user's loop is received. This complicates the deployment of this access technology in the centrals. In order to resolve this problem **DSLAM** was developed ("Digital Subscriber Line Access Multiplexer"): this is a rack that groups a

large number of cards, each one consisting of various ATU-C modems and which also execute the following functions:

- Concentrates various users central modems in the same rack.
- Concentrates (Multiplexes/demultiplexes) traffic from all the ADSL links towards a WAN network.
- Carries out functions at the link layer (ATM protocol over ADSL) between the user modem and the central modem.

2.8. ATM over ADSL

A link layer protocol is required between the ATU-R and the ATU-C.
The communication networks use the **ATM** protocol ("Asynchronous Transfer Mode") for switching in broadband. ATM transmission can be carried out over a large number of physical mediums, including optical fiber and copper lines. The most adequate solution in this latter case is **the use of ATM cells to transmit information over the ADSL link.**



- The **possibility** of being able to **define multiple connections over the ADSL link** for different services is advantageous.
- A link layer protocol is required with **Quality of Service mechanisms**.

Not all information sources have the same requirements in order to be transported. E.g. voice traffic requires a minimum delay whereas data traffic is not so demanding in this aspect.
There **exist control procedures in ATM that guarantee the required quality for the different types of information transferred**. The ATM connections between source and destination are already configured when established in order to guarantee the contracted quality level. This permits greater efficiency due to the fact that each applications prompts the network for only the strictly necessary quality and service which signifies better use of the resources.
By using **ATM**, **the information**, regardless of origin, **is fragmented into cells** (consistent sized information packets) **which are transported independently from each other**. The devices and transmission circuits can in this way transport cells originating from different sources.
By keeping in mind these advantages offered by the ATM protocol, the solution taken in order to offer services is the **transport of ATM cells over the ADSL link (between the ATU-R and the ATU-C located in the DSLAM).**

2.9. Standards

As with any other technology, ADSL requires standards. In this way, products based on this technology are consistent in performance, independently of any particular manufacturer and will operate with other devices in the same category.

- The **ANSI** (American National Standards Institute) in the subcommittee **T1.143 issue 1 (1995) and T1.413 issue 2 (1998) defines the standard for the ADSL physical layer**. The **ETSI** (European Telecommunication Standards Institute) has contributed including an attachment with the European requirements and the **TS 101 388 v.1.1.1** with the **initial solution for ADSL over ISDN** complying with ANSI**.**
- In the same way, the **ITU** (International Telecommunications Union) with their recommendations **G.992.1 (defining ADSL over POTS and ADSL over ISDN), G.992.2 (G. Lite), G.994.1, G.995.1, G.996.1 and G.997.1**.
- The **ADSL Forum** is an organization that promotes ADSL technology, developing the necessary protocols, interfaces and architectures. ADSL Forum works in collaboration with the rest of the group of similar standards.
- The **ATM Forum and DAVIC** (Digital Audio-Visual Council) has acknowledged ADSL as a physical layer transmission protocol for an unshielded twisted pair.

Chapter 2
ADSL Configuration

1. Accessing the interface configuration

In order to access the ADSL Configuration menu, you need to first access the general configuration menu and from there, access the ATM interface and subsequently the ADSL interface.

```
*P 4
Config>LIST DEVICES

 Interface       Con    Type of interface            CSR     CSR2  int
 ethernet0/0     LAN1   Quicc Ethernet           fa200a00 fa203c00   5e
 atm0/0          SL1    _ATM                     fa200a60 fa203f00   55
 bri0/0          ISDN1  ISDN Basic Rate Int      fa200a40 fa203e00   5c
 x25-node        ---    Router->Node                    0             0
 atm0/0.1        ---    ATM subinterface                0             0
 ppp1            ---    Generic PPP                     0             0

Config>
```

The ATM interface (not to be confused with the subinterface) appears as atm0/0 in this example, consequently:

```
Config> NETWORK atm0/0

-- ATM interface configuration --
atm0/0 config>
```

Once located in the ATM interface, access the physical layer menu through the **PHY** command:

```
atm0/0 config>PHY

------ ADSL Config -------

atm0/0 ADSL config>
```

2. Interface Configuration Commands

All the ADSL interface configuration commands are numerated and described in this section. All the ADSL interface configuration commands must be introduced at the ADSL prompt (`atmX/Y ADSL config>`).

The ADSL configuration is seldom modified, the parameters usually keeping the default values.

> ***An incorrect configuration may mean that the interface will no longer operate or will not do so correctly.***

You must save the configuration and restart the router so that the new configuration takes effect.

Command	Functions
? (HELP)	Lists the available commands or their options.
BER-TEST	Enables the bit error rate test.
BITS-PER-TONE-LIMIT	Sets the bits per tone limit.
FAST-CHANNEL- ADDRESS	Sets the level two UTOPIA address for the ADSL fast channel
INTERLEAVED-CHANNEL-ADDRESS	Sets the UTOPIA address for the ADSL interleaved channel.
LIST	Displays the interface configuration.
LOG-BUFFER	Enables error register file capture.
NO	Sets the default value.
OPEN-MODE	Configures the open mode (standard).
RX-GAIN-OFFSET	Sets the reception gain offset.
SHUTDOWN	Sets the interface administrative status.
SUBFUNCTIONALITY-CODE	Sets the subfunctionality code value.
TARGET-NOISE-MARGIN-OFFSET	Sets the additional noise margin.
TRELLIS-CODING	Enables the Trellis coding.
TX-GAIN-OFFSET	Sets transmit gain offset.
EXIT	Returns to the previous menu.

2.1. ? (HELP)

Displays a list of the available commands or their options.

Syntax:

```
atm0/0 ADSL config>?
```

Example:

```
atm0/0 ADSL config>?
  ber-test                      Enables BER test
  bits-per-tone-limit           Sets a bits per tone limit
  fast-channel-address          Sets UTOPIA address for fast channel
  interleaved-channel-address   Sets UTOPIA address for interleaved channel
  list                          Lists configuration
  log-buffer                    Enables the log training buffer
  no                            Disables command or sets its default
  open-mode                     Configures open mode standard
  rx-gain-offset                Sets reception gain offset
  shutdown                      Sets administrative status
  subfunctionality-code         Sets subfunctionality code value
  target-noise-margin-offset    Sets additional noise margin
  trellis-coding                Enables Trellis Coding in all modes
  tx-gain-offset                Sets transmission gain offset
  exit
atm0/0 ADSL config>
```

2.2. BER-TEST

Permits you to control BER test activation. (Currently, this is only available in interfaces based on Alcatel DynaMiTe chipset when the open mode is ANSI T1.413 and the remote end is also based on Alcatel DynaMiTe chipset; should these conditions not be fulfilled then the command is ignored).
Uses the unused bandwidth to carry out the BER test.
The BER test is disabled by default.

To enable the test:

```
atm0/0 ADSL config>BER-TEST
```

To disable the test:

```
atm0/0 ADSL config>NO BER-TEST
```

2.3. BITS-PER-TONE-LIMIT

Permits you to limit the number of bits per tone. (Currently, this is only available in interfaces based on Alcatel DynaMiTe chipset; should these conditions not be fulfilled then the command is ignored).
The range of valid values is from 2 bits per tone up to 14 bits per tone (maximum).
Default is 14.

To configure a value of 12 bits per tone:

```
atm0/0 ADSL config>BITS-PER-TONE-LIMIT 12
```

To re-establish the default value:

```
atm0/0 ADSL config>NO BITS-PER-TONE-LIMIT
```

2.4. FAST-CHANNEL-ADDRESS

Permits you to set the level two UTOPIA address assigned to the ADSL interface FAST channel.
This is only applied in cases where the ATM controller is configured in level 2 UTOPIA mode.

To configure address 7:

```
atm0/0 ADSL config>FAST-CHANNEL-ADDRESS 7
```

To re-establish the default value:

```
atm0/0 ADSL config>NO FAST-CHANNEL-ADDRESS
```

2.5. INTERLEAVED-CHANNEL-ADDRESS

Permits you to set the level two UTOPIA address assigned to the ADSL interface INTERLEAVED channel.
This is only applied in cases where the ATM controller is configured in level 2 UTOPIA mode.

To configure address 5:

```
atm0/0 ADSL config>INTERLEAVED-CHANNEL-ADDRESS 5
```

To re-establish the default value:

```
atm0/0 ADSL config>NO INTERLEAVED-CHANNEL-ADDRESS
```

2.6. LIST

Lists the current ADSL interface configuration.
Syntax:

```
atm0/0 ADSL config>LIST
```

Example:

```
atm0/0 ADSL config>LIST

Chipset:                          ADI Eagle (POTS)
Open mode:                        Multimode (G.DMT)
UTOPIA addressing
  Fast channel address:           0
  Interleaved channel address:    1
```

```
Trellis coding:                   Enabled
BER test:                         Disabled
Subfunctionality Code:            Autodetect
Tx Gain Offset:                   +0.0 dB
Rx Gain Offset:                   +0.0 dB
Target Noise Margin Offset:       +0.0 dB
Bits per tone limit:              14
Get log buffer:                   Disabled

Administrative status
  PHY interface:                  UP
  FAST channel:                   UP
  INTERLEAVED channel:            UP

atm0/0 ADSL config>
```

2.7. LOG-BUFFER

Enables the capture of a file which registers the negotiation process for an interface based on DynaMiTe chipset when the said process does not successfully complete and allows you to determine where the error was produced in the negotiation. The information contained in this file is not common interest; therefore we recommend that this option be disabled. Capturing this file also slows down device performance.

To activate file capture:

```
atm0/0 ADSL config>LOG-BUFFER
```

To deactivate file capture:

```
atm0/0 ADSL config>NO LOG-BUFFER
```

2.8. OPEN-MODE

Configures the connection standard going to be used in the open mode.
By default, the open mode is configured in `MULTIMODE-G.DMT-PREFERENCE`.

Syntax:

```
atm0/0 ADSL config>OPEN-MODE ?
ansi-t1.413              Conformance to ANSI T1.413
  g.dmt                    Conformance to ITU G.DMT (G.992.1)
  g.lite                   Conformance to ITU G.Lite (G.992.2)
  multimode-ansi-t1.413    Multimode with ANSI T1.413 preference
  multimode-g.dmt          Multimode with G.DMT preference
```

If you configure the ANSI-T1.413 mode or G.DMT (ITU G.922.1) or G.Lite (ITU G.922.2), the line will only open in cases where both ends agree on the said operation mode. In

MULTIMODE mode, the device will accept any open mode requested by the remote device giving preference to the indicated mode.
In interfaces based on the Alcatel DynaMiTe chipset, only the following modes are supported:

- ANSI T1.413
- G.LITE
- MULTIMODE-G.DMT

For the rest of the modes, the following transformation is executed:

- G.DMT →MULTIMODE-G.DMT
- MULTIMODE-ANSI-T1.413 → MULTIMODE-G.DMT

2.9. RX-GAIN-OFFSET

Permits you to set reception gain offset so that reception is made more powerful or less. (Currently, this is only available in interfaces based on Alcatel DynaMiTe chipset; should these conditions not be fulfilled then the command is ignored).
The permitted value range is between –10 to +10 dB, with a resolution of 0.1 dB. Therefore the value configured is expressed in tenths of dB, the real range being distinct depending on the chipset.

- Alcatel DynaMiTe: from –5 dB to +3 dB, with a resolution of 0.5 dB

The value to be programmed in the chip is the nearest value within the supported range and resolution.

The default value is 0.

To configure a value of 2.5 dB:

```
atm0/0 ADSL config>RX-GAIN-OFFSET 25
```

To restore the default value:

```
atm0/0 ADSL config>NO RX-GAIN-OFFSET
```

2.10. SHUTDOWN

This permits you to establish the ADSL interfaces administrative status, i.e. the physical interface, the interface corresponding to the Fast Path and that corresponding to the Interleaved Path.
The administrative status is UP by default.
Syntax:

```
atm0/0 ADSL config>shutdown ?
  fast-channel          Fast channel
  interleaved-channel   Interleaved channel
  phy                   Physical interface
```

To set the physical interface administrative status to DOWN:

```
atm0/0 ADSL config>SHUTDOWN PHY
```

To set the physical interface administrative status to UP:

```
atm0/0 ADSL config>NO SHUTDOWN PHY
```

This is a design decision that only takes into account the PHY interface administrative status when establishing the ADSL connection and not the administrative status of the Fast and Interleaved channels. This configurability is included for transparent support of the MIB standard ADSL-LINE-MIB.

2.11. SUBFUNCTIONALITY-CODE

Permits you to manually configure the analog Front End identifier used in the ADSL interface. We recommend that this parameter is left with its default value to ensure correct functionality given that an erroneous configuration can provoke reach and/or speed problems. (Currently, this is only available in interfaces based on Alcatel DynaMiTe chipset; should these conditions not be fulfilled then the command is ignored).

- ATU-R Alcatel DynaMiTe 20140 → 2d
- ATU-R Alcatel DynaMiTe 20150 → 21d

To configure a subfunctionality code with value 6:

```
atm0/0 ADSL config>SUBFUNCTIONALITY-CODE 6
```

To return to default mode (auto detection):

```
atm0/0 ADSL config>NO SUBFUNCTIONALITY-CODE
```

2.12. TARGET-NOISE-MARGIN-OFFSET

This permits you to configure an additional margin to the noise margin value configured in the remote end: during the opening of the ASDL line, the line rate is negotiated so that it complies with the noise margin value configured in the DSLAM. You can increase or decrease the said value through this parameter. (Currently, this is only available in interfaces based on Alcatel DynaMiTe chipset; should these conditions not be fulfilled then the command is ignored).
The permitted value range is between –10 to +10 dB, with a resolution of 0.1 dB. Therefore the value configured is expressed in tenths of dB, the real range being distinct depending on the chipset.

- Alcatel DynaMiTe: from –3 dB to +3 dB, with a resolution of 0.5 dB.

The value to be programmed in the chip is the nearest value within the supported range and resolution.

The default value is 0.

To configure an offset of +2.5 dB:

```
atm0/0 ADSL config>TARGET-NOISE-MARGIN-X-GAIN-OFFSET 25
```

To restore the default value:

```
atm0/0 ADSL config>NO TARGET-NOISE-MARGIN-X-GAIN-OFFSET
```

2.13. TRELLIS-CODING

Permits you to control the Trellis coding. This coding can be disabled for all the operating modes or enabled for all (support in the G.Lite mode is optional and therefore depends on the chipset used.)
Trellis coding is enabled by default.

To enable coding:

```
atm0/0 ADSL config>TRELLIS-CODING
```

To disable Trellis coding:

```
atm0/0 ADSL config>NO TRELLIS-CODING
```

2.14. TX-GAIN-OFFSET

Permits you to set transmission gain offset so that transmission is made more powerful or less. The permitted value range is between –10 to +10 dB, with a resolution of 0.1 dB. Therefore the value configured is expressed in tenths of dB, the real range being distinct depending on the chipset.

- Alcatel DynaMiTe: from –10 dB to +3 dB, with a resolution of 0.5 dB.
- Analog Devices EAGLE: from –5 dB to +5 dB, with a resolution of 0.1 dB.

The value to be programmed in the chip is the nearest value within the supported range and resolution.

Default value is 0.

To configure a value of –0.5 dB:

```
atm0/0 ADSL config>TX-GAIN-OFFSET -5
```

To restore the default value:

```
atm0/0 ADSL config>NO TX-GAIN-OFFSET
```

2.15. EXIT

Exits to the previous menu.

```
atm0/0 ADSL config>EXIT
atm0/0 config>
```

3. Commands Summary

```
[NO] BER-TEST

NO BITS-PER-TONE-LIMIT
   BITS-PER-TONE-LIMIT <2..14>

NO FAST-CHANNEL-ADDRESS
   FAST-CHANNEL-ADDRESS <0..30>

NO INTERLEAVED-CHANNEL-ADDRESS
   INTERLEAVED-CHANNEL-ADDRESS <0..30>

[NO] LOG-BUFFER

NO OPEN-MODE
   OPEN-MODE <MULTIMODE-G.DMT | G.DMT | G.LITE | ANSI-T1.413 |
              MULTIMODE-ANSI-T1.413>

NO RX-GAIN-OFFSET
   RX-GAIN-OFFSET <-100..100>

[NO] SHUTDOWN <FAST-CHANNEL | INTERLEAVED-CHANNEL | PHY>

NO SUBFUNCTIONALITY-CODE
   SUBFUNCTIONALITY-CODE <0..255>

NO TARGET-NOISE-MARGIN-OFFSET
   TARGET-NOISE-MARGIN-OFFSET <-100..100>

[NO] TRELLIS-CODING

NO TX-GAIN-OFFSET
   TX-GAIN-OFFSET <-100..100>
```

Chapter 3
ADSL Monitoring

1. Accessing the interface monitoring

In order to access the ADSL Monitoring menu, you must first access the general monitoring menu, from there, access the ATM interface and subsequently the ADSL interface.

```
*P 3
+CONFIGURATION

Teldat's Router, XXXXX X Y  S/N: 403/00222
P.C.B.=58  Mask=0502  Microcode=0000  CLK=49152 KHz  BUSCLK=49152 KHz
Boot ROM release:
 BIOS CODE VERSION: 01.07.01  Jun  7 2002 11:21:23
  gzip  Jun  7 2002 11:18:48
  io1  Jun  7 2002 11:17:57
  io2  Jun  7 2002 11:17:58
  io3  Jun  7 2002 11:17:58
 START FROM FLASH    Watchdog timer Enabled
Software release: 10.1.1 Jul 17 2003 11:53:46
Compiled by    FMIGUEL on    FMIGUEL
Hostname:                    Active user:
Date:  Thursday, 07/18/02     Time: 16:22:48

Num  Name     Protocol
0    IP       DOD-IP
3    ARP      Address Resolution Protocol
6    DHCP     Dynamic Host Configuration Protocol
11   SNMP     SNMP

3 interfaces:
Conn   Interface       MAC/Data-Link          Hardware                Status
LAN1   ethernet0/0     Ethernet/IEEE 802.3     Quicc Ethernet          Up
ADSL1  atm0/0          ATM                     ATM SAR device          Testing
---    x25-node        internal                Router->Node            Up
+
```

The ATM interface appears as atm0/0 in this example, consequently:

```
+NETWORK atm0/0

-- ATM Console --
atm0/0 monitor+
```

In order to access the physical layer monitoring:

```
atm0/0 monitor+PHY
------ ADSL Monitor -------
atm0/0 ADSL monitor+
```

2. Interface monitoring commands

All the ADSL interface monitoring commands are numerated and described in this section. All the ADSL interface monitoring commands must be introduced at the ADSL prompt (`atmX/Y ADSL monitor+`).

```
atm0/0 ADSL monitor+?
CHANNEL
CLEAR
CLOSE
LOG-FILE
OPEN
SIGNAL
STATUS
VENDOR-INFO
EXIT
```

2.1. CHANNEL

Displays diverse information on the two ADSL logical channels (fast and interleaved.)

```
atm0/0 ADSL monitor+CHANNEL ?
FAST
INTERLEAVED
PARAMETERS
```

```
atm0/0 ADSL monitor+CHANNEL <FAST | INTERLEAVED>
BER-TEST
CELL-COUNTERS
CODIFICATION
INTERVAL
PERFORMANCE
```

a) CHANNEL PARAMETERS

Displays the instantaneous parameters referent to the indicated channel, as specified by the ADSL-LINE-MIB.

```
atm0/0 ADSL monitor+CHANNEL PARAMETERS
                                  Fast channel       Interleaved channel
                               Downstream   Upstream   Downstream   Upstream
                               ----------  ----------  ----------  ----------
Interleave Delay (ms)                  --          --           0           0
Current Transmit Rate (bps)             0           0     7616000      992000
CRC Block Length                        0           0       16184        2108
```

- *Interleave delay*: delay introduced to execute interleaving (only interleaved path.)
- *Current transmit rate*: available data speed, negotiated with the remote end.
- *CRC block length*: ADSL codification block length, to which CRC is applied.

b) CHANNEL <FAST | INTERLEAVED> BER-TEST

In cases where both the remote end and the local chipsets are Alcatel DynaMiTe and the test execution has been enabled, this command offers the results of the said test. This test is executed in the available bandwidth (difference between the reachable speed and the available

speed for the user) through the insertion of empty cells. This is defined as "second with error" where at least one error has been produced in the said cells.
The binary error rate (BER) is proportional to quotient "*Accumulated bit errors*" / **"***Seconds with valid BER***"** provided that the "*Seconds without valid BER*" value is close to 0.

```
atm0/0 ADSL monitor+CHANNEL FAST BER-TEST
Accumulated bit errors             0
Seconds with valid BER           188
Seconds without valid BER          0
```

Message shown when the test is unavailable:

```
atm0/0 ADSL monitor+CHANNEL FAST BER-TEST
Not available
```

c) CHANNEL <FAST | INTERLEAVED> CELL-COUNTERS

Displays the cell counters: given that not all the chipsets provide the same counters, some values indicated as zero may not be available.

```
atm0/0 ADSL monitor+CHANNEL INTERLAVED CELL-COUNTERS
                               Downstream       Upstream
                              ------------     ----------
   Total                        17048083              183
   Delivered                         181           --
   Idle                         17034952          2219266
   Unassigned                          0           --
   Fifo Overflow                       0           --
   Short                            --                 0
   Long                             --                 0
```

- *Total* — total number of cells (includes: user, idle, unassigned and erroneous HEC)
- *Delivered* — cells delivered to the SAR device
- *Idle* — idle cells received (downstream) or transmitted (upstream)
- *Unassigned* — unassigned cells received (cells of this type are never transmitted)
- *FIFO overflow* — overflow in the ADSL chip reception queue
- *Short* — cells transmitted from the SAR device to the ADSL chip which the latter has dropped as they are incorrect (length less than 52 bytes)
- *Long* — cells transmitted from the SAR device to the ADSL chip which the latter has dropped as they are incorrect (length greater than 52 bytes)

d) CHANNEL <FAST | INTERLEAVED> CODIFICATION

Displays detailed information on the codification used in the channel.

```
atm0/0 ADSL monitor+CHANNEL INTERLEAVED CODIFICATION
                              Downstream       Upstream
                             ------------     ----------
   Codeword Size                    160              96
   Parity bytes                      16              16
```

e) CHANNEL <FAST | INTERLEAVED> PERFORMANCE

Displays information on the long-term behavior of the channel, as defined in the ADSL-LINE-MIB.

```
atm0/0 ADSL monitor+CHANNEL INTERLEAVED PERFORMANCE
                             ATU-C        ATU-R
                            -----------  -----------
Received Blocks                1741836      1741491
Transmitted Blocks             1741905      1741560
Corrected Blocks                 10212          138
Uncorrected Blocks               11454        15180
Valid Intervals                      1            1
Invalid Intervals                    0            0
Current 15 min
    Time Elapsed                   566          566
    Received Blocks            1741836      1741491
    Transmitted Blocks         1741905      1741560
    Corrected Blocks             10212          138
    Uncorrected Blocks           11454        15180
Current day
    Time Elapsed                   566          566
    Received Blocks            1741836      1741491
    Transmitted Blocks         1741905      1741560
    Corrected Blocks             10212          138
    Uncorrected Blocks           11454        15180
Previous day
    Monitored seconds                0            0
    Received Blocks                  0            0
    Transmitted Blocks               0            0
    Corrected Blocks                 0            0
    Uncorrected Blocks               0            0
```

- *Corrected blocks*: blocks received with errors that were possible to correct i.e. they do not affect performance.
- *Uncorrected blocks*: blocks received with errors that were impossible to correct i.e. they have affected performance.

f) CHANNEL <FAST | INTERLEAVED> INTERVAL

Displays information on the indicated channel behavior in intervals of 15 minutes, as defined in the ADSL-LINE-MIB. (Synchronism of 15 minutes and day is produced with the system clock i.e. the first 15 minute interval may terminate prematurely in order to synchronize the rest of the intervals with the clock and similarly with the day.)

```
atm0/0 ADSL monitor+CHANNEL INTERLAVED INTERVAL 1
                       ATU-C        ATU-R
                    -----------  -----------
Interval number               1            1
Received Blocks         1236825      1236480
Transmitted Blocks      1236963      1236549
Corrected Blocks              0            0
Uncorrected Blocks            0            0
Valid Data                true         true
```

2.2. CLEAR

Deletes the specified information.

2.3. CLOSE

Permits you to close the ADSL line and leave it idle until you execute the "OPEN" command.

2.4. LOG-FILE

If the capture from the negotiation process is enabled and the interface is based on an Alcatel DynaMiTe chipset, you have the last failed connection register.
In cases where this capture is not enabled, the chipset is not DynaMiTe or the capture has not finalized, the following message is displayed:

```
atm0/0 ADSL monitor+LOG-FILE
Not available
```

```
atm0/0 ADSL monitor+LOG-FILE

Power on the line is -18.062 dBm
tone detected   = 40
-->SNR  (lin)   = 4912.636
Power on the line is -20.907 dBm
tone detected   = 56
-->SNR  (lin)   = 2438.482
Power on the line is -20.861 dBm
tone detected   = 64
-->SNR  (lin)   = 1904.254
AME: peerModemFound at time : 269
--- Activator --- REPORT MODEMLINECONTROLLER notify : ITU_HS_FOUND
PeerModemDetector::stopTranceiver
_active_detectionMode == ADM_DETECT_ITU
HS : TRELLIS_IN_LITE_IMPLEMENTED = #0x0#
==>>HsSegPool: getFreeSegment: returned [0] =
==>>HsSegPool: getFreeSegment: returned [1] =
** HS DL notify state *** enter : 0
** HS DL notify state *** enter : 1
Start HandshakeSequence
Installing initial TEQ coefficients
new gain: 1800 /100
HandshakeSequence(commmon): new gain = 1855 /100
RxGain before C-TONE
AnalogInterface : Message transfered after filtering 0x0x6200
AnalogInterface : Message transfered after filtering 0x0x5002
AnalogInterface : Message transfered after filtering 0x0x5002
doing power measurement on C-TONES
Power on the line is -18.063 dBm
tone detected   = 40
-->SNR  (lin)   = 3042.838
Power on the line is -20.907 dBm
tone detected   = 56
-->SNR  (lin)   = 1523.930
Power on the line is -20.861 dBm
tone detected   = 64
-->SNR  (lin)   = 1183.771
CTones end of detection : 1,40
doCtonesProcessing, measuredPower = 1048576.000
 RMS line single = 87.633
handshakeSequence(nt): new gain = 2498 /100
handshakeSequence(nt): new gain = 3198 /100
RxGain after C-TONE
```

```
AnalogInterface : Message transfered after filtering 0x0x6880
Handshake pilot tone: 40
gain scale factor 1.504
g1, g2 : 491,24857
DPLL  (g1 = 491, g2= 24857) : freq error = -9.0323486328125e0 ppm, dpll_loop acc =
0xF686
AnalogInterface : Message transfered after filtering 0x0x4EE2
Remaining frequency error -7.032
DPLL  (g1 = 491, g2= 24857) : freq error = -2.50567626953125e0 ppm, dpll_loop acc =
0xFD5F
[before 4QAM - 2BAM] : Remaining frequency error -2.505
4QAM : x = 8174.000, y = 8201.000
DPLL  (g1 = 491, g2= 24857) : freq error = -1.7647705078125e0 ppm, dpll_loop acc =
0xFE26
Remaining frequency error = -1.764
Doing phase rotation
installing demodulation
** HS DL notify state *** enter : 3
sending RTone1
pvoTimeRTone1: 745
enable counter reload
HS BIT-BYTE sync :: GALF detected.
HS BIT-BYTE sync :: GALF detected.

###### HsProtTimer :: WARNING time : 615 > 500 ms #####.
HS :: send flags.
** HS DL notify state *** enter : 4
==>>HsSegPool: getFreeSegment: returned [2] =
###### HsProtTimer :: timer not running #####.
==>>HsSegPool: releaseSegment: found [2] =
###### HsProtTimer :: timer not running #####.
==>>HsSegPool: releaseSegment: found [0] =
==>>HsSegPool: getFreeSegment: returned [0] =
==>>HsSegPool: getFreeSegment: returned [2] =
==>>HsSegPool: getFreeSegment: returned [3] =
==>>HsSegPool: releaseSegment: found [0] =
==>>HsSegPool: releaseSegment: found [2] =
###### HsProtTimer :: timer not running #####.
==>>HsSegPool: releaseSegment: found [1] =
** HS DL notify state *** enter : 5
==>>HsSegPool: getFreeSegment: returned [0] =
disable Transmit Soc channel -> send quiet.
disable Receive Soc channel.
==>>HsSegPool: releaseSegment: found [2] =
==>>HsSegPool: releaseSegment: found [0] =
==>>HsSegPool: releaseSegment: found [3] =
==>>HsSegPool: releaseSegment: found [0] =
** HS DL notify state *** enter : 6
*** start INITIALIZING ***
+++ TRAINING +++
vendor code: 0x0
version code: 0x0
Installing initial TEQ coefficients
AnalogInterface : Message transfered after filtering 0x0x4EE2
AnalogInterface : Message transfered after filtering 0x0x4EE2
RxGain MID before C-REVERB1
AGC phase : 1 , 'gain'=8.600
WARNING !!! getRxBPFGain function is used only for ADSF and ADSG.....
AnalogInterface : Message transfered after filtering 0x0x2200
Putting analog gain to 8 dB
Putting FFT scale to 5
dyn threshold: -38.063
dyn threshold: -38.063
dyn threshold: -38.063
dyn threshold: -38.063
dyn threshold: -38.063
Power on the line is -20.941 dBm
Pilot detected -->SNR  (lin)   = 780843.264
C_PILOT detected
TrainingSequence::adaptPilotFeq
pilot = 64
```

```
x = 1061.437
y = -3001.437
scale = 3.639
installing DPLL coefficients
DPLL  (g1 = 274, g2= 18575) : freq error = -1.04248046875e0 ppm, dpll_loop acc =
0xFEE8
AnalogInterface : Message transfered after filtering 0x0x4F02
DPLL  (g1 = 154, g2= 13931) : freq error = -1.86529541015625e0 ppm, dpll_loop acc =
0xFE0B
DPLL  (g1 = 86, g2= 10448) : freq error = -1.86529541015625e0 ppm, dpll_loop acc =
0xFE0B
ToneTriggerModule: enable recording of C_REVERB1
P_Rx      =  1.291286945343017578e9
P_echo    =  3.791599988937377929e4
P_tot     =  1.291324853897094726e9
P_RxBoost =  2.829724502563476562e9
AnalogInterface : Message transfered after filtering 0x0x2100
Putting analog gain to 6 dB
Putting FFT scale to 5
+++ ANALYSIS +++
 Pilot rescale ...
x = 7790.875
y = -7766.125
scale = 1.053
Echo Measurement ...
   DcOffset value : -3.10142564773559570e2
Channel Measurement ...
  DcOffset value : -3.1195068359375e2
First TEQ-FEQ calculation
!! FIRST_MEDLEY_TONE_INTEROP_MASKING 220 : DELTA_SNR_INTEROP_MASKING = 2
P_Rx      =  7.734686374664306640e8
P_echo    =  5.747004508972167968e1
P_tot     =  7.734686374664306640e8
Calculated window move parameter : 112
*** Start EXCHANGE ***
New PILOT has carrier number 84
 RTV value for segue detection : 166
+++ start transmitSequence +++
enable synchronuous schedule swap
Seque symbol detected at sync 87 and symb 71
C_MESSAGES1 received completely
Psd down: -40
Target NM: 6
Downstream option #0 interl : 238
Downstream option #0 fast   : 0
Downstream option #0 RS interl:16
Downstream option #0 2*S    : 2
Downstream option #0 Idepth : 64
Downstream option #1 interl : 170
Downstream option #1 fast   : 0
Downstream option #1 RS interl:14
Downstream option #1 2*S    : 2
Downstream option #1 Idepth : 64
Downstream option #2 interl : 86
Downstream option #2 fast   : 0
Downstream option #2 RS interl:7
Downstream option #2 2*S    : 4
Downstream option #2 Idepth : 32
Downstream option #3 interl : 2
Downstream option #3 fast   : 0
Downstream option #3 RS interl:1
Downstream option #3 2*S    : 32
Downstream option #3 Idepth : 4
-------------------------------------------------------------
MODEM INITIALIZING IN OPERATION MODE  G_DMT POTS  !!!!!
INITIALIZATION SPECIFICATIONS : STANDARD COMPLIANT INITIATIZATION  !!!!!
INITIALIZATION SPECIFICATIONS : MINUMUM OVERHEAD FRAMING  !!!!!
-------------------------------------------------------------
AnalogInterface : Message transfered after filtering 0x0x6F02
build R_MESSAGES1
New PILOT has carrier number 94
```

```
force counter reload
TransmitSequence: Counter reload event
Calculate final TEQ
delta = 103     delta_0 = 111
teq gain = 0
Calculate final window move
TEQ-FEQ : DcOffset value : -2.89826202392578125e3
FSE after TEQ: 4
 RTV value for segue detection : 216
SNR Measurement ...
enable counter reload
 SNR measurement ...
Calculating max capacity ...
SNR medley:

38: 27  27      29      32      34      36      37      39      41      43
48: 44  46      47      48      48      49      50      50      51      51
58: 51  52      52      52      52      52      52      53      53      53
68: 53  53      53      54      53      53      53      53      53      53
78: 54  53      54      54      54      54      54      54      54      54
88: 54  54      54      54      54      54      54      54      54      54
98: 54  54      54      54      54      54      54      54      54      54
108: 54 53      54      54      54      54      54      54      54      53
118: 54 53      53      53      53      53      53      53      53      53
128: 53 53      53      53      53      53      53      52      53      52
138: 52 52      52      52      52      52      52      52      52      52
148: 52 52      52      52      52      51      51      51      51      51
158: 51 51      51      51      51      51      51      51      51      51
168: 51 50      50      50      51      50      50      50      50      50
178: 50 50      50      50      50      50      50      50      50      50
188: 50 49      49      49      49      49      49      49      49      49
198: 49 48      48      48      48      48      48      48      48      48
208: 48 48      48      48      48      48      48      47      47      47
218: 47 47      47      47      47      47      47      46      46      46
228: 46 46      46      46      46      46      46      46      46      46
238: 45 45      45      45      45      45      44      44      44      43
248: 43 42      41      40      39      38      36      35
maxPower = 231.884
 Max capacity Execution time    = 51 ms
 Total_number_of_bits_supported = 2690
 Performance_Margin             = 6.000 dB
uncoded snr: 728  coded snr: 650 averageBi : 12
Coding Gain (in units of 0.5 dB : 7
Build R_MESSAGES_RA
enable counter reload
TransmitSequence: Counter reload event
Seque symbol detected at sync 229 and symb 17
decode C_MESSAGES_RA
CRC error for C_MESSAGES_RA
AnalogInterface : Message transfered after filtering 0x0x7E01
Autonomuous Message : Modem init failure
```

2.5. OPEN

Disables the CLOSE command permitting the ADSL modem to function normally.

2.6. SIGNAL

Displays diverse information on the physical signal.

```
atm0/0 ADSL monitor+SIGNAL ?
INTERVAL
PARAMETERS
PERFORMANCE
```

a) SIGNAL INTERVAL

Displays information on the indicated signal behavior in intervals of 15 minutes, as defined in the ADSL-LINE-MIB. (Synchronism of 15 minutes and day is produced with the system clock i.e. the first 15 minute interval may terminate prematurely in order to synchronize the rest of the intervals with the clock and similarly with the day.)

```
atm0/0 ADSL monitor+SIGNAL INTERVAL <1..96>
                          ATU-C           ATU-R
                        ----------      ----------
Interval number                1               1
Loss of framing                0               0
Loss of signal                21              21
Loss of link                   0              --
Loss of power                  0               0
Errored Seconds               21              21
Valid Data                 false           false
```

b) SIGNAL PARAMETERS

Displays the instantaneous parameters referent to the signal, including the bits per tone load. Given that the process to obtain this information is long (some 20 seconds), you can abort the process by striking any key (in which case the information on the bits per tone will be invalid.)

```
atm0/0 ADSL monitor+SIGNAL PARAMETERS
                                ATU-C                 ATU-R
                        ----------------------   ----------------------
Noise Margin (dB)       +14.0                    + 7.0
Attenuation (dB)         29.5                     28.0
Output Pwr(dBm)         +19.5                    +12.0
Attainable Rate (bps)   10176000                 1152000
Status                  0001                     0001
                        No defect                No defect

Operational mode        G.992.1 Annex A
Bits per tone load:
  Tone   0 --> 0 0 0 0 0 0 0 9 b c d d e e e e
  Tone  16 --> e e e e e e d c d d c c c b 0 0
  Tone  32 --> 0 0 0 0 0 0 2 3 4 5 6 7 7 8 8 a
  Tone  48 --> a b b b b b c c c c c c c c d c
  Tone  64 --> 0 d d d d d d d d d d d d d d d
  Tone  80 --> d d d d d d d d d d d d d d d d
  Tone  96 --> d d d d d d d d d d d d d c d d
  Tone 112 --> c c c c c c c c c c c c c c c c
  Tone 128 --> c c c c c c c c c c c c c c c c
  Tone 144 --> c c c c c c c c c b b b b b b b
  Tone 160 --> b b b b b b b b b b b b b b b b
  Tone 176 --> b b b b b a a a a a a a a a a a
  Tone 192 --> a a a a a 9 9 9 9 9 9 8 8 8 8 8
  Tone 208 --> 8 8 8 8 8 8 8 8 8 8 8 7 7 7 7 7
  Tone 224 --> 7 7 7 7 6 6 6 6 6 6 6 6 5 5 5 4
  Tone 240 --> 4 4 3 3 2 2 0 0 0 0 0 0 2 2 2 2
```

- *Noise Margin* additional noise margin existing with respect to the signal/noise ratio required for a 10^{-7} BER (corresponding to a noise margin of 0)
- *Attenuation* attenuation measurement
- *Output Power* output power (this value is not available for the EAGLE chipset)
- *Attainable rate* maximum speed that can be achieved under normal conditions; this does not indicate the available data speed.
- *Status* Flags indicating the signal status.

- No defect
- Loss of framing
- Loss of signal
- Loss of power
- Loss of signal quality

- *Operational mode*: Operational mode through which synchronization has been reached. G.992.1 Annex A G.992.1 Annex B G.992.2 Annex A G.992.2 Annex B ANSI T1.413
- *Bits per tone load*: Number of bits assigned to each of the tones making up the DMT modulation.

c) SIGNAL PERFORMANCE

Displays information on the long-term behavior of the signal, as defined in the ADSL-LINE-MIB.

```
atm0/0 ADSL monitor+SIGNAL PERFORMANCE
                                  ATU-C          ATU-R
                                -----------    -----------
Loss of framing seconds                   0              0
Loss of signal seconds                    0              0
Loss of link seconds                      0             --
Loss of power seconds                     0              0
Errored seconds                           7              8
Inits                                     0             --
Valid Intervals                           0              0
Invalid Intervals                         0              0
Current 15 min
    Time Elapsed                        188            188
    Loss of framing                       0              0
    Loss of signal                        0              0
    Loss of link                          0             --
    Loss of power                         0              0
    Errored Seconds                       7              8
    Inits                                 0             --
Current day
    Time Elapsed                        188            188
    Loss of framing                       0              0
    Loss of signal                        0              0
    Loss of link                          0             --
    Loss of power                         0              0
    Errored Seconds                       7              8
    Inits                                 0             --
Previous day
    Monitored seconds                     0              0
    Loss of framing                       0              0
    Loss of signal                        0              0
    Loss of link                          0             --
    Loss of power                         0              0
    Errored Seconds                       0              0
    Inits                                 0             --
```

2.7. STATUS

Permits you to check the ADSL modem status as well as the chipset used and other less important information.

```
atm0/0 ADSL monitor+STATUS
  Chipset               Analog Devices EAGLE (POTS)
  Modem status          DOWN
  Machine state         INITIALIZE_TX (INITIALIZATION)

  -- ADI Eagle specific info --
  Modem Flags ......................... 00000000
  Modem Flags Last Cause .............. 00000000
```

```
atm0/0 ADSL monitor+status
   Chipset               Alcatel DynaMiTe (POTS)
   Modem status          UP
   Machine state         Line opened (SHOWTIME)

 Last cause:                    none
 Interrupts:                    638
 Interrupts in reset mode:      0
 Spurious interrupts:           0
 Semaphore failures:            0
 Watchdog value:                14
 Watchdog failures:             0
 Excluding area 1 blocked:      false
 Excluding area 2 blocked:      false
 Excluding area 3 blocked:      false
```

2.8. VENDOR-INFO

Displays information on the manufacturer of the remote (ATU-C) and local (ATU-R) ADSL interface. This information varies if the operation mode is ANSI or ITU.

Information when the operation mode is ITU:

```
atm0/0 ADSL monitor+VENDOR-INFO
                          ATU-C               ATU-R
                       -----------         -----------
ITU Country code:       0x0f                0x00
ITU Reserved:           0x00                0x00
ITU Vendor code:        ALCB                ANDV
ITU vendor specific:    0x0000              0x0000
ITU standard revision:  0x00                0x00
FW Version:             0x00000000          0x42e2ea52
HW Version:             0x00000000          0x1d3a4900
```

Information when the operation mode is ANSI:

```
ADSL atm0/0 monitor+VENDOR-INFO
                          ATU-C               ATU-R
                       -----------         -----------
ANSI Vendor ID:         0x0039              0x0000
ANSI Version Number:    Issue 1.0           Issue 1.0
FW Version:             0x00000000          0x40e4be17
HW Version:             0x00000000          0x1d3a4900
```

2.9. EXIT

Exits to the previous menu.

```
atm0/0 ADSL monitor+EXIT
atm0/0 monitor+
```

Chapter 4
ADSL Events

1. Introduction

The ADSL interface events are described in this chapter.

To activate the ADSL interface events:

From the monitoring:

```
*PROCESS 3

+EVENT

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

From the configuration:

```
*PROCESS 4


Config>EVENT

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

So that these remain stored in the device configuration, the user must save the configuration and restart the device.

2. Events

ADSL.001

Level: Common informational comment, C-INFO

Short Syntax:

ADSL.001 ADSL/***INSTANCE*** Device ***CHIPSET_DESCRIPTION*** registered address 0x***ADDRESS***

Long Syntax:

ADSL.001 ADSL/***INSTANCE*** Device ***CHIPSET_DESCRIPTION*** registered address 0x***ADDRESS***

Description:

Registration of the n-th ADSL device built on the specified chipset at the indicated address.

ADSL.002

Level: Common operation trace, C-TRACE

Short Syntax:

ADSL.002 ADSL/***INSTANCE*** Device cmd ***COMMAND_DESCRIPTION***

Long Syntax:

ADSL.002 ADSL/***INSTANCE*** Device command ***COMMAND_DESCRIPTION***

Description:

Command to the ADSL device.

ADSL.003

Level: Common informational comment, C-INFO

Short Syntax:

ADSL.003 ADSL/***INSTANCE*** Line ***LINE_INFORMATION***

Long Syntax:

ADSL.003 ADSL/***INSTANCE*** Line ***LINE_INFORMATION***

Description:

Notification of a line event: opening state, open failed and reason, opened, monitoring forces reneg, signal lost, orderly closed not granted, suicide request, closed...

ADSL.004

Level: Common operation trace, C-TRACE

Short Syntax:

ADSL.004 ADSL/***INSTANCE*** FSM ***STATE_MACHINE_EVENT***

Long Syntax:

ADSL.004 ADSL/***INSTANCE*** FSM ***STATE_MACHINE_EVENT***

Description:

ADSL state machine event (each chipset has a different state machine)

ADSL.005

Level: Common operation trace, C-TRACE

Short Syntax:

ADSL.005 ADSL/***INSTANCE CHIPSET_DESCRIPTION*** soft ev: ***SOFTWARE_EVENT***

Long Syntax:

ADSL.005 ADSL/***INSTANCE CHIPSET_DESCRIPTION*** soft event ***SOFTWARE_EVENT***

Description:

Milestone in the propietary chipset software

ADSL.006

Level: Common operation trace, C-TRACE

Short Syntax:

ADSL.006 ADSL/***INSTANCE*** DYN ***CMD_EVENT*** cmd (0x***CMD_OPCODE***) ***CMD_DETAILS***

Long Syntax:

ADSL.006 ADSL/***INSTANCE*** DYNAMITE ***CMD_EVENT*** command (0x***CMD_OPCODE***) ***CMD_DETAILS***

Description:

DYNAMITE chipset command event

ADSL.007

Level: Common operation trace, C-TRACE

Short Syntax:

ADSL.007 ADSL/***INSTANCE*** DYN ***INTERNAL_EVENT***

Long Syntax:

ADSL.007 ADSL/***INSTANCE*** DYNAMITE ***INTERNAL_EVENT***

Description:

DYNAMITE specific: unexpected response, unknown response, watchdog failed, semaphore op failed, chip busy, chip reset, chip wakeup

ADSL.008

Level: Common operation trace, C-TRACE

Short Syntax:

ADSL.008 ADSL/***INSTANCE*** EAGLE ***EVENT_DESCRIPTION***

Long Syntax:

ADSL.008 ADSL/***INSTANCE*** EAGLE ***EVENT_DESCRIPTION***

Description:

EAGLE chipset specific event