MDS932AE-10BT   STANDALONE

MDS932AE-FXO   STANDALONE

MDS932AE-FXS   STANDALONE

MDS933AE-10BT   STANDALONE

MDS932C-1   RACK-CARD

MDS932C-2   RACK-CARD

G.SHDSL Modem

USER MANUAL

Version	1.3
Revision	09. February 2005
Document name	MDS933AE-v1.3.pdf

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	26.01.2004	Manual corresponding to software version 1.7 Implementation of rack card models
1.3	09.02.2005	Extended temperature range

1   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 in 2 wire mode

  Line rate in the range from 400 Kbit/s to 4624 Kbit/s in 4 wire mode

- Manual or automatic mode of line-speed adjustment.

- Ethernet *10/100Base-T* interface, Full/Half duplex.

- Transmition 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

- 220 Vac power

For MDS932AE-FXO/FXS

- up to 2 voice cannel.

ORDER INFORMATION

MDS932AE-10BT	Standalone Modem Discovery, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 220 Vac
MDS932C-1	Rackcard Modem Discovery, G.shdsl, 10/100Base-T Bridge, VLAN
MDS932C-2	Rackcard Dual Modem Discovery, G.shdsl, 10/100Base-T Bridge, VLAN
MDS933AE-10BT	Standalone Modem Discovery, G.shdsl, 1 or 2 pairs, up to 4.6Mbps, 10/100Base-T Bridge, VLAN, Adapter 220 Vac
MDS932AE-FXS	Standalone Modem Discovery, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 220 Vac, with 2 FXS interfaces
MDS932AE-FXO	Standalone Modem Discovery, G.shdsl, 10/100Base-T Bridge, VLAN, Adapter 220 Vac, with 2 FXO interfaces

![BLACK BOX NETWORK SERVICES logo]

2   DESCRIPTION OF THE DEVICE

2.1   Exterior design Desktop models
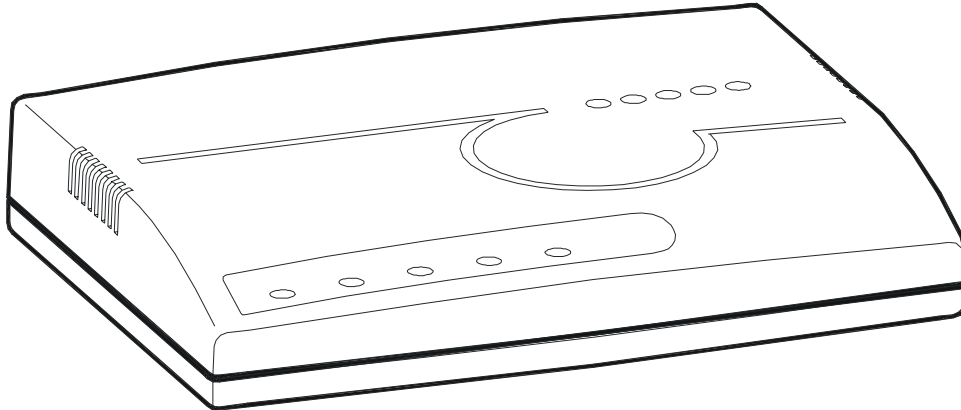

The front panel of the device has 3 LEDs:

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	informs the user about the status of the remote device. At the time being the remote configuring of modems is not provided.	
LINK/ACT	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.	

The back panel of the MDS932AE-10BT and MDS933AE-10BT modem has:
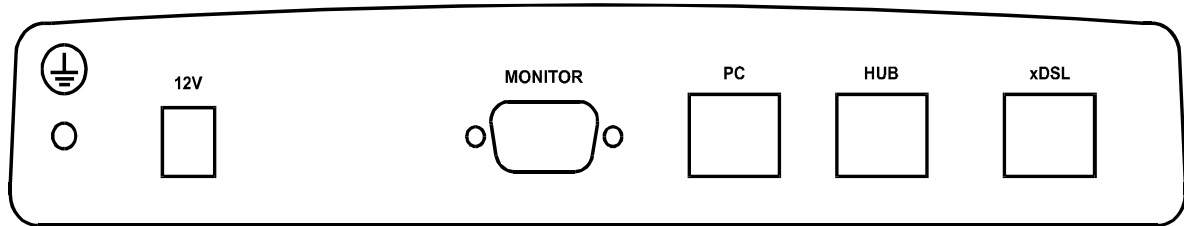
- The grounding bolt of the modem (option);

- The "AC12V" 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;

- "PC" and "HUB" connectors to connect the modem to the LAN using a straight Patch Cord (to the PC or HUB, respectively);

- the "DSL" connector to connect the modem to the leased physical line.

The back panel of the MDS932AE -FXO/FXS modem has additionally:

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

2.2 Exterior design rack card models

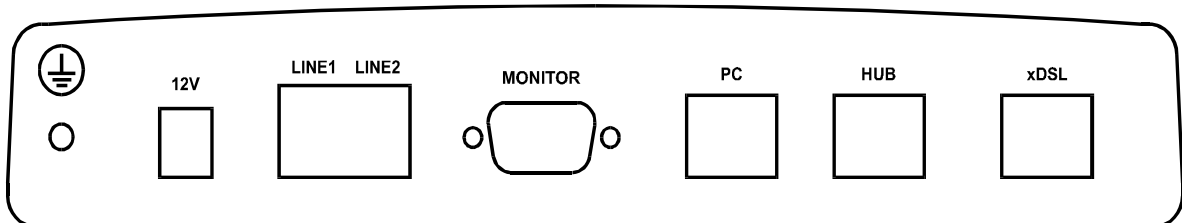| Status(L)	informs the user about the status of the local device. The following four statuses are possible	
	«blinking red»	informs the user about malfunctioning of the modem's hardware and software. In this case, the modem is out of order and should be submitted to the service center for being repaired.
	«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.	

3   RULES OF SWITCHING

3.1   The standalone 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

3.2   The rack-card delivery set

The delivery set includes:

- the subscriber access device (a modul)

- the cables for the line connections

3.3   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 "AC 12V" connector; it's necessary to
  use 13.5V adapter for FXS models

- launch the hyper-terminal operation program on the PC.

3.4   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 with the default password "admin"

After entering the password the following menu will appear.

```
    Discovery G.SHDSL
 Ethernet Monitor V1.7

 +----------------------+
 +       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.

4 THE COMMAND SYSTEM

4.1 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 choising menu item,

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

The "Esc" key is using for channeling of new value of parameters or returning to up menu screen.

4.2 The main menu

The main menu is the following:

```
    Discovery G.SHDSL
 Ethernet Monitor V1.7


 +-----------------------+
 +       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.

4.3 Performance management submenu

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

```
                    Performance Management

        1.Loop Status...


        4.EtherNet Status...




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

4.3.1 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>>
```

4.3.2 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:00-00-00-00-00-00




        1.Clear Counters


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

4.4   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...




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

4.4.1 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




    18.[2W/4W]:2W

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

4.4.1.1 Operation Mode

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

Master, Slave

4.4.1.2 Auto / Fixed

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.

4.4.1.3 Min- Max Connection Speed (only if Auto is selected)

- 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 400 kbps to 4624 kbps for 4wire models

4.4.1.4 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 400 kbps to 4624 kbps for 4wire models

4.4.1.5 Annex

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

4.4.1.6 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.

4.4.1.7 2W/4W

- In the 2W / 4W (2wire / 4wire) 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)

4.4.2 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




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

- In the Speed menu, you can setup the Ethernet speed to the following states:
  10M, 100M or Auto
- In the Duplex Mode menu you can setup the Ethernet ports to the following states:
  Half, Full or Auto

- In the IP Address, Subnet Mask and Gateway Address menu you, can setup the desired
  Ip settings

4.4.3 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.

4.5 Security management submenu

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

5 TECHNICAL SPECIFICATIONS

The main technical specifications of modems of the Black Box family are presented below in the table.

Line interface.		
Standard	ETSI 101 135	
Number of pairs	1	
Line rate 2 wire models	72 – 2312 Kbit/s	
4 wire models	400 – 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 IEEE-802.1Q	
Interface type:	Ethernet 10/100Base-T, Full/Half Duplex	
Connector:	RJ-45	
Management		
Monitoring / Configuration	VT100 and TELNET	
Power supply		
Supply voltage:	~220 Vac $\pm$ 10%; 50 Hz	
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		
Temperature range	-30° C ….+75° C	
Relative humidity of air	5%…85%	

6 STORAGE CONDITIONS

The equipment of the Black Box 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 Black Box 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.

7 TERMS TO TRANSPORT

The equipment of the Black Box family should be packed and transported by:

- motor transport with an enclosed truck body;

- enclosed railroad cars;

- unpressurized airplanes and helicopters (up to 10000 m at an air pressure of 170 Torr);

- river transport (in holds).

The equipment of the Black Box family should withstand transportation when being packed under the following conditions:

- temperature from -50° C to +75° C;

- relative air humidity up to 100% at 25° C (within 10 days).

The equipment of the Black Box family should be packed and withstand transportation by:

- motor transport with the number of transshipments no more than four:

- along the asphalt-concrete and cement-concrete roads at a distance of 200 – 1000 km;

- earth roads at a distance of 50 – 250 km at a speed of 40 km/hour;

- different means of transport (airplanes, railway transport in combination with motor transport along the asphalt-concrete and cement-concrete roads at a distance of 200 km) with the number of transshipments from three to four;

- water transport (excluding sea transport) in combination with motor transport along the asphalt-concrete and cement-concrete roads at a distance of 200 km with the number of transshipments no more than four.

During transportation the packages with the equipment should be fixed so that to exclude their moving, collision and collision against the transport bodies.

8 CONNECTOR'S DESCRIPTION
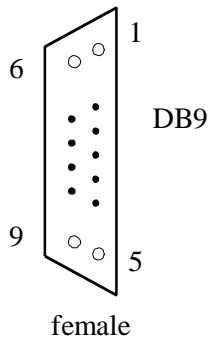
8.1 DSL Connector

Type: RJ-45, 8 pin
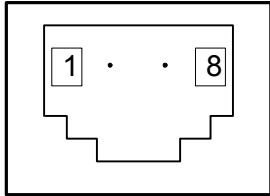
RJ-45

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	-

8.2 Monitor Connector

Type: Sub-D9, female

DB9

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	-

8.3   PC and Hub Connectors

Type: RJ-45
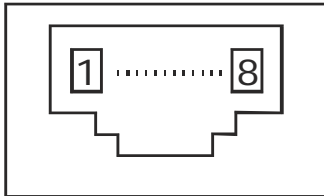
RJ–45

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

8.4   Line1 and Line2 Connector (FXO/FXS)

Type: RJ-11, 4 pin
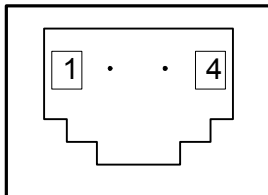
RJ-11

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

9 DESCRIPTION OF INTERFACE CABLES

9.1 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

9.2 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