SA-PAM-SAN-ETH

SA-PAM-SAN-ETH-ROHS

SA-PAM-SAN-ETH,4W

SA-PAM-SAN-ETH/FXO

SA-PAM-SAN-ETH/FXS

SA-PAM-SRL-ETH

SA-PAM-SRL-ETH,4W

SA-PAM-SRL-ETH/FXO

SA-PAM-SRL-ETH/FXS

G.SHDSL Modem

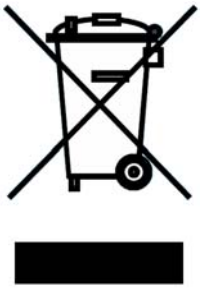
USER MANUAL

Version	2.0
Revision	18 September 2005
Document name	_SAUM_PAM-SAN-Eth_v2-0-070201.doc

1 VERSION CONTROL

Version	Date	Major changes to previous version
1.0	31.12.2001	Initial version of the manual corresponding to version 1.2 of the device micro program
1.1	23.10.2003	New function description corresponding to software release V1.6 Corrected Connecter description 9.1 Changed DSL cable to twisted type 10.2
1.2	26.1.2004	Manual corresponding to software version 1.7 Implementation of SRL models
1.3	07.7.2004	Added Connecter drawing 8.2 Manual corresponding to software version 1.8 Small Text changes
1.4	11.2.2005	Manual corresponding to software version 1.9s SNMP topic implemented TFTP topic implemented Small Text changes
1.5	2.8.2005	Manual corresponding to software version 2.4 CE Model implemented TFTP topic modified
1.6	9.9.2005	Manual corresponding to software version 2.42 Modified 4.4.1.3 TFTP topic modified
1.7	9.9.2005	Implemented EN50419
1.8	3.4.2006	Manual corresponding to software version 2.45 Implemented new soft commands
1.9	22.5.2006	Manual corresponding to software version 2.46 remove some soft commands
2.0	18.9.2006	Manual corresponding to software version 2.46a Added the VLAN topic Implemented the LF (lead free) modem

EU Directive 2002/96/EC and EN50419



This equipment is marked with the above recycling symbol. It means that at the end of the life of the equipment you must dispose of it separately at an appropriate collection point and not place it in the normal domestic unsorted waste stream. (European Union only)

2 GENERAL INFORMATION

- High-speed symmetrical data transmission over one physical copper twisted pair with the 135 Ohm impedance according to ETSI TS 101 135.
- ITU-T G.991.2 (G.shdsl) line encoding.
- Line rate in the range from 72 Kbit/s to 2320 Kbit/s.

  Line rate in the range from 144 Kbit/s to 4624 Kbit/s (4W models only)
- Manual or automatic mode of line-speed adjustment.
- Ethernet *10/100Base-T* interface, Full/Half duplex.
- Transmission of VLAN packet (IEEE-802.1Q).
- Dynamic table formation of MAC addresses.
- Accumulation of up to 1024 MAC addresses.
- Granting of 95% of the digital channel band to the user.
- In-built functions of diagnostics and self-testing.
- Low power consumption, easy-to-use applications.
- Console port for the local management.
- Telnet port for the local / remote management
- SNMP Management
- Remote TFTP Software upload
- 230 Vac power

For SA-PAM-SAN-Eth/FXO/FXS

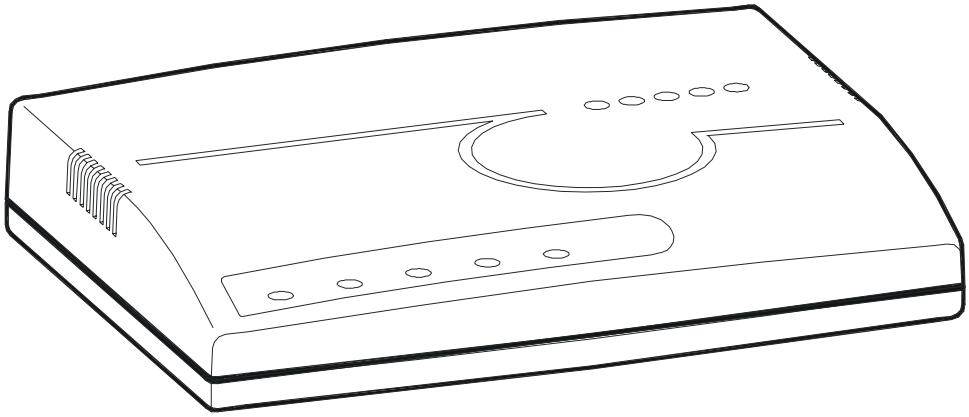
- up to 2 voice cannel.

3 ORDER INFORMATION

SA-PAM-SAN-Eth	Modem S-Access Discovery, Tabletop, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 230 Vac
SA-PAM-SAN-Eth-ROHS	RoHS-Ready Modem S-Access Discovery, Tabletop, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 230 Vac
SA-PAM-SRL-Eth	Modem S-Access Discovery, SubRack, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 230 Vac
SA-PAM-SAN-Eth,4W	Modem S-Access Discovery, Tabletop, G.shdsl, 2 pairs, up to 4.6Mbps, 10/100Base-T Bridge, VLAN, Adapter 230 Vac
SA-PAM-SRL-Eth,4W	Modem S-Access Discovery, SubRack, G.shdsl, 2 pairs, up to 4.6Mbps, 10/100Base-T Bridge, VLAN, Adapter 230 Vac
SA-PAM-SAN-Eth/FXS	Modem S-Access Discovery, Tabletop, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 230 Vac, with FXS interfaces
SA-PAM-SRL-Eth/FXS	Modem S-Access Discovery, SubRack, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 230 Vac, with FXS interfaces
SA-PAM-SAN-Eth/FXO	Modem S-Access Discovery, Tabletop, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 230 Vac, with FXO interfaces
SA-PAM-SRL-Eth/FXO	Modem S-Access Discovery, SubRack, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 230 Vac, with FXO interfaces

4 DESCRIPTION OF THE DEVICE

4.1 Exterior design SAN models



The front panel of the device has 3 LEDs (FXO and FXS has 2 additional LEDs):

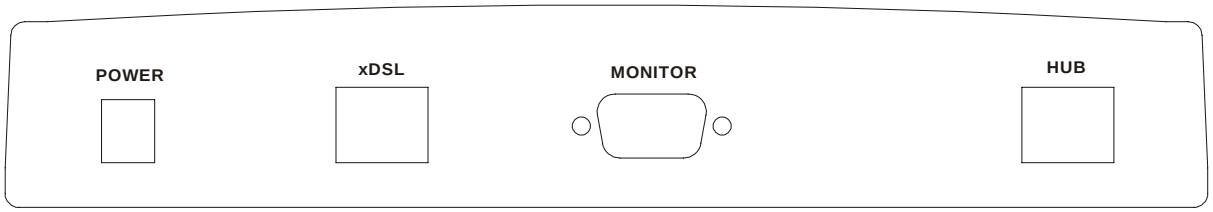
4.2 LED STATUS

LOCAL	informs the user about the status of the local device. The following four statuses are possible	
	«blinking red»	informs the user about malfunctioning of the modem's hardware and software. In this case, the modem is out of order and should be submitted to the service center for being repaired.
	«red»	informs the user about an urgent alarm. An abruption of the connection, the correspondence of the signal-to-noise ratio which does not allow to transmit information and a great number of errored blocks can cause an urgent alarm. See the "Command menu" chapter for detail.
	«amber»	informs the user about non-urgent alarms. An abruption of connection over the user's interface can cause non-urgent alarms.
	«green»	absence of alarms. Normal functioning of the device.
REMOTE (WAN)	This LED indicates the Ethernet traffic on the DSL line	
LINK/ACT (LAN)	This LED indicates the following statuses:	
	«amber»	Ethernet port receiving data packets

	«green»	Ethernet link established
PORT1	If the unit is a FXO or FXS model then the LED indicates the following status of Line2:	
	«off»	Telephone line inactive
	«red»	Telephone line active (FXO unit)
	«green»	Telephone line active (FXS unit)
PORT2	If the unit is a FXO or FXS model then the LED indicates the following status of Line1:	
	«off»	Telephone line inactive
	«red»	Telephone line active (FXO unit)
	«green»	Telephone line active (FXS unit)

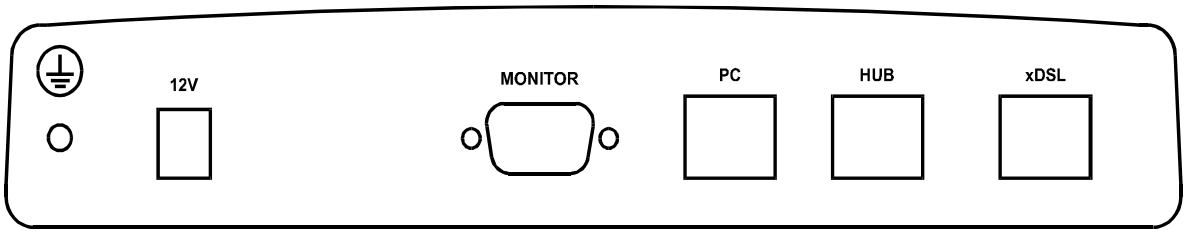
4.3 Back panel

The back panel of the SA-PAM-SAN-Eth-ROHS modem has:



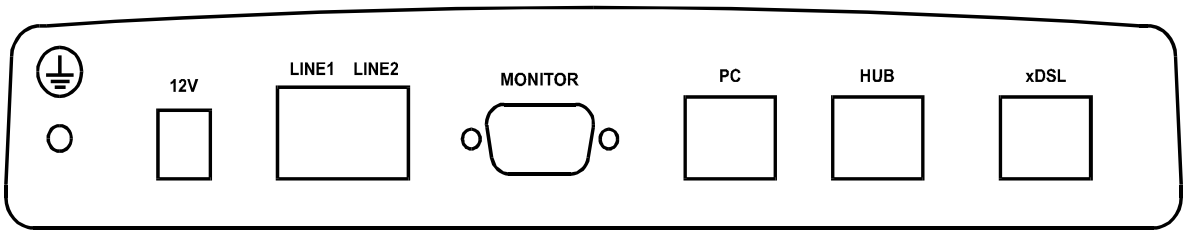
- The grounding bolt of the modem (option);
- The “12Vdc / POWER “ connector. The connection of the modem to the 220 V power supply is implemented using an external power supply unit;
- the “Monitor” connector to control the modem and store statistics;
- “HUB” connector to connect the modem to the LAN using a straight Patch Cord;
- the “DSL” connector to connect the modem to the leased physical line.

The back panel of the SA-PAM-SAN-Eth modem has additionally:



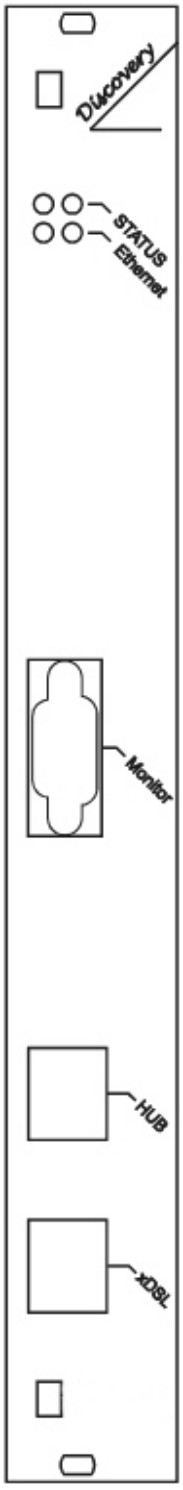
- “PC” connector to connect the modem to the LAN using a straight Patch Cord;

The back panel of the SA-PAM-SAN-Eth/FXO/FXS modem has additionally:



- The “LINE1” and “”LINE2” connector to connect to PABX (FXO model) or to telephone (FXS model).

4.4 Exterior design SRL models



Status(L)	informs the user about the status of the local device. The following four statuses are possible	
	«blinking red»	informs the user about malfunctioning of the modem's hardware and software. In this case, the modem is out of order and should be submitted to the service center for being repaired.
	«red»	informs the user about an urgent alarm. An abruption of the connection, the correspondence of the signal-to-noise ratio which does not allow to transmit information and a great number of errored blocks can cause an urgent alarm.
	«amber»	informs the user about non-urgent alarms. An abruption of connection over the user's interface can cause non-urgent alarms.
	«green»	absence of alarms. Normal functioning of the device.
Status(R)	informs the user about the status of the remote device. At the time being the remote configuring of modems is not provided.	
Ethernet	The LED is lit upon an incorrect connection to the LAN. The LED is blink upon the detection of packets in the segment of the current LAN.	

5 RULES OF SWITCHING

5.1 The SAN (Stand alone) delivery set

The delivery set includes:

- the subscriber access device (a modem)
- the power supply source (an AC adapter)
- the cables for the line connections

5.2 The SRL (SubRackCard) delivery set

The delivery set includes

- the subscriber access device (a module)
- the cables for the line connections

5.3 Connection rules

During the connection of the modem stick to the following rules:

- connect the modem using the “straight” Patch Cord cable to the hub through the HUB connector or to the PC through the PC connector. Only one device can be connected to modem jack at same time.
- connect the modem, if necessary, to the serial port of the PC through the “MONITOR” connector using the “straight” modem cable;
- connect the modem to the line using the “DSL” connector;
- connect the power supply unit to the AC power system;
- connect the modem to the power adapter using the “DC 12V” connector; it’s necessary to use 13.5V adapter for FXS models
- launch the hyper-terminal operation program on the PC.

5.4 Communication parameters of the terminal configuration

It is necessary to set the following parameters to monitor the modem:

- transmission rate – 9600;
- data bits – 8;
- parity – none;
- number of stop bits – 1;
- flow control – None

To update the information on the screen use the “Enter” key. The following menu will appear on the screen.

```
Input Password:
```

Please enter your programmed password. The unit will be delivered without a password, if there is a password: default password “admin”

After entering the password the following menu will appear.

```
   Discovery G.SHDSL
 Ethernet Monitor V2.42

+-----------------------+
+       Main Menu       +
+-----------------------+
1. Performance management (PM)

3. Configuration management (CM)
4. Security management (SM)
5. Exit Console




          Select item number or ESC to Upper level menu>>
```

The modem is ready to be configured.

6 THE COMMAND SYSTEM

6.1 Basic rules

After the command is typed, press <enter>.

The <Backspace> key is used to edit commands.

It is necessary to input item number, for choosing menu item,

You can use “PageUP”, “PageDown” and “Space” keys, for scrolling list of available value of parameters,

The “Esc” key is using for canceling of new value of parameters or returning to up menu screen.

6.2 The main menu

The main menu is the following:

```
   Discovery G.SHDSL
 Ethernet Monitor V2.42

+-----------------------+
+       Main Menu       +
+-----------------------+
1. Performance management (PM)

3. Configuration management (CM)
4. Security management (SM)
5. Exit Console

              Select item number or ESC to Upper level menu>>
```

The menu consists of five submenus. To choose the needed submenu, it is necessary to type its number and press “Enter”. The main menu also contains information about the current version of the firmware. It is important that you inform the service center about it when being consulted.

6.3 Performance management submenu

Upon activation of the performance management submenu the following message will be displayed.

```
                    Performance Management

          1.Loop Status...

          4.EtherNet Status...

          7.HDLC Status...



             Select item number or ESC to Upper level menu>>
```

6.3.1 Loop Status submenu

Upon activation of the performance management submenu the following message will be displayed.

```
                Performance Management->Loop Status

        System Up Time: 0 Day 00:16:31
                        = Loop 1 =
        Loop Up Time:   0 Day 00:15:07
        Operation State:Data
        Line Speed:     2312K
        Rx Gain:        5.43 dB
        Tx Power:       14.50 dBm
        S/N Ratio:      37.74 dB
        Framer Status:  In sync.
        Loop Atten.:    -0.19 dB

        Operation Mode: Slave
        Auto/Fixed:     Fixed
        Clock Source:   Follow Loop
        Annex:          A/B
        Fixed Speed:    2312K(36N)


        1.Disconnect
                Select item number or ESC to Upper level menu>>
```

6.3.2 Ethernet Status submenu

Upon activation of the performance management submenu the following message will be displayed.

```
                  Performance Management->EtherNet Status

        Link:Link down     Link Speed:----         Link Duplex:----
  Used Entries:0             Tx Packets:0            Rx Packets:0
   Fwd Packets:0           Drop Packets:0

       Speed:Auto        Duplex:Auto         MAC Address: 00-0E-00-02-01-FD









            1.Clear Counters

               Select item number or ESC to Upper level menu>>
```

6.3.3 HDLC Status submenu

This menu contains statistical information about the HDLC packets that are sent between master and slave.

```
                Perfomance Managment->HDLC Status
        Channel_A                       Channel_B

      HDLC Tx Cnt:0                   HDLC Tx Cnt:0
      HDLC Rx Cnt:0                   HDLC Rx Cnt:0
     HDLC Fwd Cnt:0                  HDLC Fwd Cnt:0
    HDLC Drop Cnt:0                 HDLC Drop Cnt:0
   HDLC RxErr Cnt:0                HDLC RxErr Cnt:0
             SEGD:0                          SEGD:0
            Queue:0                         Queue:0



  1.Clear Counter(s)

     Select item number or ESC to Upper level menu>>
```

6.4 Configuration management submenu

Upon activation of the configuration management submenu the following message will be displayed.

```
                    Configuration Management
  1.DSL Setup...

  4.EtherNet Setup...

  6.Profile...
  7.Erase NVRAM

  8.[Security Auto Lock]:70 Seconds

  System Information
  Boot Loader: Version BL 2.46 Build 0001 Date:Nov 08 2006 14:07:37
  Application: Version CE 2.46c Build 0001 Date:Nov 08 2006 14:07:14
  DSP Firmware Version:R3.0.5 DSP Version:00
  OS Version:2.00

  Select item number or ESC to Upper level menu>>
```

6.4.1 DSL Setup

In this menu you can setup the DSL link. When you have selected that menu, the following will appear:

```
                Configuration Management->DSL Setup

          1.[Loop 1 Operation Mode]:Slave
          2.[Loop 1 Auto/Fixed]:Fixed


          5.[Loop 1 Fixed Connection Speed]:2312K(36N)
          6.[Loop 1 Annex]:A/B
          7.[Loop 1 Tx Level Adjustment]:0 dB









          19.[2W/4W]:2W

             Select item number or ESC to Upper level menu>>
```

6.4.1.1 Operation Mode

In this menu you can setup the unit to one of the following states:

Master, Slave

6.4.1.2 Auto / Fixed

This Menu is NOT available if the unit is in 4W mode! ***Except the unit has firmware version 2.41! (Ask support@s-access.ch if you like to get this special version)***

In this Menu you can setup the unit to one of the following states:

Auto, Fixed

If Auto is selected, the unit works in the adaptive mode.

If Fixed is selected, the unit works with fixed line rates.

6.4.1.3 Min- Max Connection Speed (only if Auto selected and FW 2.41 for 4W)

- In the Min. Max Connection Speed menu, you can specify your desired Adaptive mode speed limit borders in the range of 72 kbps to 2312 kbps for 2wire units and 528 kbps to 4624 kbps for 4wire models.

6.4.1.4 Fixed Connection Speed (only if Fixed is selected)

- In the Fixed Connection Speed menu, you can specify your desired speed in the range of 72 kbps to 2312 kbps for 2wire units and 528 kbps to 4624 kbps for 4wire models

6.4.1.5 Annex

- With the Appendix menu you can choose between A, B, A / B. If you don't know what Annex you have to setup, then use the A / B configuration.

6.4.1.6 Tx Level Adjustment

- In the Tx Level Adjustments menu you can setup you desired TX output level in the range from +2dB to –13dB.

Please note: changing the default value of 0 to another value may cause serious malfunction of the DSL line. It should be changed only by qualified personal.

6.4.1.7 2W / 2CH / 4W

- In the 2W / 4W (2wire / 4 wire) Adjustments menu you can setup you desired number and mode of the DSL line. The following modes are possible:

2W: 1 DSL line, normal mode

4W: 2 DSL lines, dual pair mode (4W models only)

2CH: 2 DSL lines, multipoint mode (4W models only)

1+1: 2 DSL crossover lines, safety mode (4W models only)

6.4.1.8 Reserve mode 1+1

The characteristic property of reserve mode 1+1 is data multiplexing on the every from xDSL interfaces, and as a result, connection between modems will be broken partially when broken one pair. In other words common capacity decrease and some channel intervals (which are located in cross-connect table) don't translate.

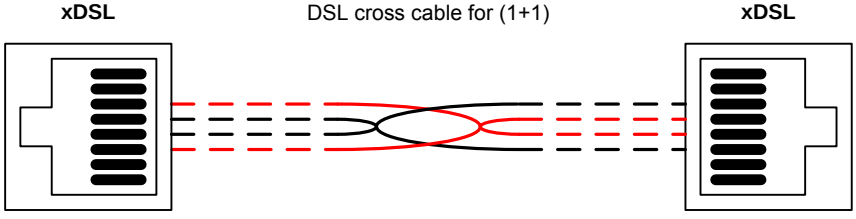
For setting of modem in reserve mode 1+1 via 4 wires line, you should set up menu in item 19.([2W/4W]) : 1+1

```
                Configuration Management->DSL Setup

        1.[Loop 1 Operation Mode]:Slave
        2.[Loop 1 Auto/Fixed]:Fixed
        3.[Loop 1 Clock Source]:INT

        5.[Loop 1 Fixed Connection Speed]:1160K(18N)
        6.[Loop 1 Annex]:B
        7.[Loop 1 Tx Level Adjustment]:0 dB

        9.[Loop 2 Operation Mode]:Master
        10.[Loop 2 Auto/Fixed]:Auto

        12.[Loop 2 Min. Connection Speed]:72K(1N)
        13.[Loop 2 Max. Connection Speed]:2312K(36N)
        14.[Loop 2 Annex]:B
        15.[Loop 2 Tx Level Adjustment]:0 dB
        16.[Loop 2 Power BackOff Enable]:Yes


        19.[2W/4W]:1+1
           Select item number or ESC to Upper level menu>>
```

After establishment of the reserve mode 1+1 the user can use sets for every from xDSL interfaces.

Attention: first xDSL-interface of every modem should be configured as SLAVE, and the second interface - as MASTER.

For connection of modems should be use cross -DSL cable.



6.4.2 Ethernet Setup submenu

```
                Configuration Management->EtherNet Setup

        1.[Speed]:Auto
        2.[Duplex Mode]:Auto
        3.[Disable Mac Filter]:No
        4.IP Address>>192.168.5.105
        5.Subnet Mask>>255.255.255.0
        6.Gateway Address>>192.168.5.1

        8.NMS IP Address>>192.168.5.32
        9.Read Community>>
        10.Write Community>>
        11.Trap Community>>
        12.[Enable TFTP Server]:Yes
        13.[DSL Reboot]:No
        14.[Time before Reboot]:1min
        15.[Management VLAN]:No
        16.VLAN ID>>2222
        17.Priority>>0




            Select item number or ESC to Upper level menu>>
```

- [Speed]: In the Speed menu, you can setup the Ethernet speed to the following states: 10M, 100M or Auto
- [Duplex Mode]: In the Duplex Mode menu you can setup the Ethernet ports to the following states:Half, Full or Auto
- [Disable Mac Filter]: prohibition of filtration of received packets from Ethernet-port side. When you set this parameter as “Yes” - all receiving packets on the Ethernet-port will be translated through DSL-connection. In most cases modems are using together with Ethernet Switch, and filtration of packets doing on the ports of the switch. In this case you haven’t necessity to filter packets again and recommend to set this parameter into “Yes”.
- [IP Address ,Subnet Mask, Gateway Address] - necessary parameters of the modem for remote management via Telnet and SNMP. These parameters are using only for remote access to the modem without none influence on the user’s traffic.
- [NMS IP Address] address of the system SNMP management on which are send messages about appearing events.
- [Read Community] Password for access to variables for reading through SNMP inquiries. Maximum length – 10 symbols. [Write Community] Password for access to variables for reading and writing through SNMP inquiries. Maximum length – 10 symbols.

- [Trap Community] Password which will be set in each event, sending to SNMP management system. This password are using for identification of messages from a guided units. Maximum length – 10 symbols
- [Enable TFTP Server]: Permission/prohibition remote upgrade SW of the modem. TFTP access has poor protection. We are recommending to enable TFTP-access before upgrade SW and to prohibit after fulfillment procedure of upgrade SW TFTP Server.
- [DSL Reboot]: this parameter to enable reloads of modems in the case when modems don't translate packets via DSL interface.
- [Time before Reboot]: time which is necessary for definition of connection's passivity.
- [Management VLAN]: enable / disable the VLAN packet support for the management of modems.
- VLAN ID: The VLAN-ID for the VLAN modem management support.
- VLAN Priority: This field defines the VLAN priority. 0 is lowest- and 7 is highest priority. This value will be inserted to every VLAN packed sent from the Discovery modem to the NMS.

6.4.3 Profile submenu

Users can save and load up to 4 profiles for different tasks. The Profile 0 is the default profile during power on. Users have to save all new value of parameters before power off.

6.4.4 Erase NVRAM

Users can erase the non volatile ram. This function will force some part of the unit to there factory default values.

6.4.5 Security Auto Lock

During this time the user must set up password for the modem. This is also the time after a telnet-session will be terminated in case of no terminal action.

6.5 Security management submenu

The security management is using for setting the desired password for the console access.

7 TFTP UPLOAD

7.1 Unit preparation

Its suggested to connect the PC Terminal to the monitor connector for the observation of the download procedure.

- Enter the Ethernet Setup submenu.
- Enter menu point [Enable TFTP Server] and switch TFTP on
- Exit menu point [Enable TFTP Server]
- Enter the Profile Submenu and Save the settings to Profile 0
- Restart the unit

7.2 PC Software download

- Unzip the download file to an empty directory
- If necessary rename the actual *.bin file to “all.bin”
- Open the cmd.exe windows menu (Start, Run, cmd)
- Enter the directory with the unzipped files
- Enter the following command “TFTP –I xx.xx.xx.xx PUT all.bin”
- Wait until the program terminates (check it on the PC Terminal)
- Close the cmd.exe windows menu

7.3 Unit termination

- Enter the Ethernet Setup submenu.
- Enter menu point [Enable TFTP Server] and switch TFTP off
- Exit menu point [Enable TFTP Server]
- Enter the Profile Submenu and Save the settings to Profile 0
- Restart the unit

8 SNMP

8.1 Traps

The unit supports the following traps:

Trap	Description
Cold start	Sent on unit startup
Linkup	Sent on DSL link up
Linkdown	Sent on DSL link loss
Authorization Error	Sent on reception of a wrong community string (hacker attack)

9 TECHNICAL SPECIFICATIONS

The main technical specifications of modems of the S-Access family are presented below in the table.

Line interface.		
Standard	ETSI 101 135	
Regulation	-RoHS = RoHS ready (Pb-free)	
Number of pairs	1 or 2	
Line rate 2 wire models 4 wire models	72 – 2320 Kbit/s 144 – 4624 Kbit/s	
Communication range for cables with the wire diameter of 144 Kbit/s 2320 Kbit/s (values are depending on noise environment and line quality)	0.4 mm: approx: 8.2 km 3.6 km	0.9 mm: approx: 31 km 13.7 km
Line code	G.shdsl (TC-PAM)	
Input impedance of the physical line	135 Ohm	
Output signal level	0.5dBm – 15.5 dBm	
Transmission spectrum	from 0…450 kHz	
User's interface		
Standard:	IEEE-802.3 IEE-802.1Q	
Interface type:	Ethernet 10/100Base-T, Full/Half Duplex	
Connector:	RJ-45	
Management		
Monitoring	VT100 / Telnet / SNMP	
Power supply		
Supply voltage: Stand alone Sub Rack Card	SAN model: ~230 Vac ± 10%; 50 Hz (power adapter) SRL model: 36Vdc – 72Vdc	
Power consumption:	No more than 5 W	
Grounding resistance	No more than 10 Ohm	
Protection	Conforms to the requirements of the GOST (State Standard) 12.2007.0-85, GOST 7153-85, GOST P.50033-92 and Norm 9-93	
Climatic conditions		
Storage Temperature range	-30° C … +75° C	
Operating Temperature range	-50° C … +75° C	
Relative humidity of air	5%…85%	

10 STORAGE CONDITIONS

The equipment of the S-Access family while being packed should withstand all means of transport at a temperature in the range form -50° C to +75° C and the relative humidity of air up to 100% at 25° C. The equipment can also withstand air-transport at a low air pressure of 12 kPa (90 Torr) at -50° C.

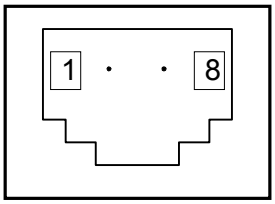
The packed equipment of the S-Access family can be stored within 12 months (from the date of transshipment including transporting time) in storage rooms without heating at -50° C - +75° C and the mean monthly value of the air humidity of 80% at 20° C; short-term increases of air humidity up to 98% (no more than a month a year) at a temperature not exceeding 25° C without moisture condensation is admissible.

The equipment should be stored in storage buildings, which protect the devices from atmospheric precipitations. The equipment should be kept on shelves or in factory packages in the absence of vapors of acids, alkali and other atmospheric impurities.

11 CONNECTOR'S DESCRIPTION

11.1 DSL Connector

Type: RJ-45, 8 pin

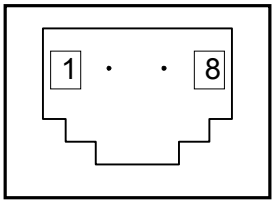


RJ-45

Number	*Signal*	*Assignment*
1,2	NC	-
3	LB,a	tip (4W model only)
4	LA,a	tip
5	LA,b	ring
6	LB,b	ring (4W model only)
7,8	NC	-

11.2 DSL Connector for SRL units

Type: RJ-45, 8 pin

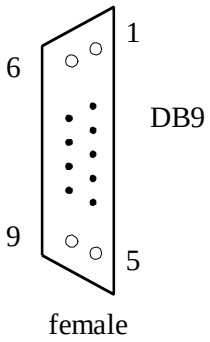


RJ-45

Number	*Signal*	*Assignment*
1	LB,a	tip (4W model only)-
2	LB,b	ring (4W model only)
3	NC	-
4	LA,a	tip
5	LA,b	ring
6,7,8	NC	-

11.3 Monitor Connector

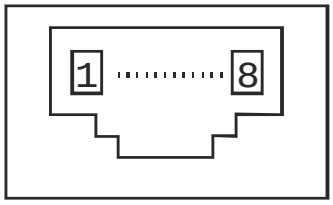
Type: Sub-D9, female



Number	*Signal*	*Assignment*
1	NC	-
2	TXD	Transmit data
3	RXD	Receive data
4	DTR	Data terminal ready
5	SGND	Signal ground
6	NC	-
7	NC	-
8	NC	-
9	NC	-

11.4 PC and Hub Connectors

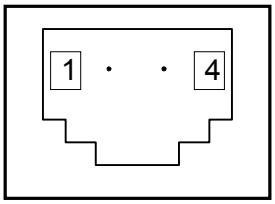
Type: RJ-45



Number	*PC assignment*	*HUB assignment*
1	Tx+	Rx+
2	Tx-	Rx-
3	Rx+	Tx+
4	NC	NC
5	NC	NC
6	Rx-	Tx-
7	NC	NC
8	NC	NC

11.5 Line1 and Line2 Connector

Type: RJ-11, 4 pin



RJ-11

Number	*Signal*	*Assignment*
1	NC	-
2	LA,a	tip
3	LA,b	ring
4	NC	-

12 DESCRIPTION OF INTERFACE CABLES

12.1 Ethernet cable

Side A	Color of wire	Side B
1	white/green	1
2	green/white	2
3	white/orange	3
4	blue/white	4
5	white/blue	5
6	orange/white	6
7	white/brown.	7
8	brown/white	8

12.2 DSL cable

Side A	Color of wire	Side B
1	white/green	1
2	green/white	2
3	white/orange	3
4	blue/white	4
5	white/blue	5
6	orange/white	6
7	white/brown.	7
8	brown/white	8