

# Long Range Ethernet Extender

Model Number: **EIDM-EXTEND-2**

User's Manual

*Rev. 1.0*

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### **3. Features**

- ITU-T Rec. G.991.2 G.shdsl.bis Compliance.
- SHDSL Trellis Coded Pulse Amplitude Modulation (TCPAM) Line Code.
- Fixed Data Rate Selection from 10.8Mbps to 128Kbps for 2-pair SHDSL lines.
- Adaptive Data Rate from 4608Kbps to 192Kbps for 1-pair SHDSL mode.
- Adaptive Data Rate from 9216Kbps to 384Kbps for 2-pair SHDSL mode.
- Maximum Transmission Distance: 20,500 ft over 26AWG twisted pair.
- Noise Margin  $\geq$  1 dB is guaranteed for fixed rate and adaptive rate modes.
- Remote side follows central side's speed for 192Kbps~2304Kbps in 1-pair fixed rate mode.
- Remote side follows central side's speed for 384Kbps~4608Kbps in 2-pair fixed rate mode.
- RJ-48 Interface for SHDSL line connections.
- Two RJ-45 Connectors for 10/100Base-TX Ethernet Switch ports.
- Ethernet Auto-Negotiation for 10/100Base-TX.
- Ethernet Auto-MDIX for Auto Tx/Rx Swap.
- Console Port for Network Management Configurations.
- 8 LED status indicators.
- Power Input: 100-240VAC.

### **4. Packing Contents**

Inside the package you should find:

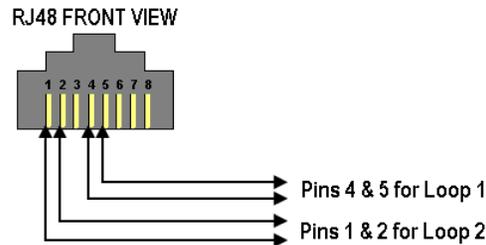
- (1) One EIDM-EXTEND-2 Long Range Ethernet Extender unit (260x151x44mm)
- (2) One power cord
- (3) One RS232 cable
- (4) One CAT 5 Ethernet Cable
- (5) One Quick Start Guide
- (6) One User's Manual on CD-ROM
- (7) Rubber Feet

Please check to see whether the package is damaged before unpacking. Also please check contents to see whether any components are missing. If so, please contact B&B Electronics or your vendor immediately for replacement.

## 5. Installation Procedures

**Step 1: Connect the SHDSL line (1 or 2 pairs) to the RJ-48 connector (marked Line) on the rear panel of the Ethernet Extender.**

Please note: RJ-48 and RJ-45 connectors are physically identical



**RJ-48 Connector Pin Assignment for SHDSL Line Interface, straight through**

**Note:** RJ48 connectors hold up to eight wires. They use the same plug and socket as an RJ-45 but have different pin-outs. RJ-48C is commonly used for T1 lines and uses pins 1, 2, 4 and 5.

**Step 2: Connect the Ethernet interface to the RJ-45 Port(s) (marked LAN1 and LAN2) with the included CAT5 cable.**

**Step 3: Connect both Ethernet Extenders to the AC outlet using the power cords included and turn on the power switch.**

**Step 4: Please refer to the Console Port Control section for initial serial interface setup. Set one Ethernet Extender as STU-C (Central) from console port, and the other Extender as STU-R (Remote). Type 1 in the Main Menu to select Configuration menu, then type 1 in the Configuration menu to select DSL Mode. Make sure one unit is STU-C and the other is STU-R. Extenders will automatically connect with each other. There will be 2 or more handshaking cycles when Adaptive is selected as the speed setting. The system will adapt to the maximum rate possible according to the loop distance. The maximum Adaptive rates are 4,608Kbps for single pair and 9,216Kbps for two pair mode. The maximum fixed rate is 10.8Mbps.**

## **6. Front Panel LED Indicators**

There are 8 LED indicators on the front panel of the Long Range Ethernet Extender displaying the current status. These LED indicators are described as following.

**POWER:** “Green On” shows Ethernet Extender power supply is normal.

**TEST** : “Yellow On” shows Ethernet Extender is self testing after powered on.

**LOOP1** : “Green Flash” shows SHDSL connection is in progress.

: “Green On” shows SHDSL loop1 connects successfully.

**LOOP2** : “Green Flash” shows SHDSL connection is in progress.

: “Green On” shows SHDSL loop2 connects successfully.

**LAN1** : “Green On” shows LAN1 port is in connection.

: “Green Flash” shows data activity on LAN1 port.

**100** : “Green On” shows LAN1 Ethernet connection is at 100Mbps.

**LAN2** : “Green On” shows LAN2 port is in connection.

: “Green Flash” shows data activity on LAN2 port.

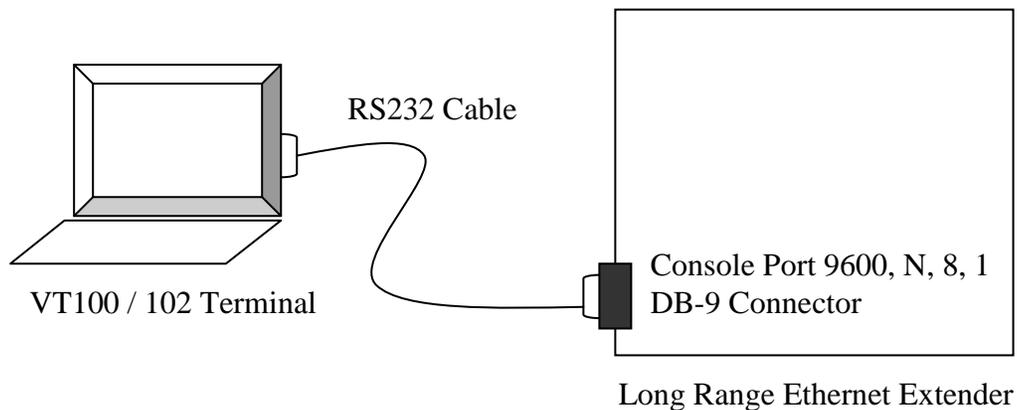
**100** : “Green On” shows LAN2 Ethernet connection is at 100Mbps.

## 7. Console Port Control

The Long Range Ethernet Extender provides an RS232C console port for users to monitor the status and configure the Extender through a VT100 terminal. This section covers the operation procedures, settings and for all screen selections.

Connect the RS232 cable to the COM port of the computer as shown in the following diagram. Set the personal computer to VT100 or VT102 type through HyperTerminal. Press the <ESCAPE> key and the main menu will be shown on the screen of the terminal. The terminal operations can then start.

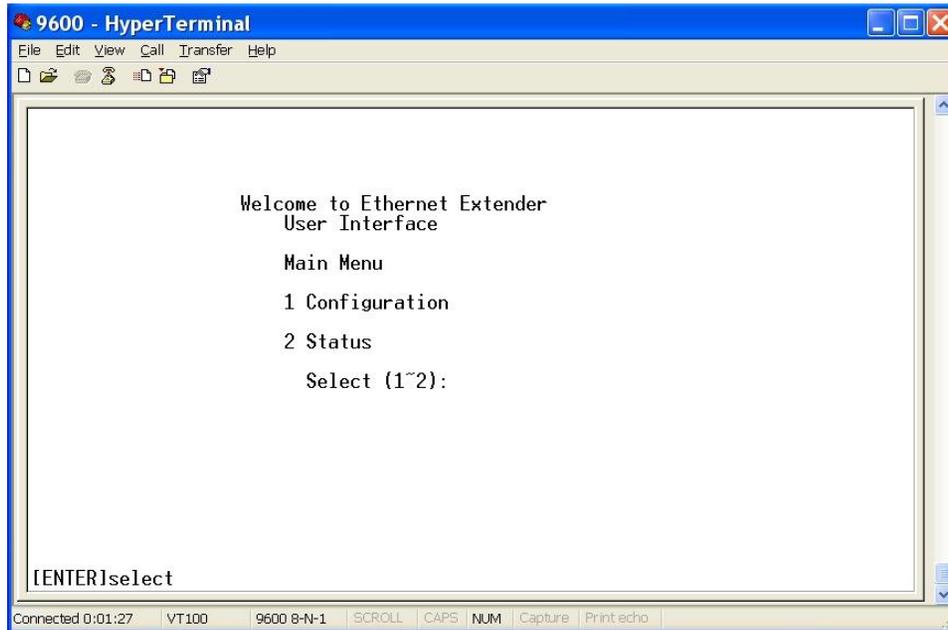
If the <ESCAPE> key is pressed and the screen of the terminal does not display, this may be due to the incorrect COM port setting. Choose the right COM port (COM1 or COM2) on the computer, and press the <ESCAPE> key again to make sure that the main menu appears on the terminal screen. Note that the COM port should be set as 9600bps, none parity, 8 data bit, and 1 stop bit.



*Figure 7-1: Connection for Console Port with RS232 Terminal*

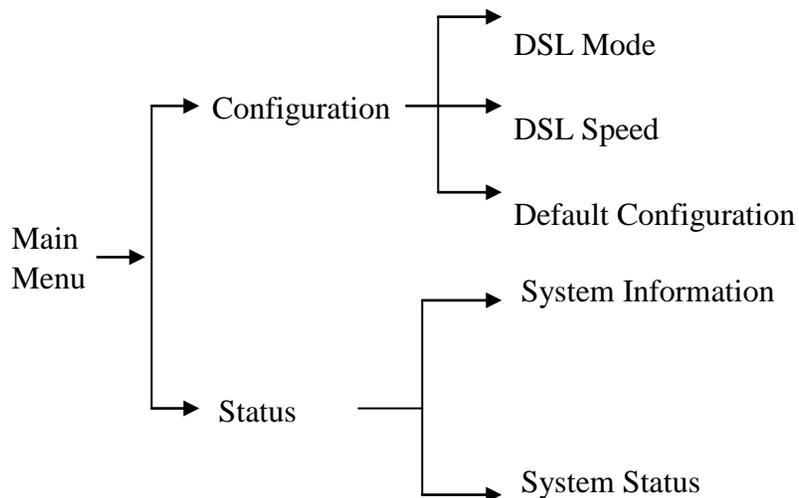
## 7.1. Main Menu

Main Menu will display the connection status of the Ethernet Extender and settings including two sections: Configuration, and Status. For details please refer to Table 7-1.



**Table 7-1 Main Menu**

The pull-down tree structure of the main menu is shown in Figure 7-2.

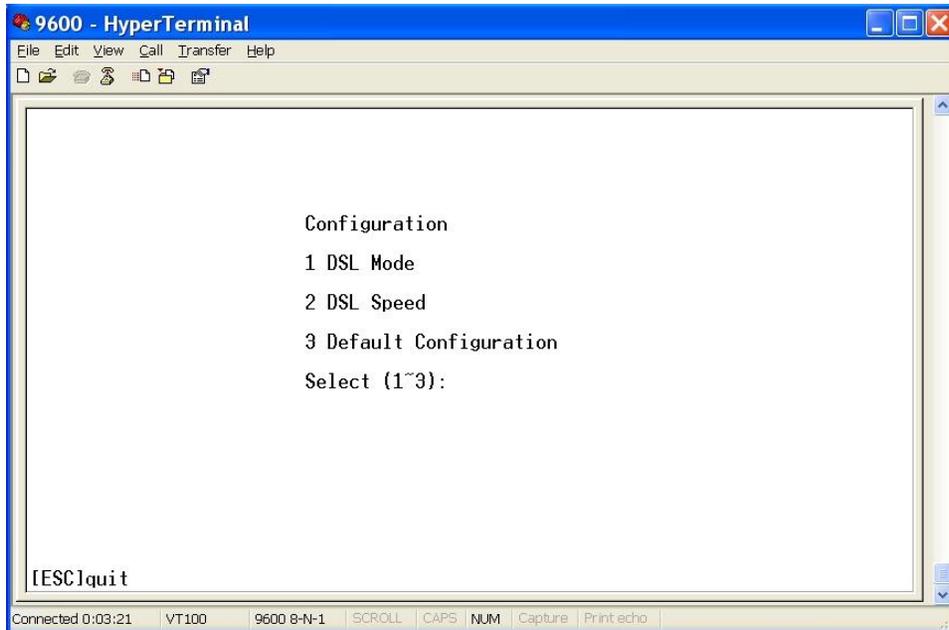


**Figure 7-2: Pull-down Tree Structure of the main menu**

## 7.2. Configuration Screen

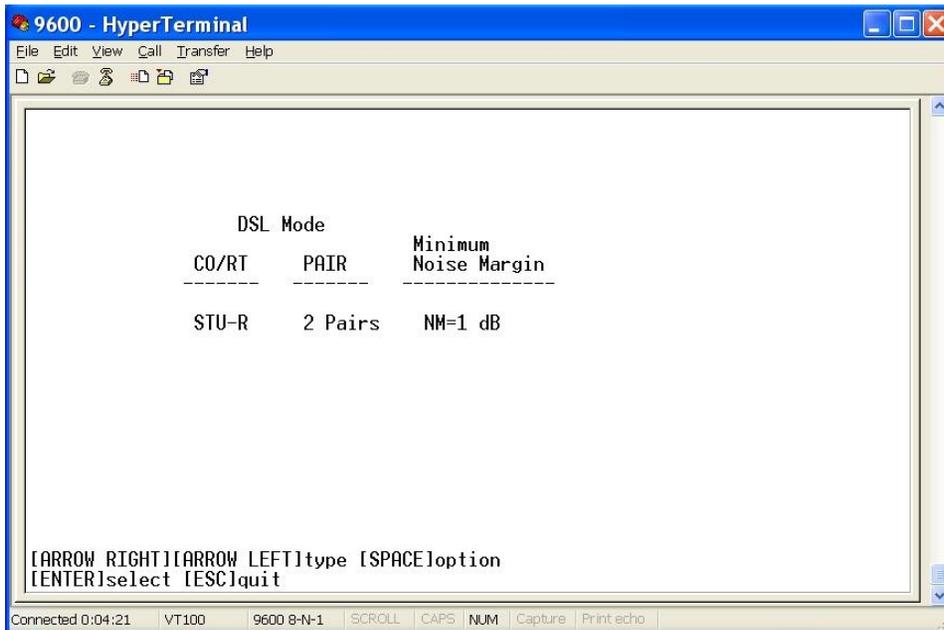
Configuration screen will display the selections of connection for the Ethernet Extender unit and the screen includes three selections: DSL Mode Settings, DSL Speed Settings, and Default Configuration.

For details please refer to Table 7-2.



*Table 7-2 Configuration screen*

**DSL Mode Settings:**



***Table 7-3: DSL Mode Settings screen***

This screen provides DSL mode settings and user can update the settings from this screen.

**CO/RT:**

The item of CO/RT has 2 options: STU-C and STU-R. To establish a successful connection for two Ethernet Extenders, it is necessary to set one unit to STU-C and the other unit to STU-R.

**PAIR:**

The item of PAIR has 2 options: 1 Pair and 2 Pairs. The Ethernet Extenders support both 1-pair and 2-pair applications. To establish a successful connection for two Ethernet Extenders, it is necessary to set the two units to the same selection.

## DSL Speed Settings:



*Table 7-4 DSL Speed Settings screen*

This screen provides DSL Speed Settings and user can configure DSL speed to set the transmission rate.

For 1-pair setting in the DSL Mode menu, the options are as following;

64Kbps, 128Kbps, 192Kbps, 256Kbps, 384Kbps, 512Kbps, 768Kbps, 1152Kbps, 1536Kbps, 1544Kbps, 2048Kbps, 2304Kbps, 2560Kbps, 3072Kbps, 3584Kbps, 4096Kbps, 4608Kbps, 5120Kbps, 5696Kbps and Adaptive speed.

For 2-pair setting in the DSL Mode menu, the options are as following;

128Kbps, 256Kbps, 384Kbps, 512Kbps, 768Kbps, 1024Kbps, 1536Kbps, 2304Kbps, 3072Kbps, 3088Kbps, 4096Kbps, 4608Kbps, 5120Kbps, 6144Kbps, 7168Kbps, 8192Kbps, 9216Kbps, 10.2Mbps, 10.8Mbps and Adaptive speed.

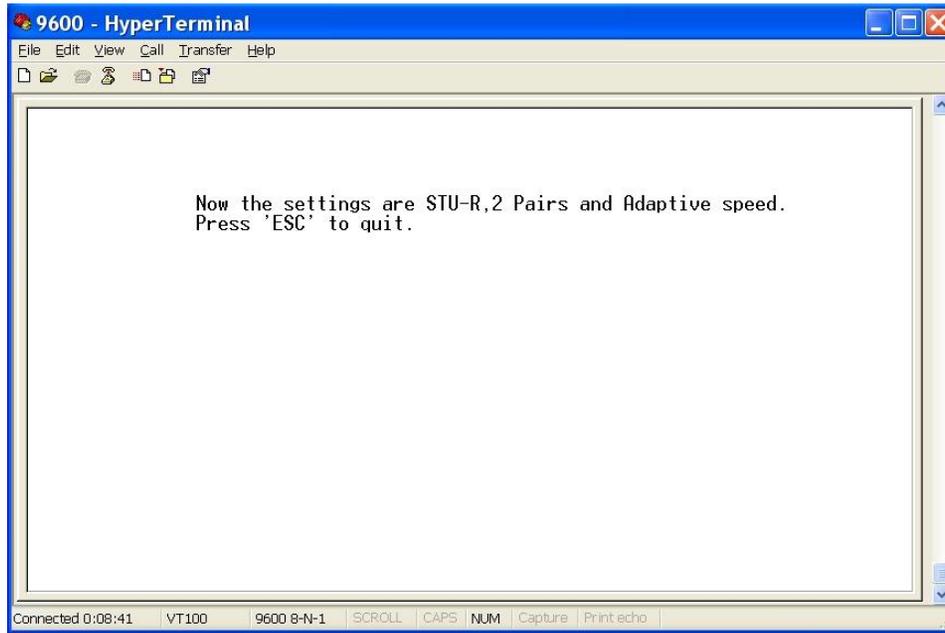
The user must set both units of Long Range Ethernet Extender to the same speed selection in order to establish a successful connection for 1-pair 64Kbps, 128Kbps, 2560Kbps, 3072Kbps, 3584Kbps, 4096Kbps, 4608Kbps, 5120Kbps, 5696Kbps, and for 2-pair 128Kbps, 256Kbps, 5120Kbps, 6144Kbps, 7168Kbps, 8192Kbps, 9216Kbps, 10.2Mbps, 10.8Mbps and Adaptive speed. For the rest of speed options from 192Kbps up to 2304Kbps, the STU-R will follow the speed of STU-C.

When setting for adaptive rate, 2 or more activation cycles are necessary. The system will

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automatically adapt to maximum speed according to the loop distances. The maximum speed is 4608Kbps for 1-pair mode and 9216Kbps for 2-pair mode.

### **Default Configuration Setting:**



*Table 7-5 Default Configuration Setting screen*

When Default Configuration is selected, all the settings of the Ethernet Extender will go back to default settings. For the screen as shown in Table 7-5, it indicates setting is finished and press <ESC> key will be back to previous screen. The default settings for the Ethernet Extenders are as following:

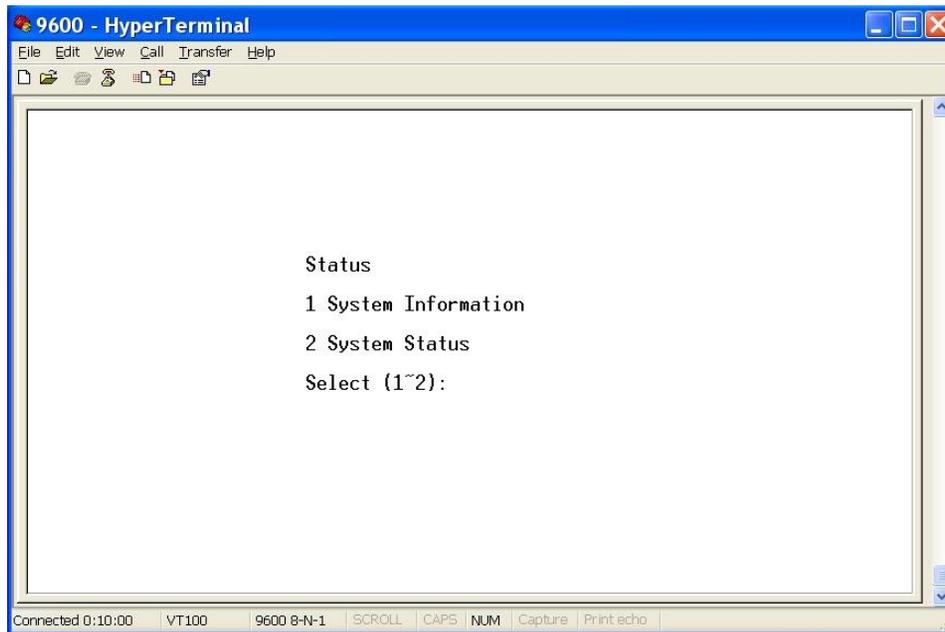
**STU-R**

**2 Pairs**

**Adaptive speed**

## 7.3. Status Screen

The Status screen shows the connection status of the Ethernet Extender unit. The screen covers two selections: System Information and System Status. For details please refer to Table 7-6.



*Table 7-6 Status screen*

**System Information:**



*Table 7-7 System Information screen*

Items listed in the above screen are as follows:

**Firmware Version:**

The firmware version in this unit.

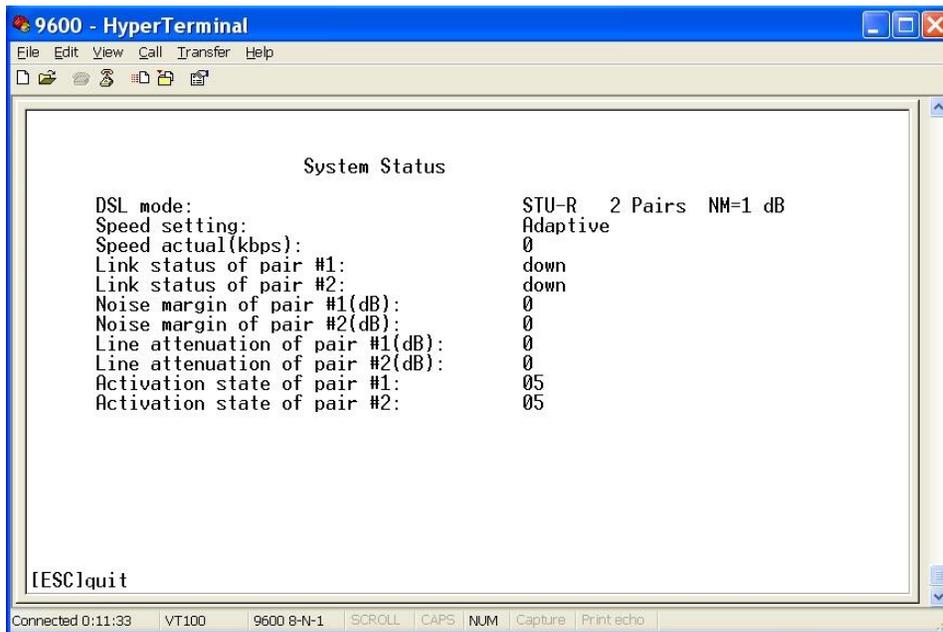
**Vendor Model:**

The model name.

**Vendor Information:**

Website information.

## System Status Screen:



```
System Status

DSL mode:                STU-R  2 Pairs  NM=1 dB
Speed setting:           Adaptive
Speed actual(kbps):      0
Link status of pair #1:  down
Link status of pair #2:  down
Noise margin of pair #1(dB): 0
Noise margin of pair #2(dB): 0
Line attenuation of pair #1(dB): 0
Line attenuation of pair #2(dB): 0
Activation state of pair #1: 05
Activation state of pair #2: 05

[ESC]quit

Connected 0:11:33  VT100  9600 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

*Table 7-8 System Status screen. The distance of this example is 6K ft and 26AWG.*

Items list in the above screen are explained as follows:

**DSL mode:**

The current DSL mode setting.

**Speed setting:**

The current DSL speed setting.

**Speed actual (Kbps):**

The actual DSL speed in kilobit per second.

**Link status of pair #1:**

The DSL connection status (either up or down) for pair #1.

**Link status of pair #2:**

The DSL connection status (either up or down) for pair #2.

**Noise Margin of pair #1(dB):**

The Noise Margin in dB of pair #1.

**Noise Margin of pair #2(dB):**

Indicates the Noise Margin in dB of pair #2.

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### **Line Attenuation of pair #1(dB):**

Indicates the Line Attenuation value in dB of pair #1. The maximum value is 43 dB when the DSL distance is 20500 ft, 26AWG.

### **Line Attenuation of pair #2(dB):**

Indicates the Line Attenuation value in dB of pair #2. The maximum value is 43 dB when the DSL distance is 20500 ft, 26AWG.

### **Activation state of pair #1(dB):**

Indicated the DSL startup activation state of pair #1. The value starts from 05 and gradually reaches the final value 16. The value 16 is the DSL link up state value. The general activation state sequence is 05 → 20 → 10 → 12 → 16.

### **Activation state of pair #2(dB):**

Indicated the DSL startup activation state of pair #2. The value starts from 05 and gradually reaches the final value 16. The value 16 is the DSL link up state value. The general activation state sequence is 05 → 20 → 10 → 12 → 16.

## 8. Specifications

Applicable Standards	IEEE802.3 10Base-T, IEEE802.3u 100Base-TX, IEEE802.3x, Ethernet over SHDSL
Fixed Ports	LAN1 and LAN2 ports: 2 x 10/100Mbps Ethernet port with RJ-45 connector Line port: 1 x Ethernet Extender port with RJ-48 interface
Speed 10Base-T 100Base-TX Ethernet Extender	10/20Mbps for half/full-duplex 100/200Mbps for half/full-duplex Fixed Data Rate Selection: 128Kbps to 10.8Mbps for 2-pair copper wire Adaptive Data Rate: 192Kbps to 4608Kbps for 1-pair copper wire Adaptive Data Rate: 384Kbps to 9216Kbps for 2-pair copper wire
Switching Method	Store-and-Forward
Forwarding rate	14,880/148,810pps for 10/100Mbps
Cable 10Base-T 100Base-TX Ethernet Extender	2-pair UTP/STP Cat. 3, 4, 5 up to 100m 2-pair UTP/STP Cat. 5 up to 100m 24 or 26AWG twisted pair copper wire
LED Indicators	Per Unit (2 LEDs)- POWER, TEST Per Port- LAN1, LAN2 (RJ-45 connector, 2 LEDs): Link/Activity, Speed Line (RJ-48 interface, 2 LEDs): LOOP1, LOOP2
Dimensions	260mm (W) x 151mm (D) x 44mm (H) (10.24" (W) x 5.94" (D) x 1.73" (H))
Weight	2.5Kg (5.51lbs.)
Power	100 ~ 240VAC, 50 ~ 60Hz Internal Universal PSU
Power Consumption	8W Max.
Operating Temperature	0°C ~ 50°C (32°F ~ 122°F)
Storage Temperature	-20°C ~ 70°C (-4°F ~ 158°F)
Humidity	5% ~ 95%, non-condensing
Regulatory Approvals	CE Mark, Class A FCC Part 15, Class A VCCI, Class A UL