MDS931AE-10BT

MDSL Standalone 2.3 Mbit/s Modem

USER MANUAL

Version	1.0
Revision	18. Nov. 2002

VERSION CONTROL

Version	Date	Major changes to previous version
0.0	31.12.2001	Initial version of the manual corresponding to version 1.31 of the device micro program
0.1	7.02.2002	Information about relays is changed
0.3	1.07.2002	The version of micro program 1.32 is changed
1.0	1.11.2002	The official version, corresponding to Software version 1.41

1 INTRODUCTION

The Black BoxDSL Discovery is targeted at the organization of high-rate Black Box to Internet or at the integration of LANs. The 2B1Q line code is used to transmit information over a twisted pair. The Black BoxDSL Discovery ensures organization of communication over one twisted pair. The device provides transmission rates in the range from 192 Kbit/s to 2320 Kbit/s. The parameters of the device can be set both using switches or stored in the NVRAM with the help of a PC. The *10/100Base-T* interface is used as a user's interface. The device can operate in the transparent bridge mode with the dynamic accumulation of MAC addresses.

The device is designed to organize a digital channel on the customer premises side and to connect this channel with the Black BoxDSL Discovery rack-mount unit installed at the central office side. It is also possible to interconnect two stand-alone modems, for example, for the organization of communication between LANs.

The modems support uploading of new firmware versions using the Monitor port.

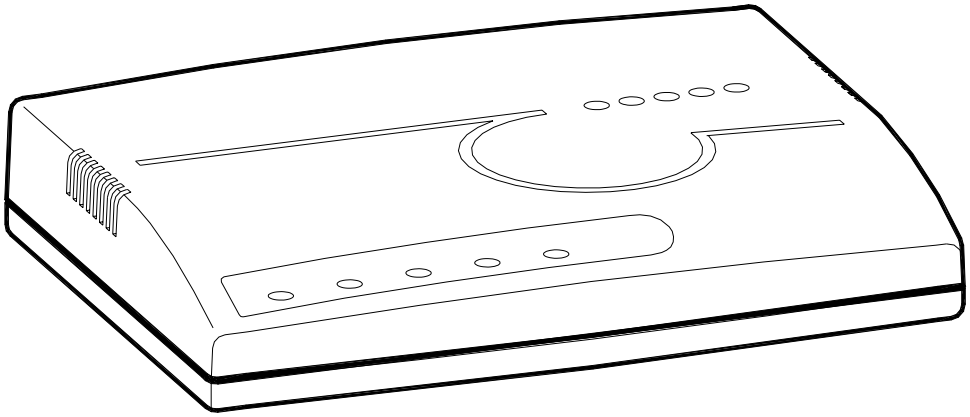
2 GENERAL INFORMATION

- High-speed symmetrical data transmission over one physical copper twisted pair with the 135 Ohm impedance according to ETSI TS 101 135.
- 2B1Q line encoding.
- Line rate in the range from 192 Kbit/s to 2320 Kbit/s.
- 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.
- 220 V power feeding.

3 DESCRIPTION OF THE DEVICE

3.1 Exterior design

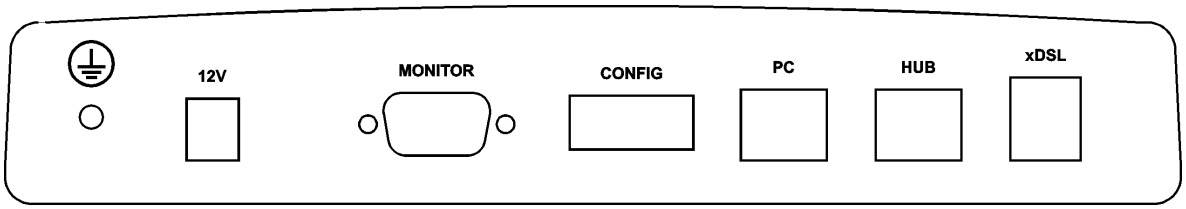
Exterior design is introduced at the picture



The front panel of the device has five 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	The LED is lit upon an incorrect connection to the LAN.	
ACT	The LED is lit on upon the detection of packets in the segment of the current LAN.	
10/100	The LED is lit upon the connection to the LAN at 100 Mbit/s.	

The back panel of the 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;
- switches to set operation modes of the modem in "field" conditions;
- "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.

3.2 Functions of switches

The switches are used to configure the modem and their position has the following applications:

Number	*Meaning*	*Effect*
1	OFF	Uploading of the modem parameters from the NVRAM
	ON	Setting of the parameters of the modem with switches
2	ON	The «MASTER» mode is enabled. This mode is usually set on the provider or the central filter side
	OFF	The «MASTER» mode is disabled
3	OFF	The «ADAPTIVE» mode of the automatic speed adjustment is enabled
	ON	The «ADAPTIVE» mode is disabled
4,5,6	OFF, OFF, OFF	192 Kbit/s
	OFF, OFF, ON	272 Kbit/s
	OFF, ON, OFF	400 Kbit/s
	OFF, ON, ON	784 Kbit/s
	ON, OFF, OFF	1040 Kbit/s
	ON, OFF, ON	1552 Kbit/s
	ON, ON, OFF	2064 Kbit/s
	ON, ON, ON	2320 Kbit/s
7,8	OFF, OFF	The Ethernet parameters are set automatically
	OFF, ON	10 Mbit/s, half duplex
	ON, OFF	100 Mbit/s, half duplex
	ON, ON	Reserved

3.3 Rules of connection settings

It is necessary to stick to the following rules while configuring the modems:

- One modem should be set in the “MASTER” mode and the other should have this mode disabled. Usually the “MASTER” mode is enabled on the provider or central office side because in this mode the modem can affect the connection parameters.
- The “ADAPTIVE” mode should be either enabled or disabled on both modems.
- In case when the “ADAPTIVE” mode is disabled, the line rates on both modems should be set equal.
- The time of connections in ADAPTIVE mode depends on the current line conditional and can be up to 5 minutes.

Examples of the modem configuration.

Parameters	*Modem 1*	*Modem 2*
MASTER	ON	OFF
ADAPTIVE	ON	ON
LINERATE	2320	Any

The connection is established at a speed of 2320 Kbit/s.

Parameters	Modem 1	Modem 2
MASTER	ON	OFF
ADAPTIVE	OFF	OFF
LINERATE	192	192

The connection is established at a speed of 192 Kbit/s.

4 RULES OF SWITCHING

Open the package and make sure that the delivery set is complete.

4.1 The delivery set

The delivery set includes:

- the subscriber Black Box device (a modem);
- the power supply source (an AC adapter);
- the cable for the connection to the line;
- operating manual.

If any problems occur, address to the vendor.

4.2 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 the modem jack at the 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;
- launch the hyper-terminal operation program on the PC.

4.3 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 – XON/XOFF.

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

```
                MDSL
 Ethernet Monitor V1.41

 +------------------------+
 |       Main Menu        |
 +------------------------+
1. Performance management (PM)
2. Fault and maintenance management (FMM)
3. Configuration management (CM)
4. Security management (SM)

NTU> Select [1..4]:
```

The modem is ready to be configured.

5 THE COMMAND SYSTEM

5.1 Basic rules

After the command is typed, press <enter>.

The <Backspace> key is used to edit commands.

Some commands have the parameter <C> to update the information on the screen. This mode starts acting after the command is entered. To exit from the mode press any key.

Each command has the (H)elp command to help the user and the (M)ain command to return to the main menu.

5.2 The main menu

The main menu is the following:

```
                    MDSL
          Ethernet Monitor V1.41

          +------------------------+
          |       Main Menu        |
          +------------------------+
        1. Performance management (PM)
        2. Fault and maintenance management (FMM)
        3. Configuration management (CM)
        4. Security management (SM)

NTU> Select [1..4]:
```

The menu consists of four 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.

5.3 Performance management submenu

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

```
00:28:10  Performance management activated
          Enter <M> to return to MAIN, or <H> for HELP information


NTU_PM>
```

Press <H> to see all available commands with their brief description.

```
00:28:10  Performance management activated
          Enter <M> to return to MAIN, or <H> for HELP information


NTU_PM>H

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
LINE                    Display Line statistic
LINE C                  Display Line statistic continuously
ETH                     Display Ethernet statistic
ETH C                   Display Ethernet statistic continuously
MAC                     Display MAC table
RESET A                 Reset All statistics
RESET L                 Reset Line statistics
RESET E                 Reset Ethernet statistics
RESET M                 Reset MAC table statistics
TRACETIME [5..20]       Change trace time (5..20 seconds)
M(AIN)                  Return to main menu
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
NTU_PM>
```

5.3.1 TRACETIME command

The TRACETIME command allows the user to change the time interval of updating the information on the screen (5…20 seconds):

```
NTU_PM>TRACETIME 10
NTU_PM>
```

5.3.2 LINE command

The LINE command informs the user about the status of the connection over the physical line. Upon entering the <C> parameter, the updating of the information on the screen will occur automatically with the interval of 5…20 seconds according to the parameter set by the TRACETIME command:

```
Line Port Statistics
                                LOCAL                        REMOTE
-------------------------------------------------------------------------
                        5  sec        Total          5  sec        Total
Transmit Packets        10            15             9             27
Receive Packets         12            25             5             15
Receive Error Packets   0             0              0             0
Error Packet Rate, %    0.00          0.00           0.00          0.00

Receive Bytes           449           3418           1272          1992
Transmit Bytes          1             1993           1536          3101
Average Speed, kBps     0             0              1             0
-------------------------------------------------------------------------
Software Version        1.41                         1.4
Link                    Up
Line Speed, kBps        656
Signal Level, dBm       16.0                         16.0
Far-End Level, dBm      0.0                          0.0
Noise Level, dBm        15.5                         15.5

NTU_PM>
```

5.3.3 ETH command

The ETH command informs the user about the status of the connection over the Ethernet port. Upon entering the <C> parameter, the updating of the information on the screen will occur automatically with the interval of 5…20 seconds according to the parameter set by the TRACETIME command:

```
Ethernet Port Statistics
        Speed           100M            Duplex Mode Full
        Link State      Link Up
                        Input                           Output
                5  sec          Total           5  sec          Total
Octets          64              9775            1110            19746
Ucast Packets   0               0               0               10
NUcast Packets  0               20              14              224
Discards Pckts  1               74              0               0
Errors          0               0               0               0

NTU_PM>
```

5.3.4 MAC command

The MAC command displays the table of MAC addresses on the screen

```
                                  LOCAL

00:90:27:1c:78:70  00:09:b7:02:66:91    00:c0:26:31:5d:61  00:60:08:76:62:08
00:60:52:0b:f8:01  XX:XX:XX:XX:XX:XX    XX:XX:XX:XX:XX:XX  XX:XX:XX:XX:XX:XX
XX:XX:XX:XX:XX:XX  XX:XX:XX:XX:XX:XX    XX:XX:XX:XX:XX:XX  XX:XX:XX:XX:XX:XX
XX:XX:XX:XX:XX:XX  XX:XX:XX:XX:XX:XX    XX:XX:XX:XX:XX:XX  XX:XX:XX:XX:XX:XX
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XX:XX:XX:XX:XX:XX  XX:XX:XX:XX:XX:XX    XX:XX:XX:XX:XX:XX  XX:XX:XX:XX:XX:XX

NTU_PM>
```

5.3.5 RESET command

The modem continuously stores statistics about its operation. The RESET command is used to reset all the statistics. The following parameters are available:

- “A” to reset all the statistics;
- “L” to reset the line statistics;
- “E” to reset the Ethernet port statistics;
- “M” to reset the MAC table statistics.

```
NTU_PM>RESET A
01:23:57 All modem statistics cleared

NTU_PM>RESET L
01:24:07 Line statistics cleared

NTU_PM>RESET E
01:24:15 Ethernet port statistics cleared

NTU_PM>RESET M
01:24:22 MAC table statistics cleared

NTU_PM>
```


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e-Mail: blackbox@black-box.ch

5.4 Fault and maintenance management submenu

Upon activation of the fault and maintenance management submenu the following message will be displayed.

```
01:37:30    Fault and maintenance management activated
            Enter <M> to return to MAIN, or <H> for HELP information

NTU_FMM>
```

Press <H> to see all available commands with their brief description.

```
01:37:30    Fault and maintenance management activated
            Enter <M> to return to MAIN, or <H> for HELP information

NTU_FMM>H

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SQ                    Display Signal Quality
SQ C                  Display Signal Quality continuously
STATUS                Display System Status
STATUS C              Display System Status continuously
ALARM                 Display Alarm
ALARM C               Display Alarm continuously
TRACETIME             [5..20] Change trace time (5..20 seconds)
M(AIN)                Return to main menu
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_FMM>
```

5.4.1 TRACETIME command

The TRACETIME command allows the user to change the time interval of updating the information on the screen (5…20 seconds):

```
NTU_FMM>TRACETIME 10
NTU_FMM>
```

5.4.2 SQ command

The SQ command informs the user about the status of the connection over the physical line. Upon entering the <C> parameter, the updating of the information on the screen will occur automatically with the interval of 5…20 seconds according to the parameter set by the TRACETIME command. It is very convenient to create a text file about the connection status for further analysis.

```
NTU_FMM>SQ

-----Levels, dBm ------------------------------------------------------
Time          Signal  FarEnd  Noise     R.Pckts  T.Pckts  E.Pckts  EPR%
---------------------------------------------------------------------------
01:39:13      49.0    50.0    -16.0     0        0        0        0.00

NTU_FMM>
```

Use this command to store the information about the quality of the connection in log files.

```
NTU_FMM>SQ C

-----Levels, dBm ------------------------------------------------------
Time           Signal   FarEnd   Noise          R.Pckts T.Pckts E.Pckts EPR%
---------------------------------------------------------------------------
00:06:35       17.0     0.0      15.5           6       0       0       0.00
00:06:40       16.0     0.0      15.5           8       0       0       0.00
00:06:45       16.0     0.0      15.5           11      1       0       0.00
00:06:50       17.0     0.0      15.5           27      0       0       0.00
00:06:55       16.0     0.0      15.5           13      0       0       0.00


NTU_FMM>
```

5.4.3 STATUS command

The STATUS command informs the user about the modem status. Upon entering the <C> parameter, the updating of the information on the screen will occur automatically with the interval of 5…20 seconds according to the parameter set by the TRACETIME command:

```
Modem Status

        Startup time            441 sec (   0 days 00:07:21)

                Line                            Ethernet
        Link              Up              Link              Up
        Master            OFF             Duplex            Full
        Speed, kBps       656             Speed, Mbps       100
        Unavailable time  60              Unavailable time  3
        Available time    382             Available time    439
        Statistic time    442             Statistic time    442
        Link Loss         1


NTU_FMM>
```

5.4.4 ALARM command

The ALARM command informs the user about urgent and non-urgent alarms. Upon entering the <C> parameter, the updating of the information on the screen will occur automatically with the interval of 5…20 seconds according to the parameter set by the TRACETIME command:

```
Alarm Status

     Urgent:        LossSync - ON      HiEPR - OFF
     Not-urgent:    Link - OFF         LoEPR - OFF    SQ - OFF

NTU_FMM>
```

5.5 Configuration management submenu

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

```
01:47:50    Configuration management activated
            Enter <M> to return to MAIN, or <H> for HELP information

NTU_CM>
```

Press <H> to see all available commands with their brief description.

```
01:47:50    Configuration management activated
            Enter <M> to return to MAIN, or <H> for HELP information

NTU_CM>H

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
CONFIG                        Display local configuration
RESET                         System Reset
MASTER ON|OFF                 Set xDSL master/slave mode (similar to CO/RT)
LINERATE [1..8]               Select line rate
ADAPTIVE ON|OFF               Set adaptive mode to ON/OFF ( only for slave mode)
DEFAULT [0..1]                Set default configuration
ESPEED [AUTO|10|100]          Set speed of Ethernet port
EMODE [AUTO|HALF|FULL]        Set Duplex mode of Ethernet port
TRACETIME [5..20]             Change trace time (5..20 seconds)
M(AIN)                        Return to main menu
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>
```

5.5.1 TRACETIME command

The TRACETIME command allows the user to change the time interval of updating the information on the screen (5…20 seconds):

```
NTU_CM>TRACETIME 10
NTU_CM>
```

5.5.2 CONFIG command

The CONFIG command informs the user about the configured parameters.

```
NTU_CM>CONFIG
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2320
     Master/Slave:           Master
     Adaptive mode:          ON
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>
```

5.5.3 RESET command

The RESET command restarts the modem.

```
NTU_CM>RESET
01:55:02 system reset
```

5.5.4 MASTER command

The MASTER command sets the modem either in the maser or slave modes.

```
NTU_CM>MASTER ON
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2320
     Master/Slave:           Master
     Adaptive mode:          ON
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>MASTER OFF
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2320
     Master/Slave:           Slave
     Adaptive mode:          ON
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>
```

5.5.5 LINERATE command

The LINERATE command determines the modem connection rate over the line. The number parameters from 1 to 16 determine the connection rate.

```
NTU_CM>LINERATE 1
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       192
     Master/Slave:           Slave
     Adaptive mode:          ON
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
NTU_CM>LINERATE 16
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2320
     Master/Slave:           Slave
     Adaptive mode:          ON
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>
```

5.5.6 ADAPTIVE command

The ADAPTIVE command adjusts the line rate of the slave modem to the line rate of the master modem. The line rates should be set equal on both modems.

```
NTU_CM>ADAPTIVE ON
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          ON
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
NTU_CM>ADAPTIVE OFF
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          OFF
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

```
NTU_CM>
```

5.5.7 ESPEED command

The ESPEED command determines the operating speed over the Ethernet port.

```
NTU_CM>ESPEED AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          OFF
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>ESPEED 10
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          OFF
Ethernet
     Speed:                  10
     Duplex mode:            HALF
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>ESPEED 100
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          OFF
Ethernet
     Speed:                  100
     Duplex mode:            HALF
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>
```

5.5.8 EMODE command

The EMODE command sets the operation mode over the Ethernet port.

```
NTU_CM>EMODE AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          OFF
Ethernet
     Speed:                  AUTO
     Duplex mode:            AUTO
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>EMODE HALF
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          OFF
Ethernet
     Speed:                  100
     Duplex mode:            HALF
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>EMODE FULL
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
xDSL
     Line Rate,kbit/s:       2064
     Master/Slave:           Slave
     Adaptive mode:          OFF
Ethernet
     Speed:                  100
     Duplex mode:            FULL
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

NTU_CM>
```

5.6 Security management submenu

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

```
00:18:02       Security management activated
               Enter <M> to return to MAIN, or <H> for HELP information

NTU_SM>
```

It is reserved for further developments.

6 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	192 – 2320 Kbit/s	
Communication range for cables with the wire diameter of 144 Kbit/s 2320 Kbit/s	 0.5 mm: 7.7 km 3.4 km	 1.2 mm: 31 km 13.7 km
Line code	2B1Q	
Input impedance of the physical line	135 Ohm	
Output signal level	7.8 – 14.8 dBm	
Transmission spectrum	from 0…96 kHz to 0…1160 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	
Power supply		
Supply voltage:	~220 V ± 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	-5° C ….+45° C	
Relative humidity of air	5%…85%	

7 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 +50° 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 - +50° 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.

8 GUARANTEE

The mean time before failure is no less 30000 hours.

The manufacturer guarantees that the equipment are in all respects in accordance with the requirements of technical conditions when the customer follows the rules and conditions of storage, transporting and maintenance.

The guarantee period (no less than 12 months after putting the equipment into operation) is specified upon drawing the Contract for the sale of the equipment.

Should the equipment prove defective during the guarantee period, the manufacturer undertakes to remedy the defects or replace the faulty equipment. If the defects appear due to incompetent storage, maintenance and transporting, the guarantee does not cover such defects.

After the guarantee period expires, the manufacture provides paid delivery of spare parts. The list of spare parts and terms of their delivery during the operating lifetime of the equipment should be specified in the Contract.

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

- temperature from -50° C to +50° 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:

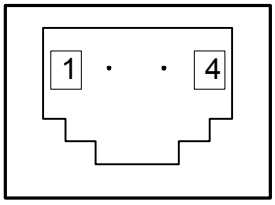
- motor transport with the number of transshipments no more than four:
  - along the asphalt-concrete and cement-concrete roads at a distance of 200 – 1000 km;
  - earth roads at a distance of 50 – 250 km at a speed of 40 km/hour;
- different means of transport (airplanes, railway transport in combination 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.

10 CONNECTOR'S DESCRIPTION

10.1 DSL Connector

Type: RJ-11, 4 pin

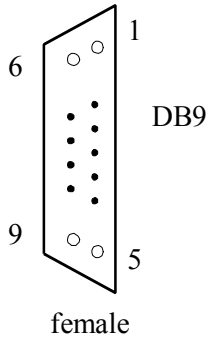


RJ-11

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

10.2 Monitor Connector

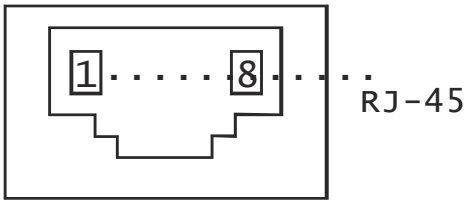
Type: Sub-D9, female



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	-

10.3 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 DESCRIPTION OF INTERFACE CABLES

«Straight» 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

«Straight» modem cable

The device side	The PC side	
DB9M	DB9F	DB25F
2	2	3
3	3	2
5	5	7
4	4	20