

XL-EFM-404

G.SHDSL.bis EFM Network Extender

User's Guide



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1 Introduction

1.1 Descriptions

- The EFM Based Network Extender (or say EFM Modem) which provides a flexible and friendly solution for the Ethernet based services provision to subscribers by the service provider. Additionally, this family of products provides a simple way in a back-to-back deployment to provide point to point configuration. This allows broadband service providers to deploy single DSL lines economically when required for low density geographical areas or during start up phase.
- EFM Network Extender provides cost-effectively symmetrical bandwidth at rates up to 22.8 Mbps which allows service providers to deliver friendly Ethernet services rapidly. EFM Network Extender extends the reach of Ethernet services to the sites with no fiber access to by using bonded copper pairs. Designed with standard-based EFM technology (2BASE-TL), the delivery of Ethernet services with EFM modem can be deployed quickly on the existing copper plant. It is a nice application for back-to-back connection between remote office and enterprise headquarters.
- EFM Network Extender implements the management features based on IEEE 802.3ah standard and it enables users to significantly reduce operation expense by eliminating unnecessary transformation between Ethernet and legacy ATM network. As based on user-friendly Ethernet, it saves time and costs because of simple engineering task without additional trainings costs. Packet based technology which architecture utilizes 100% packet transmission technology for optimum throughput and reliability. With a compact form-factor design and optimization for the use over existing copper network, EFM Network Extender reduces the initial investment cost and deployment time in delivering higher speed Ethernet service. It provides minimized risk bearing and quick return on investment to service providers and enterprises
- EFM Network Extender can bond up to 4 pairs and deliver up to 22.8 Mbps Ethernet services to all users within their service area by utilizing existing copper infrastructure and EFM 802.3ah PAF bonding technology. Service Providers and enterprises are able to offer symmetrical high speed connectivity for transparent Ethernet service on DSLAM backhaul, Wireless backhaul, and more.
- EFM Network Extender provides future-proof features meeting Ethernet Quality of Service (QoS) requirements by utilizing 802.1q VLAN capabilities, four levels of priorities, traffic flow control and rate control. This traffic management and QoS features enable service providers to offer highly profitable and value-added services to a vast majority of business and institutional sites.

1.2 Features

- Extending Ethernet Services to sites with existing copper infrastructure
- Increased Flexibility in Deployment
- Lower Investment and Quick Return on Investment
- EFM Bonding (PAF, PME Aggregation Function) up to 22.8Mbps (4 pairs)
- Support EFM OAM complying IEEE 802.3ah
- Flexible configuration as CPE side or CO side
- Low Delay, Jitter and Packet Loss for delay sensitive application
- Comprehensive and easy OAM & P functions in provisioning and managing
- QoS feature for guaranteed Ethernet service
- Future-proof Ethernet traffic management and QoS features

1.3 Specifications

WAN Interface

- One RJ45 Connector
- SHDSL.bis: ITU-T G.991.2 (2004) Annex A/B/F/G
- Encoding scheme: 16-TCPAM, 32-TCPAM
- 2BASE-TL, 64/65-octet encoding
- EFM bonding (IEEE 802.3ah PAF)
- Maximum data rate is 22.8Mbps for 8-wire mode (5.7Mbps/Port x 4Ports)
- Impedance: 135 ohms

LAN Interface

- Four RJ45 Connector
- 4-ports switching hub
- 10/100 Base-T auto-sensing and auto-negotiation
- Auto-MDI/MDIX
- 802.1d Transparent Bridging
- Up to 2K MAC Address

Indicators

- LAN : Link/Act , 10/100 per port
- WAN : Link/Activity per loop
- System: Power , Alarm , Diagnostic

VLAN Support

- **Port-bases & Tag-based(802.1Q)**
- **Up to 16 VLANs**
- **Priority Re-mapping**
- **VLAN Trunk mode**

QoS Support

- **Ingress Rate control**
- **Egress Traffic shaping**
- **Classification based on Port/802.1p/DSCP**
- **4 Priority Queues**
- **Strict Priority**
- **Simple WFQ (Weighted Fair Queue)**

Management Interface

In-Band

- **EFM (IEEE 802.3ah) OAM**
- **Web Browser (HTTP) , Telnet**

Out-Band

- **Easy-to-use web-based GUI for quick setup, configuration and management**
- **Menu-driven interface for local console and Telnet access**
- **Password protected management and access control list for administration**
- **Software upgrade via web-browser or FTP server**

Physical/Electrical

- **Dimensions: 19.8 x 4.8 x 16.6cm (WxHxD)**
- **Power: 100~240VAC (via external power adapter)**
- **Power consumption: 9 watts max.**
- **Temperature: 0~45 °C**
- **Humidity: 0%~95%RH (non-condensing)**

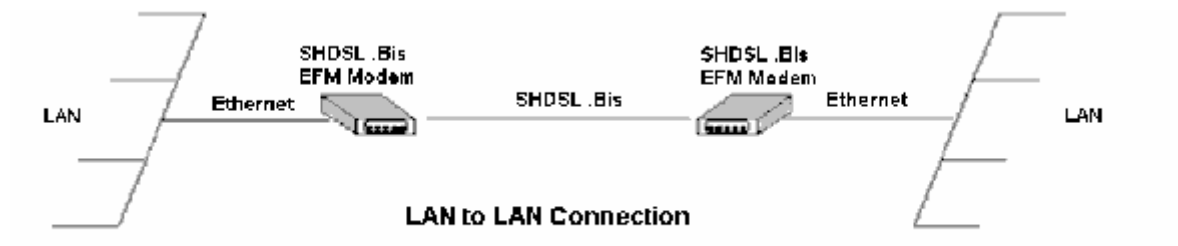
Memory

2MB Flash Memory, 8MB SDRAM

Products' Information

- 1 pair 2BASE-TL EFM Network Extender
- 2 pair 2BASE-TL EFM Network Extender
- 4 pair 2BASE-TL EFM Network Extender

1.4 Applications

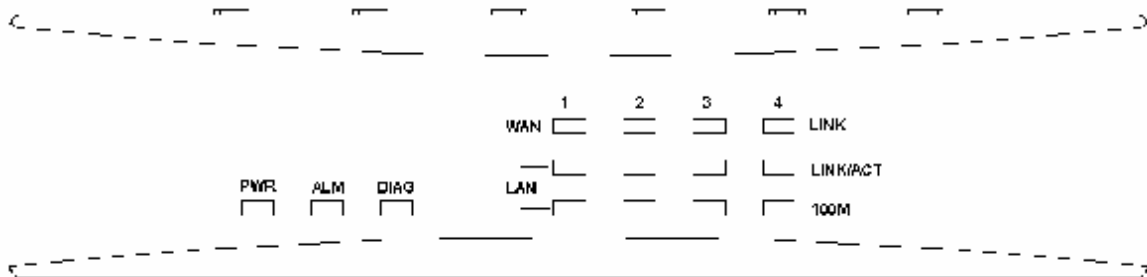


2 Getting to know about the EFM Modem

This section will introduce hardware of the EFM modem.

2.1 Front Panel

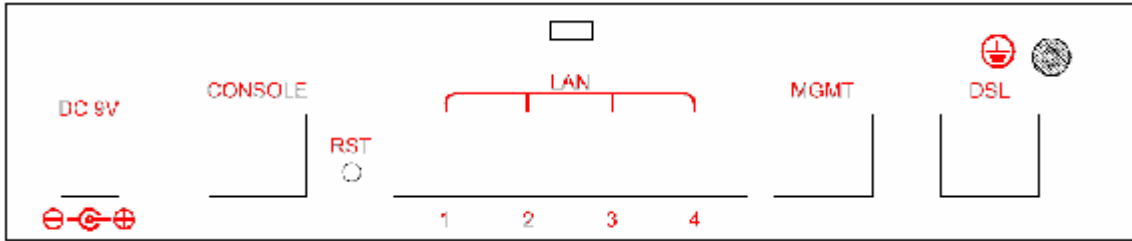
The front panel contains LED which show status of the EFM Modem.




LED status of EFM Modem			
LEDs	Active	Description	
PWR	On	Power on	
ALM	On	SHDSL.bis line connection is dropped	
	Blink	SHDSL.bis self test	
DIAG	On	Management port line connection is established	
WAN	LINK 1	On	SHDSL.bis line 1 connection is established
		Blink	SHDSL.bis line 1 handshake, Transmit or received data over SHDSL.bis link 1
	LINK 2	On	SHDSL.bis line 2 connection is established
		Blink	SHDSL.bis line 2 handshake, Transmit or received data over SHDSL.bis link 2
	LINK 3	On	SHDSL.bis line 3 connection is established
		Blink	SHDSL.bis line 3 handshake, Transmit or received data over SHDSL.bis link 3
	LINK 4	On	SHDSL.bis line 4 connection is established
		Blink	SHDSL.bis line 4 handshake, Transmit or received data over SHDSL.bis link 4
LAN	LINK/ACT 1	On	Ethernet cable is connected to LAN 1
		Blink	Transmit or received data over LAN 1
	LINK/ACT 2	On	Ethernet cable is connected to LAN 2
		Blink	Transmit or received data over LAN 2
	LINK/ACT 3	On	Ethernet cable is connected to LAN 3
		Blink	Transmit or received data over LAN 3
	LINK/ACT 4	On	Ethernet cable is connected to LAN 4
		Blink	Transmit or received data over LAN 4
LAN	100M 1	On	LAN 1 is on 100M mode
		Off	LAN 1 is on 10M mode
	100M 2	On	LAN 2 is on 100M mode
		Off	LAN 2 is on 10M mode
	100M 3	On	LAN 3 is on 100M mode
		Off	LAN 3 is on 10M mode
	100M 4	On	LAN 4 is on 100M mode
		Off	LAN 4 is on 10M mode

2.2 Rear Panel

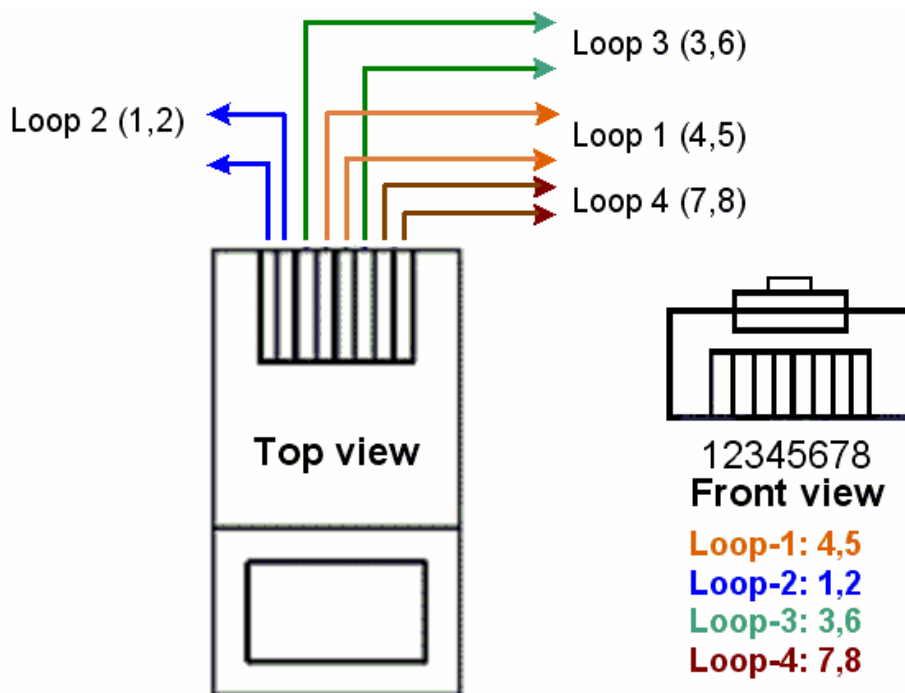
The rear panel of G.SHDSL.bis EFM Modem is where all of the connections are made.



Connector	Description
DC-IN	Power adaptor inlet: Input voltage 9VDC
CONSOLE	RJ-45 for system configuration and maintenance
RST	Reset button for reboot or load factory default
LAN (1,2,3,4)	10/100BaseT auto-sensing and auto-MDIX for LAN port (RJ-45)
MGMT	RJ-45 for management port
DSL	G.SHDSL .Bis interface for WAN port (RJ-45)
	Frame Ground / Protective earth

WAN Port

The EFM modem have one port for WAN port connection, this is a G.SHDSL .Bis interface
The pin assignments for SHDSL line cable are:



For pair (2-wire) model , Loop1 has been used

For two pair (4-wire) model, Loop1 and 2 have been used

For four pair (8-wire) model, Loop1, 2, 3 and 4 have been used

LAN ports and MGMT port

The EFM modem have four LAN ports and one MGMT Ethernet port. Those ports are auto-negotiating, auto-crossover. In 10/100Mbps Fast Ethernet, the speed can be 10Mbps or 100Mbps and the duplex mode can be half duplex or duplex.

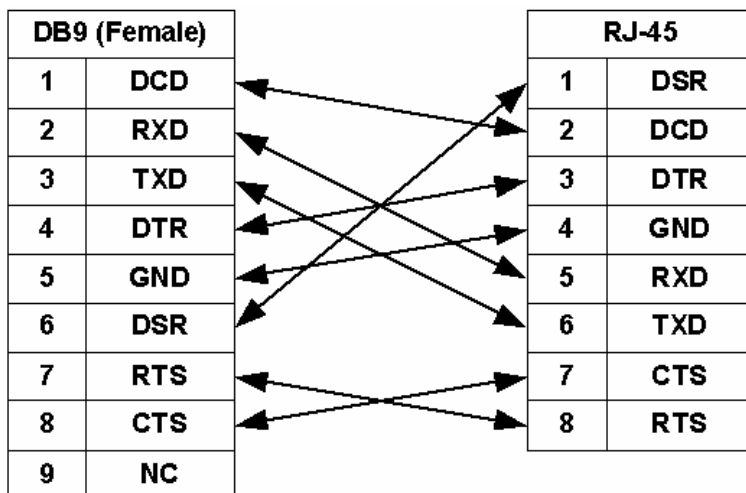
An auto-negotiating port can detect and adjust to the optimum Ethernet speed(10/100 Mbps) and duplex mode(full duplex or half duplex) of the connected device.

An auto-crossover(auto-MDI/MDI-X) port automatically works with a straight-through or crossover Ethernet cable.

Console Port

Connect the RJ-45 jack of the console cable to the console port of the EFM modem. Connect the DB-9 female end to a serial port(COM1 , COM2 or other COM port) of your computer.

The wiring diagram of console cable is as following:



Power connection

Make sure you are using the correct power source as the AC/DC adaptor. Inset the female end of power adaptor’s cord into the power receptacle on the rear panel. Connect the power adaptor to an appropriate power source.

Reset Button

The reset button can be used only in one of two ways.

- (1) Press the Reset Button for two second will cause system reboot.

- (2) Pressing the Reset Button for eight seconds will cause the product loading the factory default setting and losing all of yours configuration. When you want to change its configuration but forget the user name or password, or if the product is having problems connecting to the Internet and you want to configure it again clearing all configurations, press the Reset Button for eight seconds with a paper clip or sharp pencil.**

Protective Earth (Frame Ground) terminal

The marked lug or terminal should be connected to the building protective earth bus. Before connecting this unit to a power source and connecting or disconnecting any other cable, the protective earth terminal of this unit must be connected to the protective ground conductor of the mains AC power cord. If you are using an extension cord (power cable) make sure it is grounded as well. Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting of the protective earth terminal can make this unit dangerous. Intentional interruption is prohibited.

3 Configuration use Web Browser

3.1 Configuration method

There are three methods to configure the EFM modem: serial console, Telnet and Web Browser. Users have to choose one method to configure the EFM modem.

For Web configuration:

Make sure that Ethernet Adapter had been installed in PC or NB used for configuration of the modem. TCP/IP protocol is necessary for web configuration, so please check the TCP/IP protocol whether it has been installed.

The EFM modem provides a browser interface that lets you configure and manage the EFM modem. After you set up your IP address for the EFM modem. You can access the EFM modem's Web interface applications directly in your browser by entering the IP address of the EFM modem. You can then use your Web browser to list and manage configuration parameters from PC.

Web Configuration requires Internet Explorer 5.0 or later or Netscape Navigator 6.0 and later versions. The recommended screen resolution is 1024 by 768 pixels.

For serial console configuration:

For Serial Console, users can directly connecting a terminal or a PC equipped with a terminal-emulation program (such as Hyper Terminal) to the EFM modem's serial console port.

Use the supplied serial cable (RJ-45 to DB9F) is required to connect the EFM modem to PC. After marking this connection, configure the terminal-emulation program to use the following parameters: 9600 bps , 8 data bits , no parity and 1 stop bit.

For Telnet configuration:

Make sure that Ethernet Adapter had been installed in PC or NB used for configuration of the modem. The EFM modem also supports telnet for remote configuration. The command is " telnet 192.168.1.1" . It with asks for user name and password for remote login when using telnet, please use "admin" for username and "admin" for password. All display screen are as same as serial console configuration.

The IP address 192.168.1.1 is the default vaule and you can change to another one for you application.

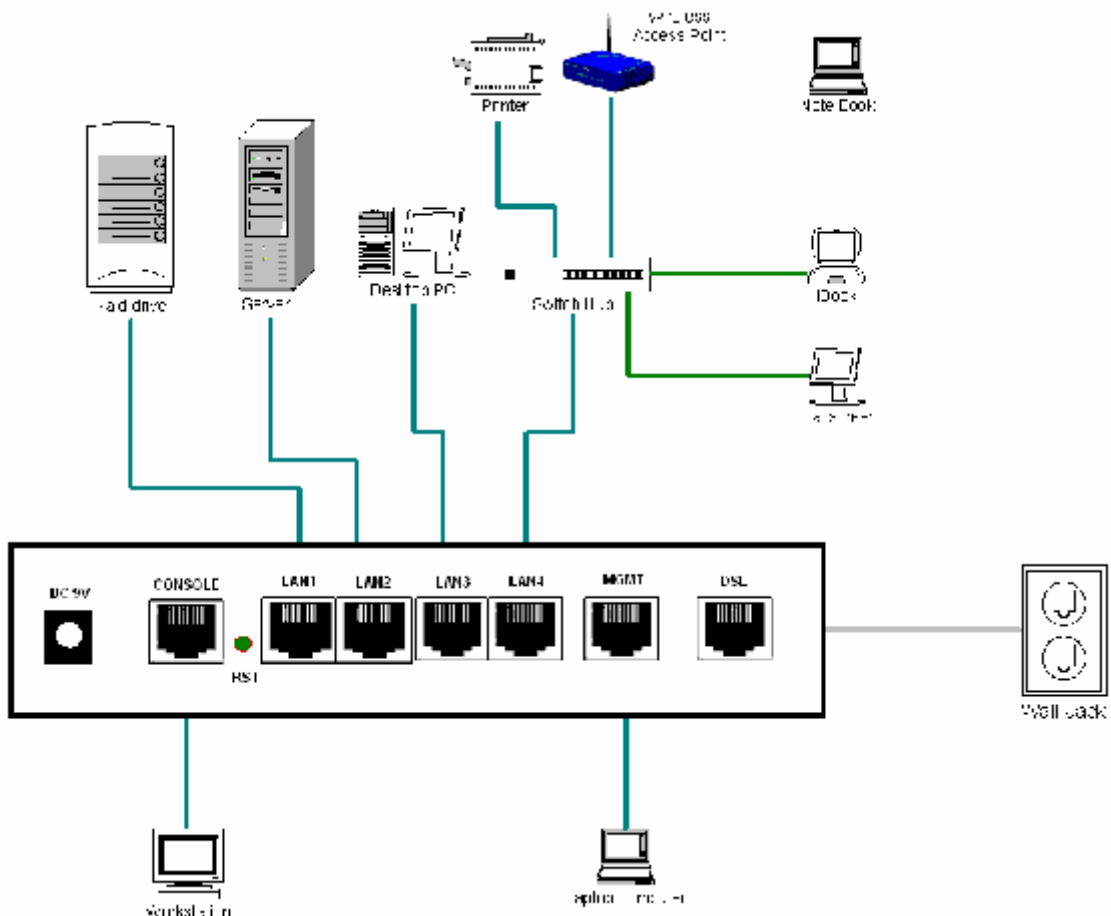
3.2 Installation

This following guide is designed to lead users through Web Configuration of G.shdsl.bis EFM Modem in the easiest and quickest way possible. Please follow the instructions carefully.

- ✓ Connect the power adapter to the port labeled DC 9V on the rear panel of the EFM modem.
- ✓ Connect the Ethernet cable to MGMT port.
(Note: The EFM modem supported auto-MDIX switching hub so both straight through and cross-over Ethernet cable can be used.)
- ✓ Connect the phone cable to the EFM modem and the other side of phone cable to wall jack.
- ✓ Connect the power adapter to power source.
- ✓ Turn on the PC or NB, which is used for configuration the EFM modem.



To avoid possible damage to this EFM modem, do not turn on the EFM modem before Hardware Installation.



Connection with G.SHDSL .Bis Modem

3.3 Setup up on Web Browser

This section introduces the configuration and functions of the web configurator. The web configurator is an HTML-based management interface that allows easy EFM modem setup and management via Interface browser.

TCP/IP setup

For Window System, click the **start** button. Select setting and **control panel**.

Double click the **network** icon.

In the Configuration window, select the **TCP/IP protocol** line that has been associated with your network card and then click **property** icon.

Choose **IP address** tab.

Select Obtain **IP address automatically**.

Click **OK** button.

System Login

After IP setting on your PC, open IE or Netscape Browser to connect the EFM Modem. Type "http://" and the IP address of the EFM modem MGMT port. Such that type: **http://192.168.1.1**

The default IP address and sub net-mask of the EFM Modem are 192.168.1.1 and 255.255.255.0. Because the EFM modem acts as DHCP server in your network, the EFM modem will automatically assign IP address for PC or NB in the network.

If your PC set the same net-mask also O.K. such as 192.168.1.X which X is from 2 to 254, that are also can connect.

Type User Name root and Password root and then click **OK**.

The default user name and password both is **root**. For the system security, suggest changing them after configuration.

Note: For safety purpose, the password will be prompt as star symbol.

Note: After changing the User Name and Password, strongly recommend you to save them because another time when you login, the User Name and Password have to be used the new one you changed.

Following is the first screen that displays when you access the web configurator.

SHDSL.bis EFM

Home Basic Advanced Status Admin Utility

INDEX

Function Overview
Following list is the EFM Bridge function overview. If you want to see more information, click the link of specific feature on the left window.

- ▶ **BASIC**
- ▶ **ADVANCED**
- ▶ **STATUS**
- ▶ **ADMIN**
- ▶ **UTILITY**

- **BASIC (Quick Setup)**
- **ADVANCED**
 - SHDSL.bis EFM
 - VLAN
 - QoS
- **STATUS**
 - SHDSL.bis EFM
 - MGMT
 - LAN
 - INTERFACE
- **ADMIN**
 - SECURITY
 - SNMP
- **UTILITY**
 - SYSTEM INFO
 - CONFIG TOOL
 - FIRMWARE UPGRADE
 - LOGOUT
 - RESTART

3.4 Basic Setup

The Basic Setup contains:

- Operation mode and MGMT port IP
- DHCP server
- LAN

User can use it to completely basic setup the EFM modem.

Operation mode and MGMT

Click **Basic** for basic installation.

SHDSL.bis EFM

Home Basic Advanced Status Admin Utility

BASIC - STEP 1

Operation Mode:

SHDSL.bis EFM: CO Side CPE Side

MGMT:

IP Address: . . .

Subnet Mask: . . .

Host Name:

Trigger DHCP Service: Disable Server

Click **CPE** (Customer Premises Equipment) side or **CO** (Central Office) side to setup the operation mode. When connection with DSLAM, the SHDSL.bis EFM modem's working mode is CPE. When "LAN to LAN" connection, one side must be CO and the other side must be CPE.

Enter Parameters in **MGMT** item.

IP: 192.168.1.1

Subnet Mask: 255.255.255.0

Host Name: SOHO

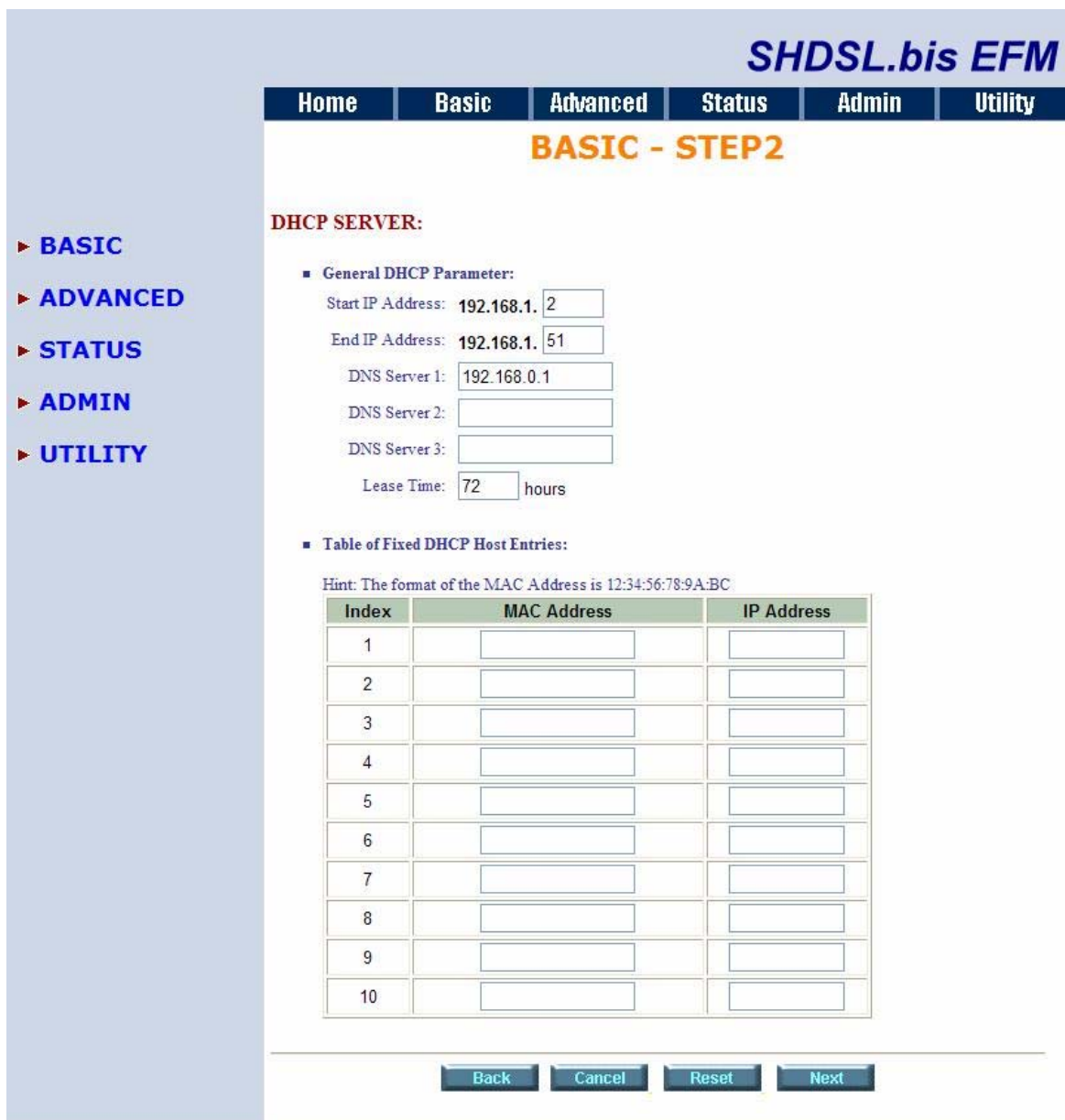
The default management **IP address** of the EFM modem is 192.168.1.1. You can configure another IP address in a different **Subnet Mask** for management purposes.

Some of the ISP requires the **Host Name** as identification. You may check with ISP to see if your Internet service has been configured with a host name. In most cases, this field can be ignored.

And then click **Trigger DHCP service** is **Disable** or **Server**. If you don't need the DHCP service, please click Disable.

DHCP server

Press **Next** to set the next page :



Dynamic Host Configuration Protocol (DHCP) is a communication protocol that lets network administrators to manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine.

Without DHCP, the IP address must be entered manually at each computer. If computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator to supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

The embedded DHCP server assigns network configuration information at most 253 users accessing the Internet in the same time.

For example: If the LAN IP address is 192.168.0.1, the IP range of LAN is 192.168.0.2 to 192.168.0.254. The DHCP server assigns the IP form Start IP Address to End IP Address. The legal IP address range is form 0 to 255, but 0 are reserved as network name and 255 are reserved for broadcast. It implies the legal IP address range is from 1 to 254. That means you cannot assign an IP greater than 254 or less than 1.

Lease time 72 hours indicates that the DHCP server will reassign IP information in every 72 hours.

The default value is 72 hours .You can set up from 1 to 720 hours according to your application.

Moreover, you may assign a fixed IP address to some device while using DHCP, you have to put this device's MAC address in the Table of Fixed DHCP Host Entries.

LAN

Press **Next** to set the next page :

SHDSL.bis EFM

Home Basic Advanced Status Admin Utility

BASIC - STEP3

LAN:

Type: Disable Dynamic IP Static IP

■ Static IP:

IP Address: 192 . 168 . 2 . 1

Subnet Mask: 255 . 255 . 255 . 0

Gateway: 0 . 0 . 0 . 0

DNS Server 1: 168.95.1.1

DNS Server 1: 168.95.192.1

DNS Server 1:

Enter Parameters in LAN:

LAN types can be selected as: **Disable**, **Dynamic IP** and **Static IP**.

If you select Disable, can't need input all IP address etc.

If you select and Dynamic IP and Static IP, enter the following:

The default values are as following:

IP Address: 192.168.2.1

Subnet Mask: 255.255.255.0

Gateway: 0.0.0.0

DNS Server 1: 168.95.1.1

DNS Server 2: 168.95.192.1

DNS Server 3:

Review

Press **Next** to set the next page :

SHDSL.bis EFM

Home
Basic
Advanced
Status
Admin
Utility

BASIC - REVIEW

REVIEW:
To let the configuration that you have changed take effect immediately, please click **Restart** button to reboot the system. To continue the setup procedure, please click **Continue** button.

- Operation Mode:

SHDSL.bis EFM	CPE Side
---------------	----------
- MGMT:

IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Hostname	SOHO
Trigger DHCP Service	Server
- LAN:

Type	Disable
------	---------

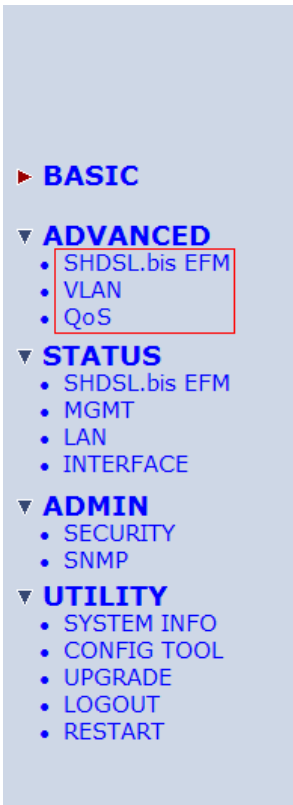
Continue
Restart

The screen will prompt the new configured parameters. Checking the parameters and Click **Restart** The EFM modem will reboot and working with new parameters or press or **Continue** to configure another parameters.

3.5 Advanced Setup

Note: The advanced functions are only for advanced users to setup advanced functions. The incorrect setting of advanced function will affect the performance or system error, even disconnection.

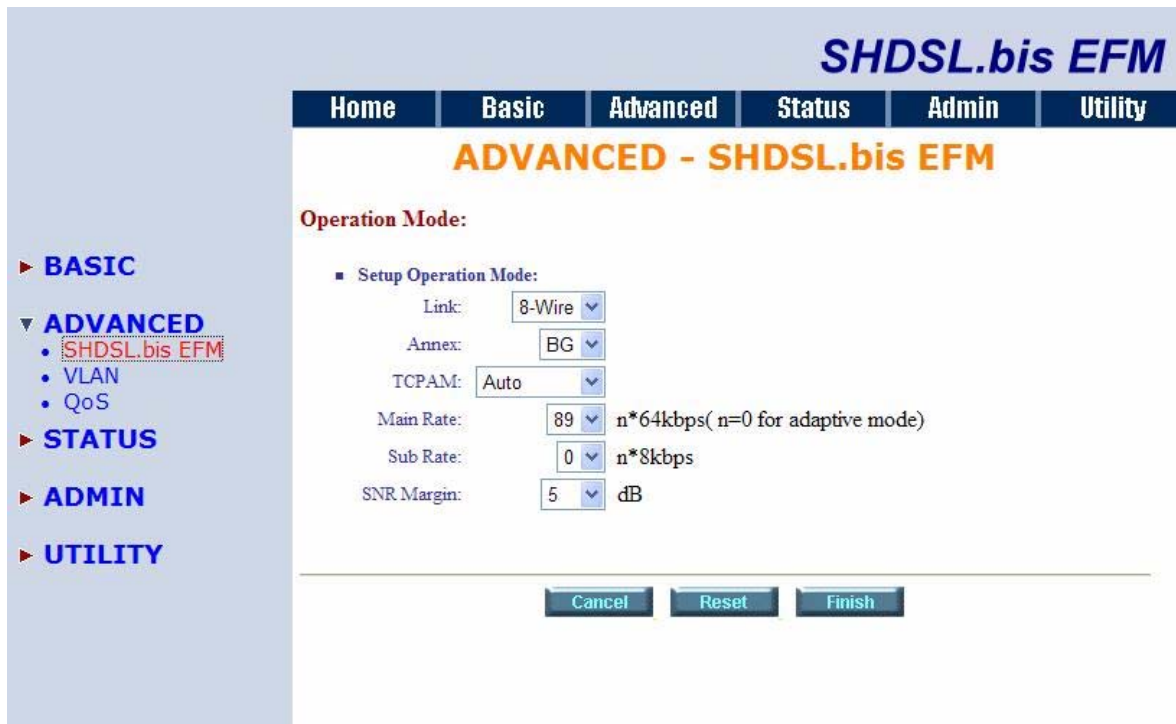
Advanced setup contains **SHDSL.bis EFM**, **VLAN** and **QoS** parameters.



SHDSL.bis EFM

You can setup the **Link** (number of wires), **Annex type**, **TCPAM type**, **Main Rate**, **Sub Rate** and **SNR margin** for SHDSL.bis EFM parameters.

Click **SHDSL.bis EFM**



Annex Type: There are four Annex types, Annex **A** (ANSI), Annex **B** (ETSI), Annex **AF** and Annex **BG** in SHDSL.bis . Check with your ISP about it.

TCPAM Type: the default option is Auto. You may assign the different type manually by click the caption TCPAM-16 or TCPAM-32 . If you select Annex A or Annex B , the TCPAM type can only assign toTCPAM-16.

Main Rate and Sub Rate:

You can setup the SHDSL.bis main rate is in the multiple of 64kbps , 128kbps and 256 kbps and sub rate is in the multiple of 8kbps, 16kbps and 32 kbps. For adaptive mode, you can setup the main rate N=0. The EFM modem will adapt the data rate according to the line status.

2 wire model:

<p>Main Rate:</p> <p>When using Annex AF and BG</p> <p>TCPAM32 : 768Kbps ~ 5696Kbps (Nx64kbps, N=12~89)</p> <p>TCPAM16 : 192Kbps ~ 3840Kbps (Nx64kbps, N=3~60)</p> <p>When using Annex A and B</p> <p>TCPAM16 : 192Kbps ~ 2304Kbps (Nx 64kbps, N=3~36)</p> <p>Sub Rate:</p> <p>0kbps ~ 56Kbps (Nx 8kbps, N=0~7)</p>

4 wire model:

Main Rate: When using Annex AF and BG TCPAM32 : main rate is 1536Kbps ~ 11392Kbps (Nx128kbps, N=12~89) TCPAM16 : main rate is 384Kbps ~ 7680Kbps (Nx128kbps, N=3~60) When using Annex A and B TCPAM16 : main rate is 384Kbps ~ 4608Kbps (Nx 128kbps, N=3~36) Sub Rate: 0kbps ~ 112Kbps (Nx 16kbps, N=0~7)
--

8 wire model:

Main Rate: When using Annex AF and BG TCPAM32 : main rate is 3072bps ~ 22784Kbps (Nx256kbps, N=12~89) TCPAM16 : main rate is 768Kbps ~ 15360Kbps (Nx256bps, N=3~60) When using Annex A and B TCPAM16 : main rate is 768Kbps ~ 9216Kbps (Nx 256bps, N=3~36) Sub Rate: 0kbps ~ 224Kbps (Nx 32kbps, N=0~7)
--

SNR margin is an index of line connection quality. You can see the actual SNR margin in STATUS SHDSL.bis. The larger is SNR margin; the better is line connection quality.

If you set SNR margin in the field as 5, the SHDSL.bis connection will drop and reconnect when the SNR margin is lower than 5. On the other hand, the device will reduce the line rate and reconnect for better line connection quality.

The screen will prompt the parameters that will be written in EEPROM. Check the parameters before writing in EEPROM.

Press Restart to restart the EFM modem working with new parameters or press continue to setup another parameter.

VLAN

Click VLAN to configure VLAN.



VLAN (Virtual Local Area Network) allows a physical network to be partitioned into multiple logical networks. Devices on a logical network belong to one group. A device can belong to more than one group. With VLAN, a device cannot directly talk to or hear from devices that are not in the same group.

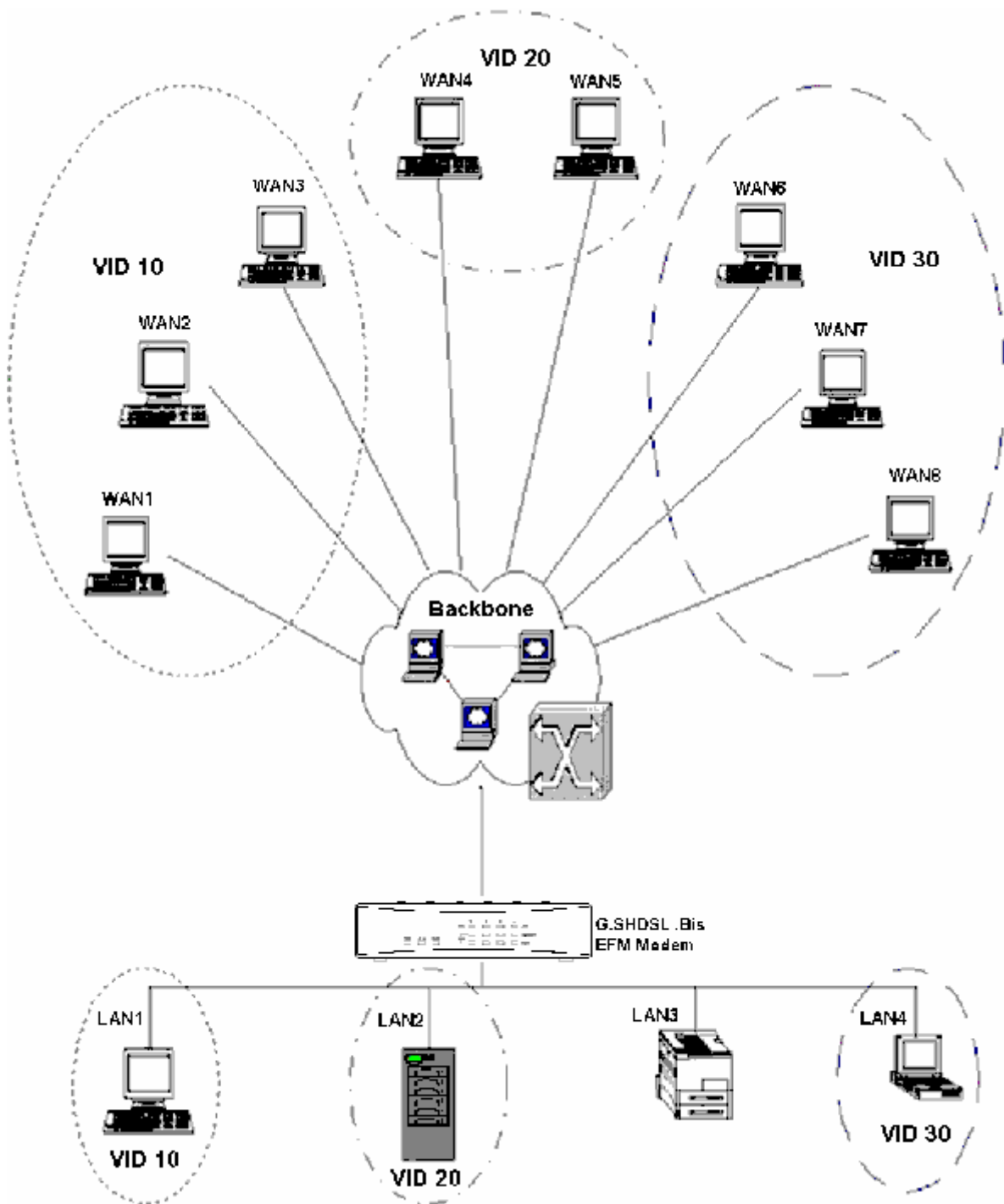
With MTU (Multi-Tenant Unit) applications, VLAN is vital in providing isolation and security among the subscribers. When properly configured, VLAN prevents one subscriber from accessing the network resources of another on the same LAN.

VLAN also increases network performance by limiting broadcasts to a smaller and more manageable logical broadcast domain. In traditional switched environments, all broadcast packets go to each every individual port. With VLAN, all broadcasts are confined to a specific broadcast domain.

User can choose two types of VLAN: **802.1Q Tag-Based VLAN** and **Port-Based VLAN**.

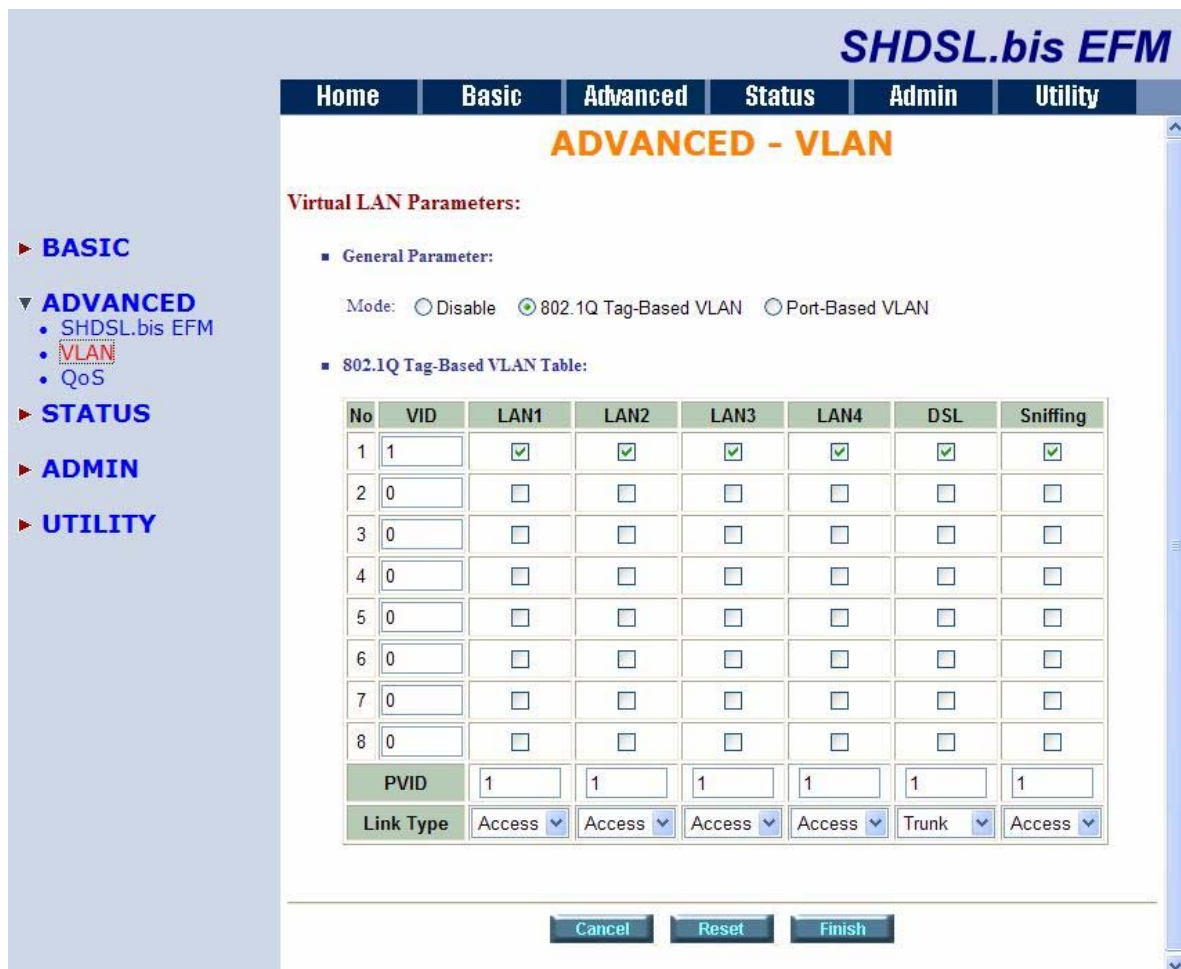
The VLAN Setup screen changes depending on whether you choose 802.1Q Tag-Based VLAN type or Port Based VLAN type in this screen.

The IEEE 802.1Q defines the operation of VLAN bridges that permit the definition, operation, and administration of VLAN topologies within a bridged LAN infrastructure.



802.1Q Tag-Based VLAN

Click the **802.1Q Tag-Based VLAN** to configure the EFM modem.



VID: (Virtual LAN ID) It is an definite number of ID which number is from 1 to 4094.

PVID: (Port VID) It is an untagged member from 1 to 4094 of default VLAN.

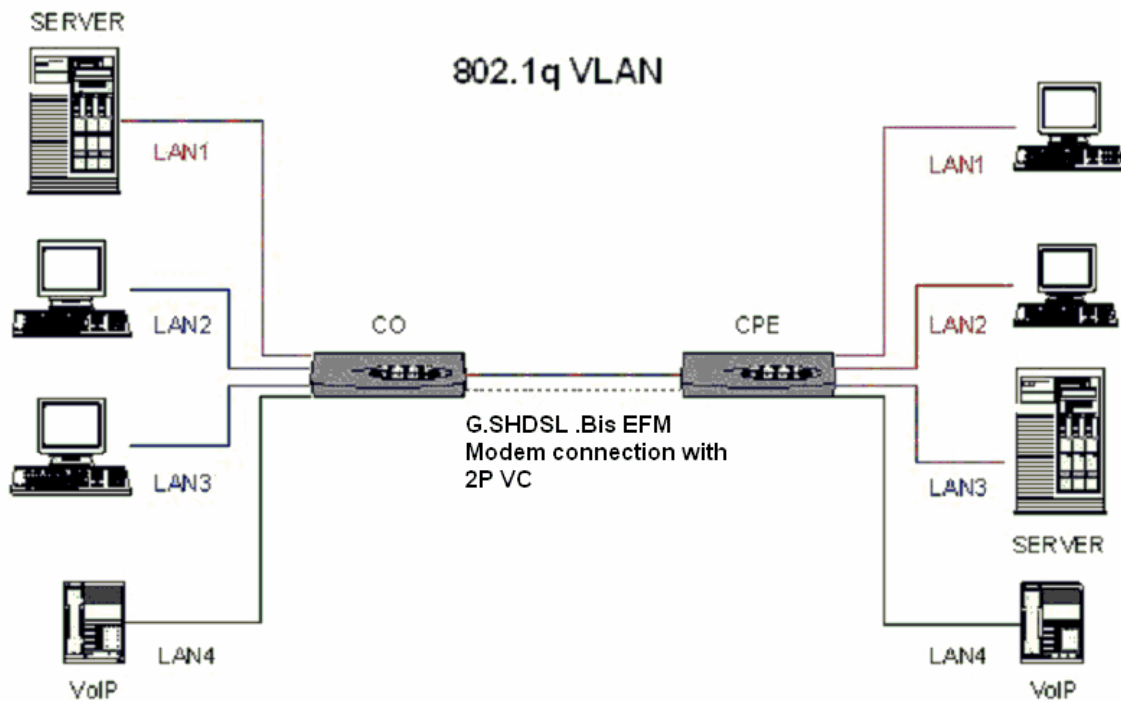
Link Type: **Access** means the port can receive or send untagged packets.

Trunk means that the port can receive or send tagged packets.

The EFM modem initially default configures one VLAN , VID=1.

A port such as LAN1 to 4, DSL or sniffing can have only one PVID, but can have as many VID as the EFM modem has memory in its VLAN table to store them.

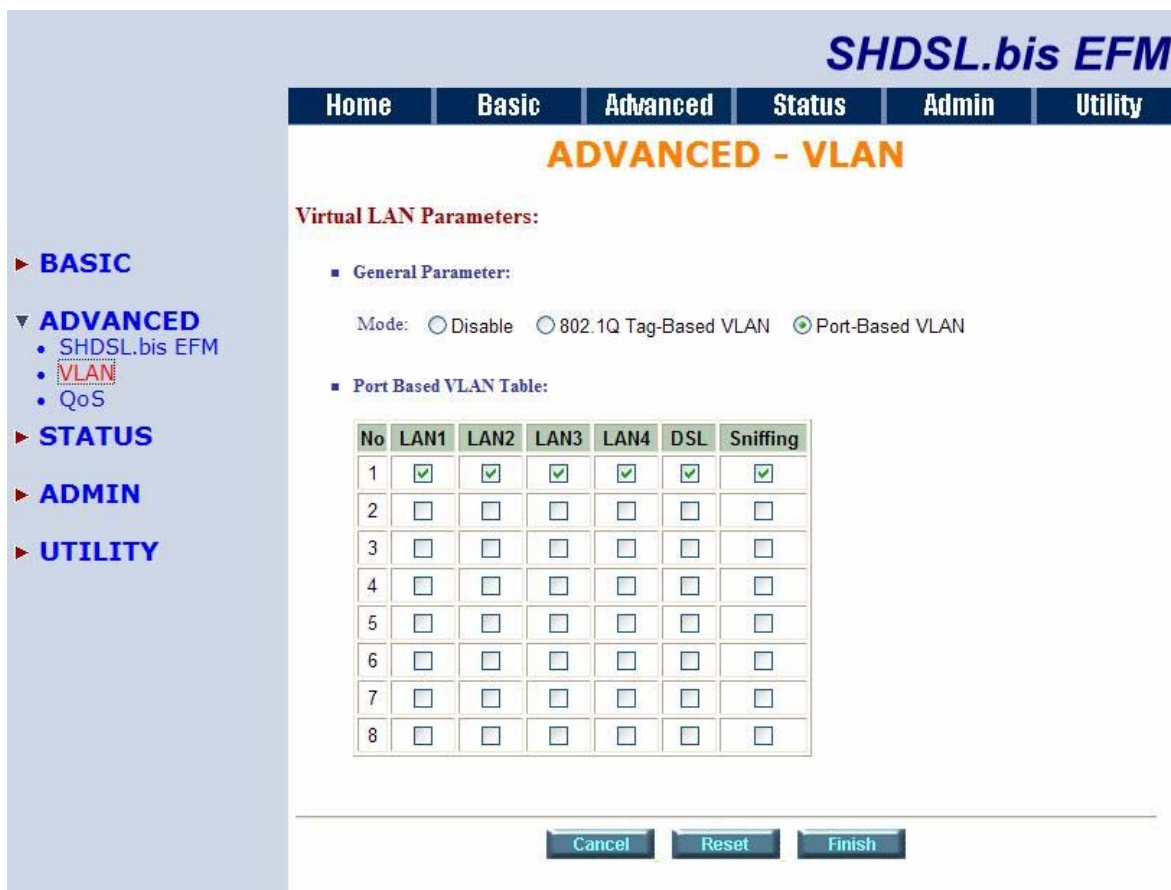
Ports in the same VLAN group share the same frame broadcast domain thus increase network performance through reduced broadcast traffic. VLAN groups can be modified at any time by adding, moving or changing ports without any re-cabling.



1. The unit supports up to 8 active VLANs with shared VLAN learning (SVL) bridge out of 4096 possible VLAN specified in IEEE 802.1Q.
2. Each port always belongs to a default VLAN with its port VID (PVID) as an untagged member. Also, a port can belong to multiple VLANs and be tagged members of these VLANs.
3. A port must not be a tagged member of its default VLAN.
4. If a non-tagged or null-VID tagged packet is received, it will be assigned with the default PVID of the ingress port.
5. If the packet is tagged with non-null VID, the VID in the tag will be used.
6. The look up process starts with VLAN look up to determine whether the VID is valid. If the VID is not valid, the packet will be dropped and its address will not be learned. If the VID is valid, the VID, destination address, and source address lookups are performed.
7. The VID and destination address lookup determines the forwarding ports. If it fails, the packet will be broadcasted to all members of the VLAN, except the ingress port.
8. Frames are sent out tagged or untagged depend on if the egress port is a tagged or untagged member of the VLAN that frames belong.
9. If VID and source address look up fails, the source address will be learned.

Port-Based VLAN

Click **Port-Based VLAN** to configure the EFM modem.



Port-Based VLANs are VLANs where the packet forwarding decision is based on the destination MAC address and its associated port.

When using the port-based VLAN, the port is assigned to a specific VLAN independent of the user or system attached to the port. This means all users attached to the port should be members in the same VLAN. The network administrator typically performs the VLAN assignment. The port configuration is static and cannot be automatically changed to another VLAN without manual reconfiguration.

As with other VLAN approaches, the packets forwarded using this method do not leak into other VLAN domains on the network. After a port has been assigned to a VLAN, the port cannot send to or receive from devices in another VLAN.

The default setting is all ports connected which means all ports can communicate with each other. That is, there are no virtual LANs. The option is the most flexible but the least secure.

Port Based VLAN Table:

No	LAN1	LAN2	LAN3	LAN4	DSL	Sniffing
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you click the LAN1 to LAN4 only with DSL and Sniffing, there are port isolation means that each LANs port can only communicate with management port and cannot communicate with each other. This option is the most limiting but also the most secure.

■ Port Based VLAN Table:

No	LAN1	LAN2	LAN3	LAN4	DSL	Sniffing
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

QoS

Click **QoS** to configure QoS

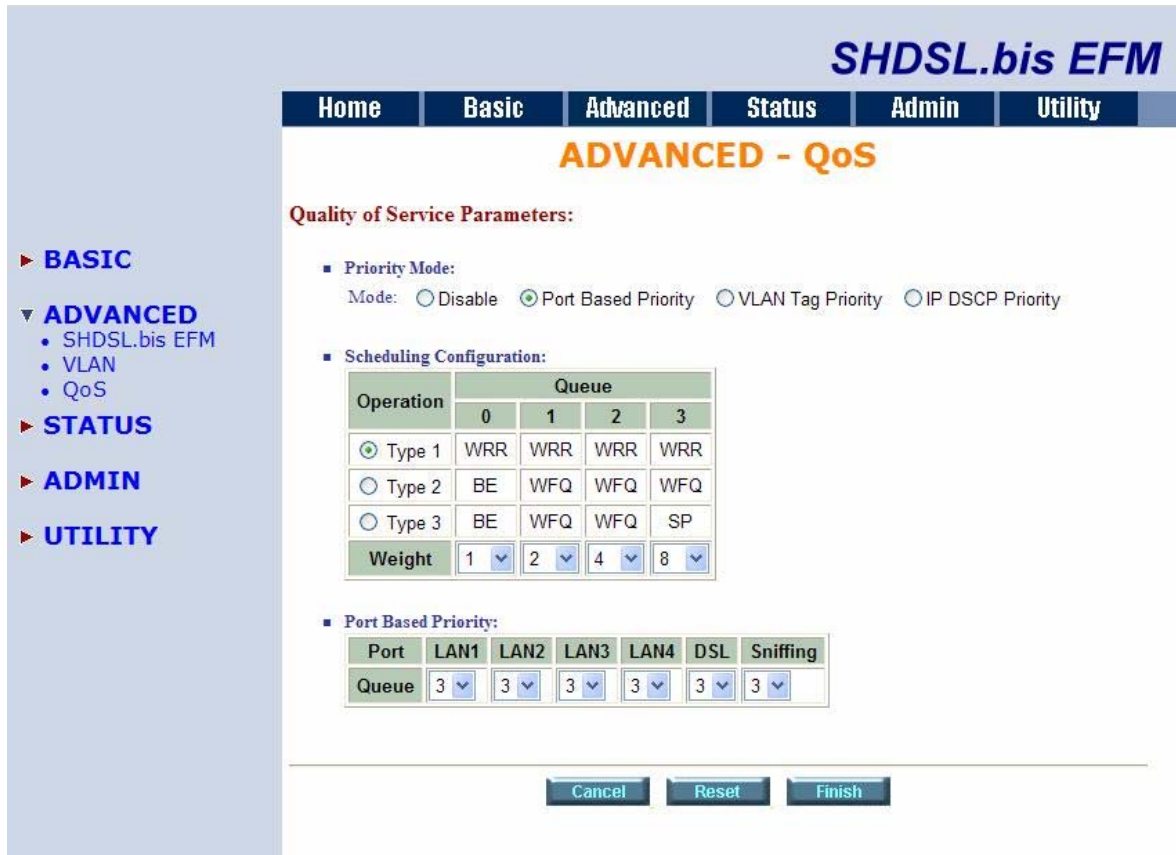


IP QoS (Quality of Service) is a good function to decide which PCs can get the priorities to pass through EFM modem once if the bandwidth is exhausted or fully saturated.

The priority modes have three type: **Port Based Priority**, **VLAN Tag Priority** and **IP DSCP Priority**. You can also set **Disable** the QoS function.

Port Based Priority

When you click Port Based Priority, it will show the following:

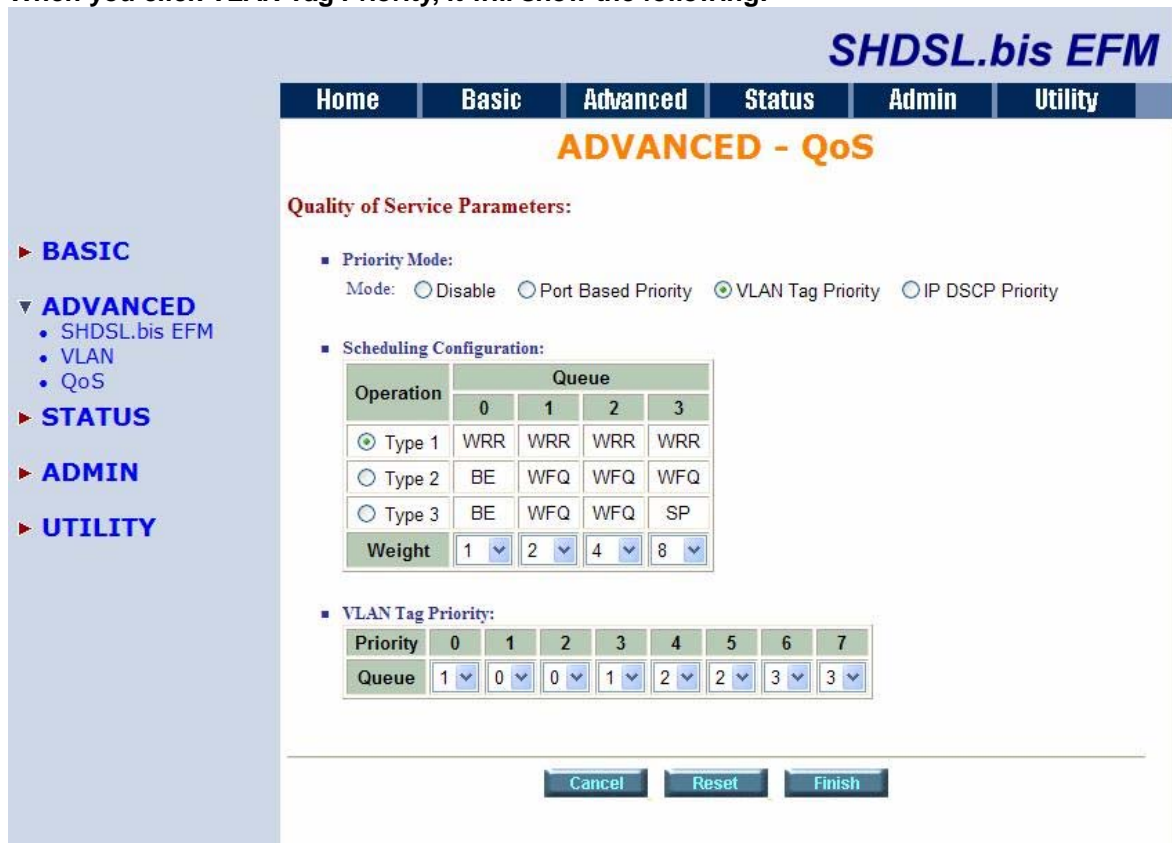


Scheduling Configuration item can setup the queue type from type 1 to type 3. Each queue type can setup the queue weight form 1 to 15.

WRR	Weight Round Robin
WFQ	Weight Fair Queue
BE	Best Effort
SP	Strictly Priority

VLAN Tag Priority

When you click VLAN Tag Priority, it will show the following:



Scheduling Configuration item can setup the queue from 0 to 3. Each queue can select three type: from type 1 to type 3. Queue Weight item can setup the queue with weight form 1 to 15.

User can setup each VLAN Tag Priority from 0 to 7 and their queue from 0 to 3.

IP DSCP Priority

When you click IP DSCP(Differentiated Services Code Point) Priority, it will show the following:

SHDSL.bis EFM

Home
Basic
Advanced
Status
Admin
Utility

ADVANCED - QoS

Quality of Service Parameters:

- Priority Mode:
 - Mode: Disable Port Based Priority VLAN Tag Priority IP DSCP Priority
- Scheduling Configuration:

Operation	Queue			
	0	1	2	3
<input checked="" type="radio"/> Type 1	WRR	WRR	WRR	WRR
<input type="radio"/> Type 2	DC	WFQ	WFQ	WFQ
<input type="radio"/> Type 3	BE	WFQ	WFQ	SP
Weight	1 ▾	2 ▾	4 ▾	8 ▾

SHDSL.bis EFM

Home
Basic
Advanced
Status
Admin
Utility

■ IP DSCP Priority:

DSCP	Queue	DSCP	Queue	DSCP	Queue	DSCP	Queue
0	0 ▾	16	1 ▾	32	2 ▾	48	2 ▾
1	0 ▾	17	1 ▾	33	2 ▾	49	2 ▾
2	0 ▾	18	1 ▾	34	2 ▾	50	2 ▾
3	0 ▾	19	1 ▾	35	2 ▾	51	2 ▾
4	0 ▾	20	1 ▾	36	2 ▾	52	2 ▾
5	0 ▾	21	1 ▾	37	2 ▾	53	2 ▾
6	0 ▾	22	1 ▾	38	2 ▾	54	2 ▾
7	0 ▾	23	1 ▾	39	2 ▾	55	2 ▾
8	0 ▾	24	2 ▾	40	3 ▾	56	2 ▾
9	0 ▾	25	2 ▾	41	3 ▾	57	2 ▾
10	0 ▾	26	2 ▾	42	3 ▾	58	2 ▾
11	0 ▾	27	2 ▾	43	3 ▾	59	2 ▾
12	0 ▾	28	2 ▾	44	3 ▾	60	2 ▾
13	0 ▾	29	2 ▾	45	3 ▾	61	2 ▾
14	0 ▾	30	2 ▾	46	3 ▾	62	2 ▾
15	0 ▾	31	2 ▾	47	3 ▾	63	2 ▾

Cancel Reset Finish

Each IP DSCP value (from 0 to 63) is mapped to a Queue value (from 0 to 3). The number 0 represents the lowest priority and 3 represents the highest priority. You are easy to change the table setting. If you want to save the changes, click **Finish**.

When click **finish**, there will have a QoS parameters review page for your confirm.

SHDSL.bis EFM

Home
Basic
Advanced
Status
Admin
Utility

■ Priority Mode:

Mode

■ Scheduling Configuration:

Operation	Queue			
	Queue 0	Queue 1	Queue 2	Queue 3
Type 1	WRR	WRR	WRR	WRR
Weight	1	2	4	8

■ IP DSCP Priority:

DSCP	Queue	DSCP	Queue	DSCP	Queue	DSCP	Queue
0	0	16	1	32	2	48	2
1	0	17	1	33	2	49	2
2	0	18	1	34	2	50	2
3	0	19	1	35	2	51	2
4	0	20	1	36	2	52	2
5	0	21	1	37	2	53	2
6	0	22	1	38	2	54	2
7	0	23	1	39	2	55	2
8	0	24	2	40	3	56	2
9	0	25	2	41	3	57	2
10	0	26	2	42	3	58	2
11	0	27	2	43	3	59	2
12	0	28	2	44	3	60	2
13	0	29	2	45	3	61	2
14	0	30	2	46	3	62	2
15	0	31	2	47	3	63	2

Continue
Restart

To let the configuration that you have changed take effect, click **Restart** to reboot system. If you want to continue the setup procedure, click **Continue** is O.K.

3.6 Status

When you click **STATUS** You can monitor the following : SHDSL.bis EFM, MGMT, LAN and INTERFACE

- ▶ **BASIC**
- ▼ **ADVANCED**
 - SHDSL.bis EFM
 - VLAN
 - QoS
- ▼ **STATUS**
 - SHDSL.bis EFM
 - MGMT
 - LAN
 - INTERFACE
- ▼ **ADMIN**
 - SECURITY
 - SNMP
- ▼ **UTILITY**
 - SYSTEM INFO
 - CONFIG TOOL
 - UPGRADE
 - LOGOUT
 - RESTART

SHDSL .Bis EFM

SHDSL.bis status including run-time device status : mode and Bitrate and Performance information: **SNR margin**, **attenuation** and **CRC error count**.

4-pairs model will be showed as following, you can know about their four channel run-time status.

Below display screen is come from four pair model:

SHDSL.bis EFM

Home Basic Advanced **Status** Admin Utility

STATUS - SHDSL.bis

Status Information:

- Run-Time Device Status:

SHDSL.bis Status	Channel A	Channel B	Channel C	Channel D
SHDSL.bis Mode	CPE Side	CPE Side	CPE Side	CPE Side
Line Rate(n*64)	0 Kbps	0 Kbps	0 Kbps	0 Kbps
- Performance Information:

Item	Local Side				Remote Side			
	Channel A	Channel B	Channel C	Channel D	Channel A	Channel B	Channel C	Channel D
SNR Margin	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
Attenuation	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB
CRC Error Count	0	0	0	0	0	0	0	0

Finish

Below display screen is come from one pair model:

SHDSL

Home Basic Advanced Status Admin Utility

STATUS - SHDSL.bis

Status Information:

- Run-Time Device Status:

SHDSL.bis Status	Value
SHDSL.bis Mode	CPE Side
Line Rate(n*64)	5696 Kbps
- Performance Information:

Item	Local Side	Remote Side
SNR Margin	17 dB	17 dB
Attenuation	1 dB	1 dB
CRC Error Count	0	0

Finish

If two EFM modem have been linking together, you can know about their run-time line rate status and performance information from this screen.

Note: CPE side's line rate according to the setting of CO side.

MGMT

MGMT status will display the MGMT interface information.

SHDSL.bis EFM

Home Basic Advanced Status Admin Utility

STATUS - MGMT

MGMT Interface Status:

- General status:

IP Type:	Fixed
MAC Address	00:3C:25:10:EF:13
IP Address	192.168.1.1
Subnet Mask:	255.255.255.0
- DHCP client table:

Type	Client IP Address	Client MAC Address
DYNAMIC	192.168.1.2	00:19:21:50:1F:BE

Refresh Finish

LAN

LAN status will prompt the MAC address, IP address, Subnet mask and DHCP client table.

SHDSL.bis EFM

Home Basic Advanced Status Admin Utility

STATUS - LAN

LAN Interface Status:

- General status:

IP Type:	Dynamic(DHCP Client)
IP Address	0.0.0.0
Subnet Mask:	0.0.0.0

Refresh Finish

Interface

INTERFACE status includes MGMT and LAN statistics information.

SHDSL.bis EFM

Home Basic Advanced Status Admin Utility

STATUS - INTERFACE

Interface Statistics:

Port	InOctets	InPackets	OutOctets	OutPackets	InDiscards	OutDiscards
MGMT	411910	3564	718822	2102	0	0
LAN	0	0	9974	134	0	0

[Finish](#)

▶ BASIC

▼ ADVANCED

- SHDSL.bis EFM
- VLAN
- QoS

▼ STATUS

- SHDSL.bis EFM
- MGMT
- LAN
- **INTERFACE**

▶ ADMIN

▶ UTILITY

3.7 Administration

This session introduces Administration including **SECURITY** and **SNMP** (simple network management protocol).

Security

For system security, suggest to change the default user name and password in the first setup otherwise unauthorized persons can access the EFM modem and change the parameters.

Press **Security** to setup the parameters.



For better security, change the **Supervisor ID** and **Supervisor password** for the EFM modem. If you don't set them, all users can be able to access the EFM modem using the default IP and Password is **root**.

You can authorize five legal users to access the EFM modem via telnet or console. There are two UI modes, **menu** driven mode and **command** mode to configure the EFM modem.

There have a Telnet Port number setting. The default value is 23.

SHDSL.bis EFM

Home
Basic
Advanced
Status
Admin
Utility

■ **Remote Management Host:**
 Modify legal management IP address. Note, an empty pool defaults to a security level that would allow any management connections from any host in LAN but deny all connections from WAN side. A 0.0.0.0 entry in the pool will allow all management connections from any host, including the Internet.

ID	IP Address
1	0.0.0.0
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Cancel
Reset
Finish

Legal address pool will setup the legal IP addresses from which authorized person can configure the EFM modem. This is the more secure function for network administrator to setup the legal address of configuration.

Configured **0.0.0.0** will allow all hosts on Internet or LAN to access the EFM modem. Leaving blank of trust host list will cause blocking all PC from WAN to access the EFM modem. On the other hand, only PC in LAN can access the EFM modem. If you type the exact IP address in the field, only the host can access the EFM modem.

Click **Finish** to finish the setting.

The browser will prompt the configured parameters and check it before writing into EEPROM.

Press **Restart** to restart the EFM modem working with the new parameters and press **Continue** to setup other parameters.

SNMP

Simple Network Management Protocol (SNMP) provides for the exchange of messages between a network management client and a network management agent for remote management of network nodes. These messages contain requests to get and set variables that exist in network nodes in order to obtain statistics, set configuration parameters, and monitor network events. SNMP communications can occur over the LAN or WAN connection.

The EFM modem can generate SNMP traps to indicate alarm conditions, and it relies on SNMP community strings to implement SNMP security.

This EFM modem support both MIB I and MIB II.

Click **SNMP** to configure the parameters.

The screenshot shows the web interface for configuring SNMP parameters. The page title is "ADMIN - SNMP" and the sub-header is "SNMP Community and Trap Parameters:". There are two tables, each with "Reset" and "Modify" buttons below it.

Table of current community pool:

Index	Status	Access Right	Community
1	Disable	---	---
2	Disable	---	---
3	Disable	---	---
4	Disable	---	---
5	Disable	---	---

Table of current trap host pool:

Index	Version	IP Address	Community
1	Disable	---	---
2	Disable	---	---
3	Disable	---	---
4	Disable	---	---
5	Disable	---	---

At the bottom of the page, there are three buttons: "Cancel", "Reset", and "Flash".

In the table of **current community pool**, you can setup the access authority.

Status: Set Enable for modify this item.

Access Right: **Deny** for deny all access

Read for access read only

Write for access read and write.

Community: it serves as password for access right.

After configuring the community pool, press **Modify**.

The browser will prompt the configured parameters and check it before writing into EEPROM.

Press **Restart** to restart the EFM modem working with the new parameters and press

Continue to setup other parameters.

In the table of **current trap host pool**, you can setup the trap host.

SNMP trap is an informational message sent from an SNMP agent to a manager. Click **Modify** to modify the trap host pool.

Version: select version for trap host. (**Version 1** is for SNMPv1; **Version 2** for SNMPv2).

IP Address: type the trap host IP address

Community: type the community password. The community is setup in community pool.

Press **OK** to finish the setup.

The browser will prompt the configured parameters and check it before writing into EEPROM.

Press **Restart** to restart the EFM modem working with the new parameters and press

Continue to setup other parameters.

3.8 Utility

This section will describe the **UTILITY** of the EFM modem.



The UTILITY menu including:

SYSTEM INFO: system information,

CONFIG TOOL: load the factory default configuration,

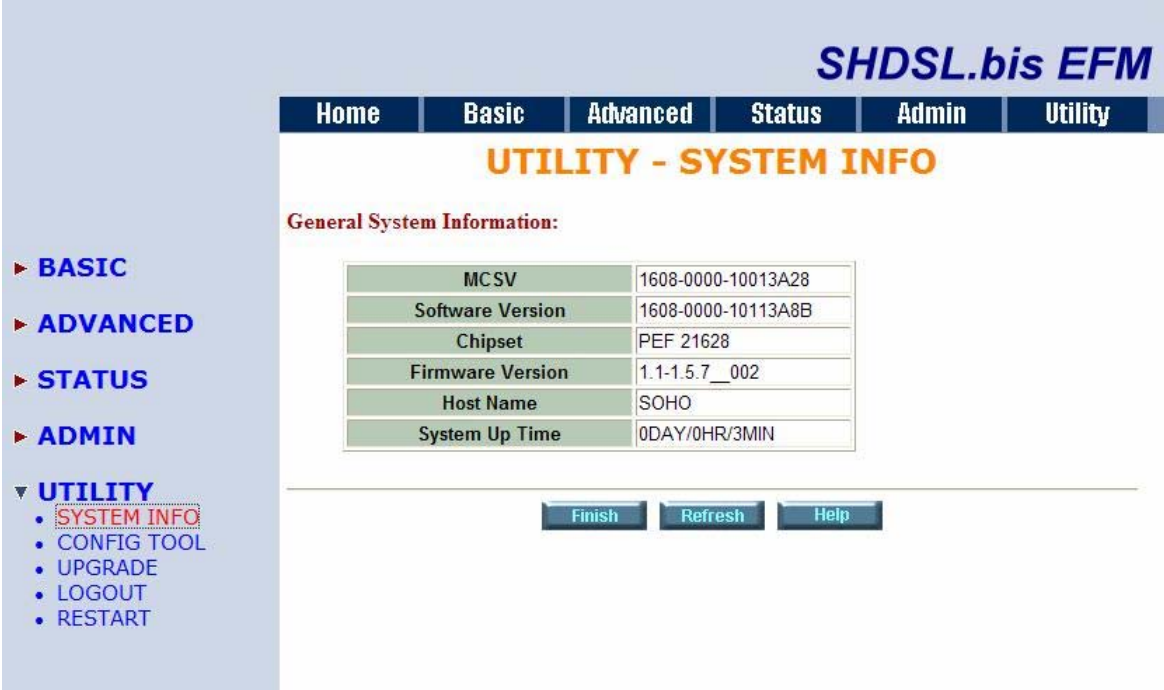
UPGRADE: upgrade the firmware

LOGOUT: logout the system

RESTART: restart the EFM modem.

System Info

For review the information, click **SYSTEM INFO** to display the screen as shown below.



The screenshot shows the SHDSL.bis EFM web interface. The top navigation bar includes Home, Basic, Advanced, Status, Admin, and Utility. The main content area is titled "UTILITY - SYSTEM INFO" and displays "General System Information" in a table. The table lists the following information:

MCSV	1608-0000-10013A28
Software Version	1608-0000-10113A8B
Chipset	PEF 21628
Firmware Version	1.1-1.5.7__002
Host Name	SOHO
System Up Time	0DAY/0HR/3MIN

Below the table are three buttons: Finish, Refresh, and Help. On the left side, there is a navigation menu with options: BASIC, ADVANCED, STATUS, ADMIN, and UTILITY. The UTILITY menu is expanded, showing SYSTEM INFO, CONFIG TOOL, UPGRADE, LOGOUT, and RESTART.

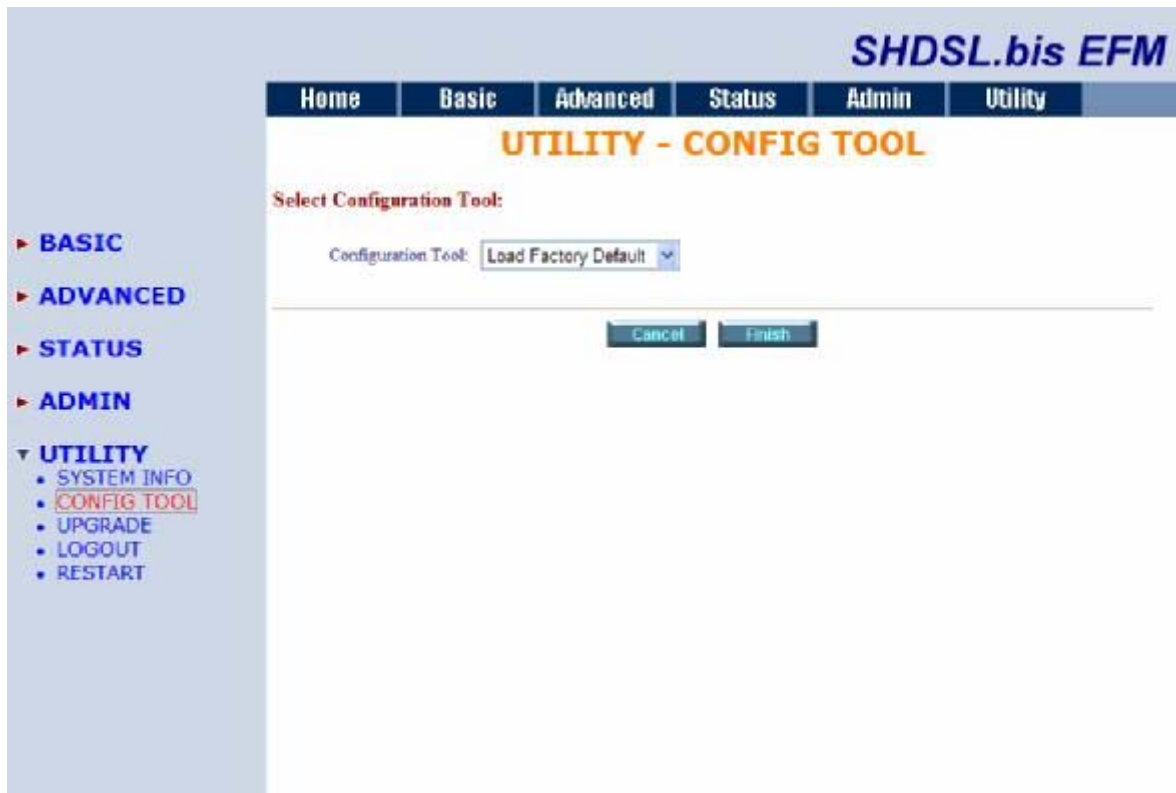
You can check the **MCSV**, **Software Version**, **Chipset**, **Firmware Version**, **Host Name** and **System Up Time**.

The System Up Time item let you know the EFM modem how long time after power on.

Config Tool

This configuration tool has three functions: load Factory Default, Restore Configuration, and Backup Configuration.

Press **CONFIG TOOL**, you can view the following:



Choose the function and then press **Finish**.

Load Factory Default: It will load the factory default parameters to the EFM modem.

Note: This action will change all of the settings to factory default. On the other hand, you will lose all the existing configured parameters.

Restore Configuration:

In case of the configuration crashed occasionally, it will help you to recover the backup configuration easily.

Click **Finish** after selecting **Restore Configuration**.

Browse the route of backup file then press **finish**. The EFM modem will automatically restore the saved configuration.

Backup Configuration:

After configuration, suggest using the function to backup your EFM modem parameters in the PC. Select the **Backup Configuration** and then press **Finish**.

Browse the place of backup file named backup. Press **Finish**. The EFM modem will automatically backup the configuration.

Upgrade

You can upgrade the firmware of EFM modem using the upgrade function.

Press **Upgrade** in UTILITY menu.



Type the path and file name of the firmware file you wish to upload to the EFM modem in text box or click **Browse** to locate it. Press **OK** button to upgrade. The system will reboot automatically after finishing. (Firmware upgrades are only applied after a reboot)

After the firmware upgrade process is complete, you can see the **SYSTEM INFO** screen to verify your current firmware version number.

Logout

To exit the web configurator, press **LOGOUT**. You have to log in with your password again after you log out. This is recommended after you finish a management session for security reasons.



Restart

For restarting the EFM modem, press **Restart** to reboot the EFM modem.



When you press **Restart**, display screen is as following:

The screenshot displays the SHDSL.bis EFM web interface. At the top right, the title "SHDSL.bis EFM" is visible. Below it is a navigation menu with tabs for "Home", "Basic", "Advanced", "Status", "Admin", and "Utility". The "Utility" tab is currently selected. On the left side, there is a vertical menu with expandable sections: "BASIC", "ADVANCED", "STATUS", "ADMIN", and "UTILITY". The "UTILITY" section is expanded, showing sub-items: "SYSTEM INFO", "CONFIG TOOL", "UPGRADE", "LOGOUT", and "RESTART". The main content area is titled "UTILITY - RESTART" and contains the following text: "Save configuration successfully. The system will reboot automatically in 5 seconds. Please close your browser and re-open it one minute later."

It show the configuration is success. When the system have rebooted later, you can re-open the browser.

4 Configuration use Serial Console and Telnet with Menu Driven Interface

4.1 Introduction

Serial Console

Check the connectivity of the supplied serial cable from your computer to the serial port of this EFM Modem. Start your terminal access program by terminal emulation program or Hyper Terminal and configure its communication parameters to match the following default characteristics of the console port:

Parameter	Value
Baud rate	9600
Data Bits	8
Parity Check	No
Stop Bits	1
Flow-control	No

After finished the parameter settings, press the **SPACE** key until the login screen appears. When you see the login screen, you can logon to this EFM Modem.

Note: Only **SPACE** key invoke the login prompt. Pressing other keys does not work.

The system asks for User and Password, please enter “admin” both for the factory default password. As show in the following:

```
User: admin
Password: *****
```

Telnet

Make sure the correct Ethernet cable connected the LAN port of your computer to EFM modem. The DIAG indicator on the front panel shall light if a correct cable is used. Starting your Telnet client with VT100 terminal emulation and connecting to the management IP of EFM modem, wait for the login prompt appears. Input User and Password after login screen pop up.

```
User: admin
Password: *****
```

Note: The default IP address is 192.168.1.1.

Operation Interface

For serial console and Telnet management, the EFM Modem implements the menu driven interface. It can show you all of available commands for you to select. You don't need to remember the command syntax and save your time on typing the whole command line.

The following figure gives you an example of the menu driven interface. In the menu, you scroll up/down by pressing key **I / K** ; select one command by key **L**, and go back to a higher level of menu by key **J** ; you also can scroll to top/bottom by pressing Key **U/O**.

For example, to show the system information, just logon to the EFM Modem, move down the cursor by pressing key **K** twice and select "show" command by key **L**, you shall see a submenu and select "system" command in this submenu, then the system will show you the general information.

You can press the **Enter** key for select command same as key **L**.

```

                                SHDSL.bis EFM Bridge
-----
>> enable          Modify command privilege
   status          Show running system status
   show            View system configuration
   ping            Packet internet groper command
   exit            Quit system

-----

Command: enable <CR>
Message:

-----

<I/K> Move up/down, <L/J> Select/Unselect, <U/O> Move top/bottom, <^Q> Help

```

Window structure

From top to bottom, the window is divided into four parts:

1. Product name: SHDSL.bis EFM Bridge
2. Menu field: Menu tree prompts on this field. Symbol ">>" indicates the cursor place.
3. Configuring field: You will configure the parameters in this field. < parameters > indicates the parameters you can choose and < more...> indicates that there have submenu in the title.
4. Operation command for help

Menu Driven Interface Commands

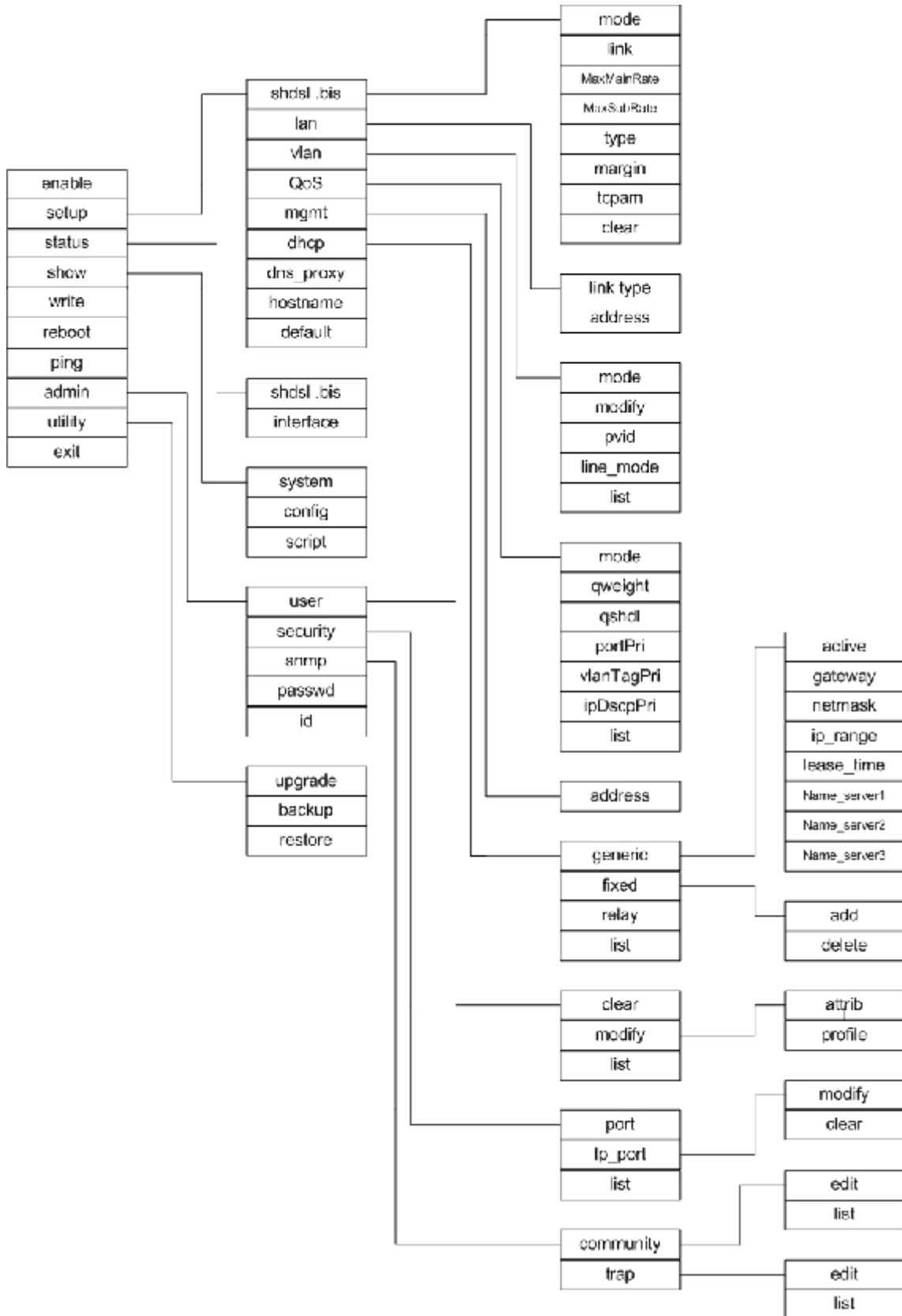
Before changing the configuration, familiarize yourself with the operations list in the following table. The operation list will be shown on the window.

Menu Driven Interface Commands	
Keystroke	Description
[UP] or I	Move to above field in the same level menu.
[DOWN] or K	Move to below field in the same level menu.
[LEFT] or J	Move back to previous menu.
[RIGHT] or L	Move forward to submenu.
[ENTER]	Move forward to submenu.
[HOME] or U	Move to first field
[END] or O	Move to last field
[TAB]	To choose another parameters.
Ctrl + C	To quit the configuring item.
Ctrl + Q	For help

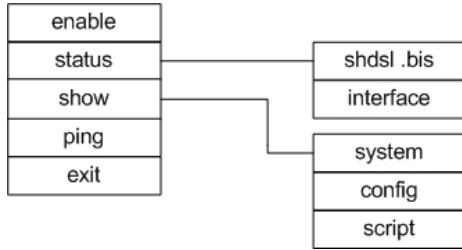
4.2 Main Menu Tree

The main menu tree is as following figures. All of the configuration commands are placed in the subdirectories of Enable protected by supervisor password. Unauthorized user cannot change any configurations but can view the status and configuration of the EFM Modem and use ping command to make sure the EFM modem is working.

If you are the authorized user, the menu tree is the following:



If you are the unauthorized user, the menu tree is the following:



If you are the authorized user, you can view the display screen as the following:

```

SHDSL.bis EFM Bridge
-----
>> enable      Modify command privilege
  setup        Configure system
  status        Show running system status
  show          View system configuration
  write         Update flash configuration
  reboot       Reset and boot system
  ping          Packet internet groper command
  admin         Setup management features
  utility       TFTP upgrade utility
  exit          Quit system
-----
Command: enable <CR>_
Message:
-----
<I/K> Move up/down, <L/J> Select/Unselect, <U/O> Move top/bottom, <^Q> Help
  
```

If you are the unauthorized user, you can view the display screen as the following, only have view status, show system and ping function.

```

SHDSL.bis EFM Bridge
-----
>> enable      Modify command privilege
  status        Show running system status
  show          View system configuration
  ping          Packet internet groper command
  exit          Quit system
-----
Command: enable <CR>_
Message:
-----
<I/K> Move up/down, <L/J> Select/Unselect, <U/O> Move top/bottom, <^Q> Help
  
```

4.3 Enable

To setup the EFM modem, move the cursor “>>” to **enable** and press enter key. While the screen appears, type the supervisor password. The default supervisor password is “root”. The password will be prompted as “ * “ symbol for system security.

Command: enable <CR>
Message: Please input the following information.

Supervisor password: ****

In this sub menu, you can setup management features and upgrade software, backup the system configuration and restore the system configuration via utility tools.

For any changes of configuration, you have to write the new configuration to EEROM and reboot the EFM modem to work with new setting.

The screen will prompt as follow.

```
>> enable      Modify command privilege
  setup        Configure system
  status       Show running system status
  show         View system configuration
  write        Update flash configuration
  reboot       Reset and boot system
  ping         Packet internet groper command
  admin        Setup management features
  utility      TFTP upgrade utility
  exit         Quit system
```

Command Description:

Command	Description
enable	Modify command privilege. When you login via serial console or Telnet, the EFM modem defaults to a program execution (read-only) privileges to you. To change the configuration and write changes to nonvolatile RAM (NVRAM), you must work in enable mode.
setup	To configure the product, you have to use the setup command.
status	View the status of product.
show	Show the system and configuration of product.
write	Update flash configuration. After you have completed all necessary setting, make sure to write the new configuration to NVRAM by “write” command and reboot the system, or all of your changes will not take effect.
reboot	Reset and boot system. After you have completed all necessary setting, make sure to write the new configuration to NVRAM and reboot the system by “reboot” command, or all of your changes will not take effect.

ping	Internet Ping command.
admin	You can setup management features in this command.
utility	Upgrade software and backup and restore configuration are working via “utility” command.
exit	Quit system

4.4 Setup

All of the setup parameters are located in the subdirectories of setup. Move the cursor “ >> “ to setup and press enter.

```
>> shdsl.bis      Configure SHDSL.bis parameters
   lan            Configure LAN interface profile
   vlan          Configure virtual LAN parameters
   mgmt          Configure management interface profile
   dhcp          Configure DHCP parameters
   dns_proxy     Configure DNS proxy parameters
   hostname      Configure local host name
   default       Restore factory default setting
```

SHDSL.bis

You can setup the SHDSL.bis parameters by the command shdsl.bis. Move the cursor “ >> “ to shdsl.bis and press enter.

```
>> mode          Configure shdsl.bis mode
   link          Configure shdsl.bis link
   maxMainRate  Configure shdsl.bis max main data
   rate maxSubRate Configure shdsl.bis max sub data rate
   type         Configure Shdsl.bis annex type
   margin       Configure Shdsl.bis SNR margin
   tcpam        Configure shdsl.bis TCPAM
   type clear   Clear current CRC error count
```

There are two types of SHDSL.bis mode, STU-C and STU-R. STU-C means the terminal of central office and STU-R customer premise equipment.

Link type will be 2-wire , 4-wire or 8-wire mode according to the product type . 4-wire product can be worked under 2-wire mode. 8-wire product can be worked under 4-wire mode and 2-wire mode.

You can setup the maximum main data rate by the multiple of 64Kbps, 128Kbps and 256Kbps where n is from 3 to 89 and maximum sub data rate by the multiple of 8Kbps, 16Kbps and 32Kbps where n is from 0 to 7.

2 wire model:

Main Rate:

When using Annex AF and BG

TCPAM32 : 768Kbps ~ 5696Kbps (Nx64kbps, N=12~89)

TCPAM16 : 192Kbps ~ 3840Kbps (Nx64kbps, N=3~60)

When using Annex A and B

TCPAM16 : 192Kbps ~ 2304Kbps (Nx 64kbps, N=3~36)

Sub Rate:

0kbps ~ 56Kbps (Nx 8kbps, N=0~7)

4 wire model:**Main Rate:**

When using Annex AF and BG

TCPAM32 : main rate is 1536Kbps ~ 11392Kbps (Nx128kbps, N=12~89) TCPAM16 : main rate is 384Kbps ~ 7680Kbps (Nx128kbps, N=3~60)

When using Annex A and B

TCPAM16 : main rate is 384Kbps ~ 4608Kbps (Nx 128kbps, N=3~36)

Sub Rate:

0kbps ~ 112Kbps (Nx 16kbps, N=0~7)

8 wire model:**Main Rate:**

When using Annex AF and BG

TCPAM32 : main rate is 3072bps ~ 22784Kbps (Nx256kbps, N=12~89)

TCPAM16 : main rate is 768Kbps ~ 15360Kbps (Nx256bps, N=3~60)

When using Annex A and B

TCPAM16 : main rate is 768Kbps ~ 9216Kbps (Nx 256bps, N=3~36)

Sub Rate:

0kbps ~ 224Kbps (Nx 32kbps, N=0~7)

There are four types of SHDSL .bis Annex type, Annex-A, Annex-B, Annex-AF, and Annex-BG. There are two TCPAM modes for SHDSL .Bis: TCPAM-16 and TCPAM-32. You also can select Auto mode.

Generally, you aren't necessary to change SNR margin, which range is from -10 to 21. SNR margin is an index of line connection. You can see the actual SNR margin in STATUS SHDSL.bis. The larger is SNR margin; the better is line connection quality. If you set SNR margin in the field as 5, the SHDSL.bis connection will drop and reconnect when the SNR margin is lower than 5. On the other hand, the device will reduce the line rate and reconnect for better line connection.

The **Clear** command can clear CRC error count.

LAN

You can setup the LAN parameters by the command lan. Move the cursor ">>" to **lan** and press enter.

Command: setup lan <1~1>

Message: Please input the following information.

Interface number <1~1>: 1

The default interface number is 1, no matter what it the model.

LAN interface parameters can be configured LAN IP address, subnet mask and NAT network type.

Select link_type item:

```
>> link_type      Configure Link type
    address        LAN  address and subnet mask
```

Command: setup lan 1 link_type <Disable|Dynamic|Static>
Message: Please input the following information.

Link type (TAB Select) <Disable>:

You can select the lan 1 link type is Disable, Dynamic or Static.

Select address item:

```
    link_type      Configure Link type
>> address        LAN  address and subnet mask
```

Command: setup lan 1 address <ip> <netmask>
Message: Please input the following information.

IP address (ENTER for default) <192.168.2.1>:
Subnet mask (ENTER for default) <255.255.255.0>:

You can configure LAN IP address, subnet mask. The default value is 192.168.2.1 and 255.255.255.0

VLAN

Virtual LAN (VLAN) is defined as a group of devices on one or more LANs that are configured so that they can communicate as if they were attached to the same wire, when in fact they are located on a number of different LAN segments. Because VLAN is based on logical instead of physical connections, it is extremely flexible.

You can setup the Virtual LAN (VLAN) parameters in VLAN command. The EFM modem support the implementation of VLAN-to-PVC only for bridge mode operation, i.e., the VLAN spreads over both the CO and CPE sides, where there is no layer 3 routing involved. The unit supports up to 8 active VLANs with shared VLAN learning (SVL) bridge out of 4096 possible VLANs specified in IEEE 802.1Q.

Move the cursor “ >> “ to vlan and press enter.

```
>> mode          Trigger virtual LAN function
    modify        Modify virtual LAN rule
    pvid          Modify port default ID
    link_mode     Modify port link type
    list          Show VLAN configuration
```

To active the VLAN function, move the cursor “ >> “ to mode and press enter. The products support two types of VLAN, 802.1Q and Port-Based.

The 802.1Q defines the operation of VLAN bridges that permit the definition, operation, and administration of VLAN topologies within a bridged LAN infrastructure.

Port-Based VLANs are VLANs where the packet forwarding decision is based on the destination MAC address and its associated port.

Mode:

 Command: setup vlan mode <Disable|8021Q|Port>
 Message: Please input the following information.

Trigger VLAN function (TAB Select) <Disable>:

Modify:

 Command: setup vlan modify <1~8> <0~4094> <string>
 Message: Please input the following information.

VLAN table entry index <1~8>:

Pvid:

 Command: setup vlan pvid <1~6> <1~4094>
 Message: Please input the following information.

Port index <1~6>:
 VID value (ENTER for default) <1>:

Link_mode:

 Command: setup vlan link_mode <1~6> <Access|Trunk>
 Message: Please input the following information.

Port index <1~6>: 1
 Port link type (TAB Select) <Access>:

MGMT

Move the cursor “ >> “ to **mgmt** and press enter.

MGMT interface parameters can be configured MGMT IP address and subnet mask.

 Command: setup mgmt <1~1> <more...>
 Message: Please input the following information.

Interface number <1~1>:

The EFM modem only have one MGMT interface can use, so that use the default interface number is 1.

>> address MGMT IP address and subnet mask

 Command: setup mgmt 1 address <ip> <netmask>
 Message: Please input the following information.

IP address (ENTER for default) <192.168.1.1>:
 Subnet mask (ENTER for default) <255.255.255.0>:

DHCP

Dynamic Host Configuration Protocol (DHCP) is a communication protocol that lets network administrators to manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs an unique IP address. When an organization sets up its computer users with connection to the Internet, an IP address must be assigned to each machine.

Without DHCP, the IP address must be entered manually at each computer. If computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator to supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

To configure DHCP server, move the cursor to dhcp and press enter.

>> generic	DHCP server generic parameters
fixed	DHCP server fixed host IP list
relay	DHCP relay parameter
list	Show DHCP configuration

The generic DHCP parameters can be configured via **generic** command.

>> active	Tigger DHCP server function
gateway	Default gateway for DHCP client
netmask	Subnet maskj for DHCP client
ip_range	Dynamic assigned IP address range
lease_time	Configure max lease time
name_server1	Domain name server1
name_server2	Domain name server2
name_server3	Domain name server3

Active the DHCP function with **active** command.

Set the default gateway for DHCP client use **gateway** command.

The subnet mask for DHCP client is configured by **netmask** command.

Ip_range command is to configure dynamic assigned IP address range.

The dynamic IP maximum lease time is configured by **lease_time** command.

You can setup 3 domain name servers via **name_server** commands.

Fixed Host IP Address list is setup via **fixed** command.

	generic	DHCP server generic parameter
>>	fixed	DHCP server fixed host IP list
	relay	DHCP relay parameter
	list	Show DHCP configuration

You can add and delete a fixed host entry via **fixed** command.

>>	add	Add a fixed host entry
	delete	Delete a fixed host entry

DHCP relay parameter is setup via **relay** command.

	generic	DHCP server generic parameter
>>	fixed	DHCP server fixed host IP list
	relay	DHCP relay parameter
	list	Show DHCP configuration

You can set Disable and Enable on this command.

 Command: setup dhcp relay <Disable|Enable> <ip>
 Message: Please input the following information.

Parameter of command 'relay' (TAB Select) <Disable>: Enable
 IP address (ENTER for default) <192.168.0.124>:

You can view the DHCP configuration via **list** command.

DNS proxy

You can setup three DNS servers on EFM modem. The number 2 and 3 DNS servers are option. Move cursor “ >> ” to **dns_proxy** and press enter.

 Command: setup dns_proxy <IP> [IP] [IP]
 Message: Please input the following information.

DNS server 1 (ENTER for default) <168.95.1.1>: 10.0.10.1
 DNS server 2: 10.10.10.1
 DNS server 3:

Host name

Enter local host name via hostname command. Move cursor “ >> “ to **hostname** and press enter.

```
-----
Command: setup hostname <name>
Message: Please input the following information.

Local hostname (ENTER for default) <SOHO>: test
-----
```

Default

If you want to restore factory default, first move the cursor “ >> “ to **default** and then press enter.

```
-----
Command: setup default <name>
Message: Please input the following information.

Are you sure? (Y/N): y
-----
```

4.5 Status

You can view running system status of SHDSL.bis and interface via status command.

Move cursor “ >> “ to **status** and press enter.

```
>> shdsl.bis      Show SHDSL.bis status
   interface      Show interface statistics status
```

Command	Description
shdsl.bis	The SHDSL.bis status includes mode, line rate, SNR margin, attenuation, and CRC error count of the local side modem, and SNR margin, attenuation and CRC error count of remote side modem. The modem can access remote side information via EOC (embedded operation channel).
interface	The statistic status of MGMT interface can be monitor by interface command.

Move cursor “ >> “ to **shdsl.bis** and press enter.

```

-----
SHDSL.bis EFM Bridge
-----
Monitoring Window...
<SHDSL.bis Status>
SHDSL.bis Mode      :CPE Side
Line Rate(n*64)    :5696kbps
Current SNR Margin  :18dB
Attenuation         :1dB
CRC Error Count     :0

SHDSL Remote Side Status
Current SNR Margin  :18dB
Attenuation         :1dB
CRC Error Count     :0

Refresh counter:9. Press 'Ctrl+C' to quit...

-----
<I/K> Move up/down, <L/J> Select/Unselect, <U/O> Move top/bottom, <^Q> Help
-----

```

Move cursor “>>” to interface and press enter.

```

-----
SHDSL.bis EFM Bridge
-----
Monitoring Window...
<Interface Statistics>
Port      InOctets   InPackets   OutOctets   OutPackets  InDiscards  OutDiscards
-----
MGMT          0           0           1920        30           0            0

Refresh counter:6. Press 'Ctrl+C' to quit...

-----
<I/K> Move up/down, <L/J> Select/Unselect, <U/O> Move top/bottom, <^Q> Help
-----

```

4.6 Show

You can view the system information, configuration, and configuration in command script by show command.

Move cursor “>>” to show and press enter.

```

>> system      Show general information
   config      Show all configuration
   script      Show all configuration in command script

```

Command	Description
system	The general information of the system will show in system command.
config	Config command can display detail configuration information.
script	Configuration information will prompt in command script.

Move cursor “ >> ” to **system** and press enter.

```

-----
SHDSL.bis EFM Bridge
-----
Status Window...
General system information
MCSV          :1608-0000-10013A28
Software Version :1608-0000-10113A8B
Chipset        :PEF 21628
Firmware Version :1.1-1.5.7_002
Hostname       :SOHO
System Up Time  :0DAY/0HR/2MIN

Press 'Enter' to Return Menu Window...

-----
<I/K> Move up/down, <L/J> Select/Unselect, <U/O> Move top/bottom, <^Q> Help

```

4.7 Write

For any changes of configuration, you must write the new configuration to flash component using **write** command and then reboot the modem to take affect.

Move cursor “ >> ” to **write** and press enter.

```

-----
Command: write <CR>
Message: Please input the following information.

Are you sure? (y/n): y
-----

```

4.8 Reboot

To reboot the EFM modem, please move cursor “ >> ” to **reboot** command and press enter.

```

-----
Command: reboot <CR>
Message: Please input the following information.

Do you want to reboot? (y/n): y
-----

```

4.9 Ping

Ping command will be used to test the connection of EFM modem. Please move cursor to **ping** and press enter.

```
-----
Command: ping <ip> [1~65534|-t] [1~1999]
Message: Please input the following information.
```

```
IP address <IP> : 10.0.0.1
Number of ping request packets to send (TAB select): -t
Data size [1~1999]: 32
-----
```

There are 3 parameters for ping command:

IP address: The IP address which you want to ping.

Number of ping request packed to send, key TAB for further selection

- Default: It will send 4 packets only
- 1~65534: Set the number of ping request packets from 1 to 65534
- -t : It will continuous until you key Ctrl+C to stop

Data Size: From 1 to 1999

4.10 Administration

You can modify the user profile, telnet access, SNMP (Sample Network Management Protocol) and supervisor information (supervisor password and ID) in admin.

For configuration the parameters, move the cursor “ >> “ to **admin** and press enter.

```
>> user          Manage user profile
   security      Setup system security
   snmp          Configure SNMP parameter
   passwd        Change supervisor password
   id            Change supervisor ID
```

User Profile

You can use **user** command to clear, modify and list the user profile. You can setup at most five users to access the EFM modem via console port or telnet in user profile table however users who have the supervisor password can change the configuration of the EFM modem. Move the cursor “ >> “ to **user** and press enter key.

```
>> clear          Clear user profile
   modify         Modify the user profile
   list           List the user profile
```

You can delete the user by number using clear command. If you do not make sure the number of user, you can use list command to check it. Modify command is to modify an old user information or add a new user to user profile.

To modify or add a new user, move the cursor “ >> “ to **modify** and press enter.

```
-----
Command: admin user modify <1~5> <more...>
Message: Please input the following information.

Legal access user profile number <1~5> : 2
-----
```

The screen will prompt as follow.

```
>> Attrib      UI mode
   Profile     User name and password
```

Security

Security command can be configured sixteen legal IP address for telnet access and telnet port number.

Move the cursor “ >> “ to **security** and press enter. The default legal address is 0.0.0.0. It means that there is no restriction of IP to access the EFM modem via telnet.

```
>> port      Configure telnet TCP port
   ip_pool   Legal address IP address pool
   list      Show security profile
```

SNMP

Simple Network Management Protocol (SNMP) is the protocol not only governing network management, but also the monitoring of network devices and their functions.

The EFM modem can generate SNMP traps to indicate alarm conditions, and it relies on SNMP community strings to implement SNMP security. This EFM Modem support MIB I & II.

Move the cursor “ >> “ to **snmp** and press enter.

```
>> community  Configure community parameter
   trap       Configure trap host parameter
```

There are 5 number entries of SNMP community can be configured in this system. Move the cursor to community and press enter.

```
-----
Command: admin snmp community <1~5> <more...>
Message: Please input the following information.

Community entry number <1~5> : 2
-----
```

The screen will prompt as follow:

```
>> edit          Edit community entry
    list          Show community configuration
```

There have 5 entries of SNMP trap are allowed to be configured in this system. Move the cursor to **trap** and press enter.

```
-----
Command: admin snmp trap <1~5> <more...>
Message: Please input the following information.
```

```
Trap host entry number <1~5> : 2
-----
```

The screen will prompt as follow:

```
>> edit          Edit trap host parameter
    list          Show trap configuration
```

Supervisor Password and ID

The supervisor password and ID is the last door for security but the most important. Users who access the EFM modem via web browser have to use the ID and password to configure the EFM model and users who access the EFM modem via telnet or console mode have to use the password to configure the EFM modem. Suggest to change the ID and password after the first time of configuration, and then save it. At next time when you access to the EFM modem, you have to use the new password.

```
-----
Command: admin passwd <pass_conf>
Message: Please input the following information.
```

```
Input old Supervisor password: ****
Input new Supervisor password: ****
Re-type Supervisor password: ****
-----
```

If you want to exit the system without saving, use **exit** command to quit system.

```
-----
Command: exit <CR>
Message: Please input the following information.
```

```
Do you want to disconnect? (y/n): y
-----
```

4.11 Utility

There are three utility tools, upgrade, backup and restore which embedded in the firmware. You can update the new firmware via TFTP upgrade tools and backup the configuration via TFTP backup tool and restore the configuration via TFTP restore tool. For upgrade the firmware, TFTP server with the new firmware file named *.bin will be supported by supplier but for backup and restore, you must have your own TFTP server to backup and restore the file.

Move the cursor “>>” to **utility** and press enter.

>> upgrade	Upgrade main software
backup	Backup system configuration
Restore	Restore system configuration

4.12 EXIT

If you want to **exit** the system without saving, use exit command to quit system.

```
-----
enable      Modify command privilege
setup       Configure system
status      Show running system status
show        View system configuration
write       Update flash configuration
reboot      Reset and boot system
ping        Packet internet groper command
admin       Setup management features
utility     TFTP upgrade utility
>> exit     Quit system
-----
```

```
-----
Command: exit <CR>
```

```
Message: Please input the following information.
```

```
Do you want to disconnect? (y/n): y
```

```
-----
Please press “y”, you can disconnect this system.
```

■ End