YODA

AH505R

1 pair G.SHDSL Router

User's Manual

V1.1.3

Table of Contents

1. Product Overview

1.1 Preface

The primary objective of this manual is to help network administrator operate GSHDSL.bis bridge product. Strongly committed to user friendly, this manual will guide the users step by step to turn the product up and running in the simplest way ever.

1.2 Overview

The AH505R, a SHDSL (Single-pair High-bit-rate Digital Subscriber Line) Router, provides a broadband transmission with bandwidth up to 5.696Mbps over a single pair of copper wires for LAN connection between two local area networks. AH505R provides a console port for users to configure the settings and to monitor the DSL connection status.

AH505R conforms to ITU-T G.991.2, the GSHDSL requirements. Each AH505R can be configured as either STU-C for the central side or STU-R for the remote side. 1 / 2 pair of AH505R offers a cost effective symmetrical broadband solution for bandwidth-hungry applications such as LAN-to-LAN connection, Internet, 2 pairs DSL Router, provides a broadband transmission with bandwidth up to 11.392Mbps for LAN connection.

1.3 Features

- ITU G.991.2 Annex A/B/F/G and Annex A+B/F+G (RT Mode)

- Symmetrical downstream and upstream data rates from 192Kbps to 15Mbps

- EFM Bonding up to 30 Mbps (2 pairs option, TC-PAM 128)

- Auto or Fixed DSL rate operation

- Auto-Negotiation for 10/100 Base-T

● Auto-MDIX for Auto Ethernet Tx/Rx Swap

1.4 Specification

G.shdsl bis Transmission:
● Fully compliant with standards of ETSI (SHDSL, SHDSL.bis), ITU (G.SHDSL, G.SHDSL.bis, G.hs, g.998.2/g.bond) and IEEE (EFM)
● Line Code: TC-PAM 16/32/128
● M-pair mode for 1/2 pairs
● Support ITU-T G991.2 Annex A/B/F/G and Annex A+B/F+G (RT Mode)
● STU-C/STU-R mode selectable
● Impedance: 135 ohm
● SNR /Attenuation Value calculation

Physical Interfaces:
● 4 ports RJ45 for 10/100Mbs Ethernet LAN connection
● RJ-45 ports for G.SHDSL connection
● 1 console port for local configuration and management

ATM Protocol:
● ATM adaptation layer type 5 (AAL5)
● VC multiplexing and LLC encapsulation
● Multi-protocol over AAL5 (RFC 1483 bridged PDU)
● Support 5 PVCs

Bridging:
● IEEE 802.1D transparent learning bridge
● Up to 1K MAC learning addresses
● Support 802.1Q or port base VLAN

Routing Capability:
● Support IP/TCP/UDP/ARP/ICMP protocols
● IP routing with static routing and RIPv1/RIPv2 (RFC1058/2453)
● Support DHCP server
● Support PPPoE

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- Support NAT

Configuration:

- Local console
- Telnet access
- Web-based GUI (HTTP)

Network Management:

- Web-based GUI for express setup, configuration and management
- Password protected management
- SNMP management with SNMPv1/SNMPv2c
- Software upgrade via TFTP server

LED Indicators:

- POWER: Power is ON.
- SYS: System status.
- LAN 1~4:   Data Activity of LAN Port.
- DSL: DSL connection status.

Physical Dimension:

Desktop: 160x120x35 (mm)

Power:

External power adapter 12V DC, 1000mA

Operating Environment:

- Humidity: 5% to 95% non-condensing
- Temperature: 0 ~ 45 degree C

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2. Hardware Installation

This section will introduce hardware of the router.

2.1 Front Panel LEDs Indicators

There are eight LED indicators on the front panel. They show the statuses of the device.
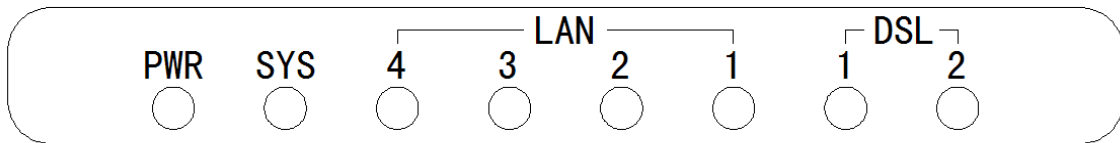

Figure 1 Front Panel

The functions of LED indicators are described in the following table:

LED	Color	Status	Meaning
PWR	Green	Steady Off	The device is on. The device is off.
SYS	Green	Steady Blinking	Loading image file. The system is ready.
LN1	Green	Steady	Link 1 - The LAN connection is successfully established.
LN2	Green	Steady	Link 2 - The LAN connection is successfully established.
LN3	Green	Steady	Link 3 - The LAN connection is successfully established.
LN4	Green	Steady	Link 4 - The LAN connection is successfully established.
DSL1,2	Green	Steady Blinking Off	The device is Sync Status. The link is synchronizing - this may take several minutes. The device is unplugged or disconnected.

2.2 Rear Panel Connectors

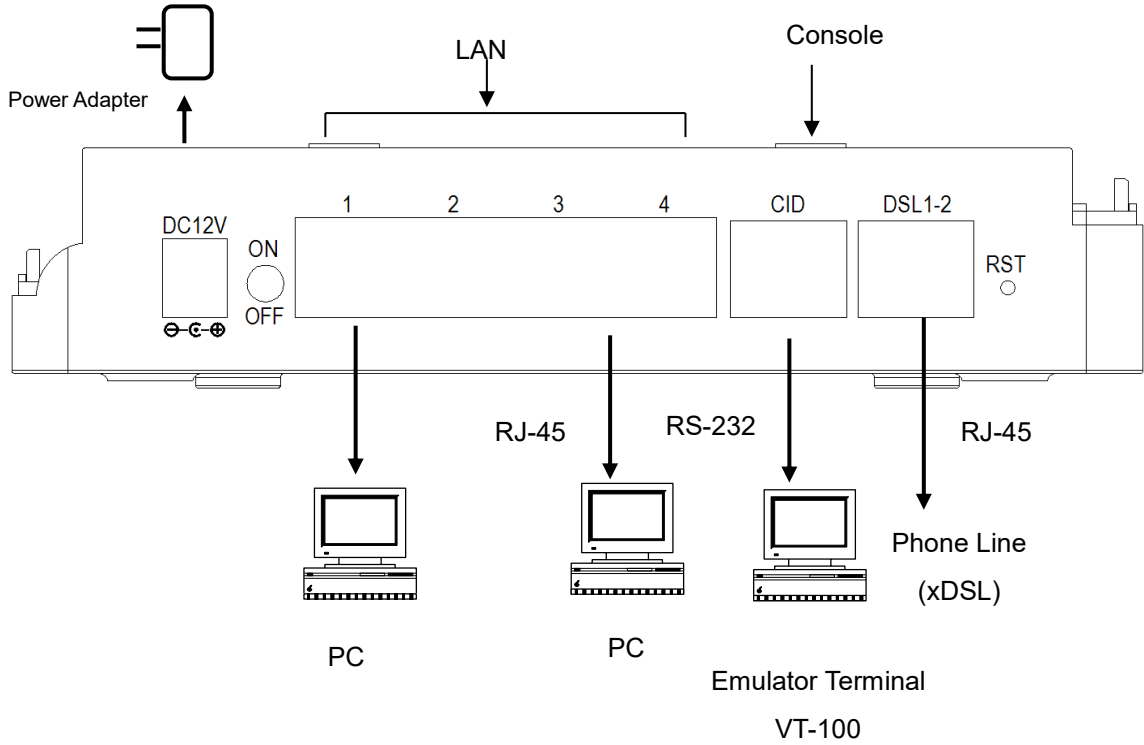The rear panel connectors connecting the device to the LAN and xDSL network are illustrated as below.

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Figure 2 Rear Panel

2.3 Installation Procedure

Step 1: Use RJ-45 cable to connect the device to xDSL line.

Pin out of the DSL RJ-45 Connector

	Pin No	Function	Designation
DSL	3	Loop 1 Ring	DSL_1 Ring
	4	Loop 1 Tip	DSL_1 Tip
	7	Loop 2 Ring	DSL_2 Ring
	8	Loop 2 Tip	DSL_2 Tip

Step 2: Use RJ-45 to RS-232 cable to connect the console port of the device to serial port of

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the PC with terminal emulator software installed.

RJ-45 to RS-232 cable definition：

DB-9 Pin	Signal	Direction
1	DCD	X
2	RD	Input
3	TD	Output
4	DTR	Output
5	GND	~~~
6	DSR	Input
7	RTS	Output
8	CTS	Input
9	RI	X

Step 3: Use RJ-45 cable to connect the LAN port of the device and the PC which has the Network Interface Card (NIC) installed.   If you want to connect to an external hub, you have to use the RJ-45 cross-over cable. 10/100 Base-T pin out:

Pin NO.	Function	Data Direction	Designation
1	TX Transmitting Data	Toward the LAN network	TX+
2	TX Transmitting Data	Toward the LAN network	TX-
3	RX Receiving Data	Toward the LAN Equipment	RX+
6	RX Receiving Data	Toward the LAN Equipment	RX-

Step 4: Plug in the Power adaptor to the DC Power socket of the device, then connect the Power adaptor to the AC outlet.

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3. Console

3.1 Console Setup

Step 1: Connect computer to the device through the console port as shown in the figure 1.

Step 2: Open the terminal emulator software (like Hyper-Terminal on Microsoft Windows machine, or " Minicom" on Linux machine), then select the proper COM port for the connection.   Set the terminal and port to the following parameters:

- Terminal Mode: VT-100
- Baud rate   : 57600 bps
- Data bits   : 8
- Parity   : None
- Stop bits   : 1
- Flow Control   : None

Turning on the GSHDSL, then after few seconds of machine initialization, the system management terminal will display the login screen.Details Figure 2.
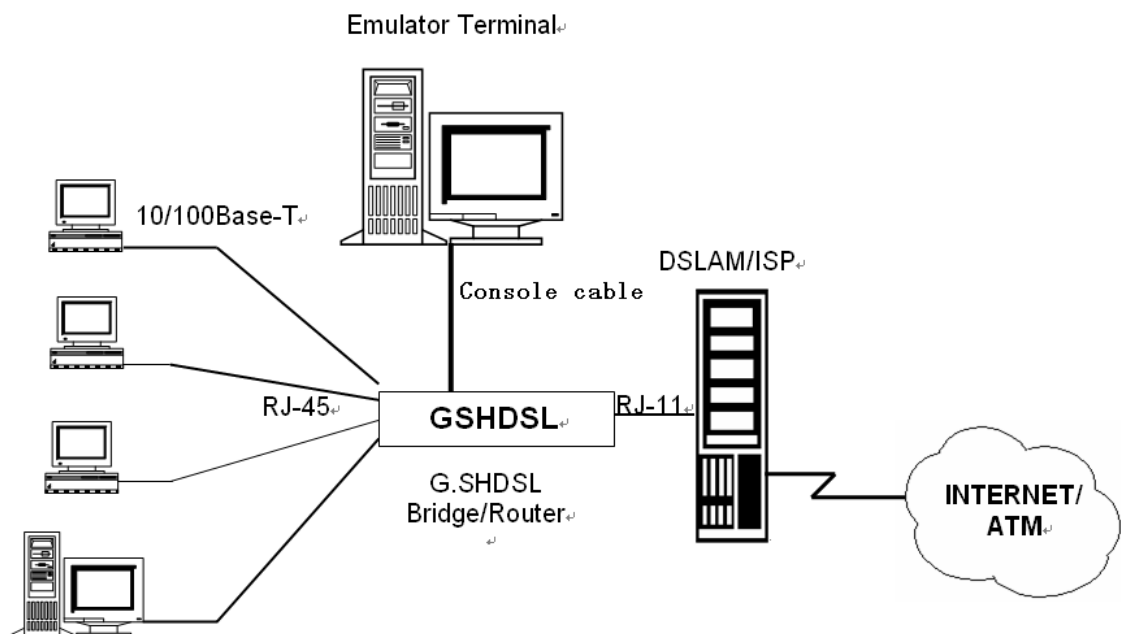

Figure 3 Console Setup

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3.2 Login

```
phy_tx_ring = 0x0250b000, tx_ring = 0xa250b000

phy_rx_ring0 = 0x0250c000, rx_ring0 = 0xa250c000
SMACCR1 -- : 0x000000d0
SMACCR0 -- : 0xda903322
ESW: Link Status Changed - Port5 Link UP
ESW: Link Status Changed - Port0 Link UP
CDMA_CSG_CFG = 81000000
GDMA1_FWD_CFG = 20710000
Device is in Route mode!

 login: admin
Password:

BusyBox v1.12.1 (2018-07-31 14:51:47 CST) built-in shell (ash)
Enter 'help' for a list of built-in commands.


Hello, this is Quagga (version 0.99.17).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

G.SHDSL#
```

■ Enter " **admin** " for the User Name.

■ Enter Password "**admin** ".

■ You can see the Main menu

■ If you want to set ip address of G.SHDSL, you can setup the IP address as the below.

```
G.SHDSL# configure  terminal
G.SHDSL(config)# interface  vlan  1
G.SHDSL(config-if-vlan)# ip address  192.168.0.1 255.255.255.0
Configure successfully!

G.SHDSL(config-if-vlan)#
```

4. Application

4.1 Bridge

In Bridge, GSHDSL provides frame forward services between two or more LANs.   It forwards frames based on the MAC (Medium Access Control) addresses which is hardware-level of NICs (Network Interface Card).

The Encapsulation of the system must set to RFC2684 – bridge. To change the Encapsulation,
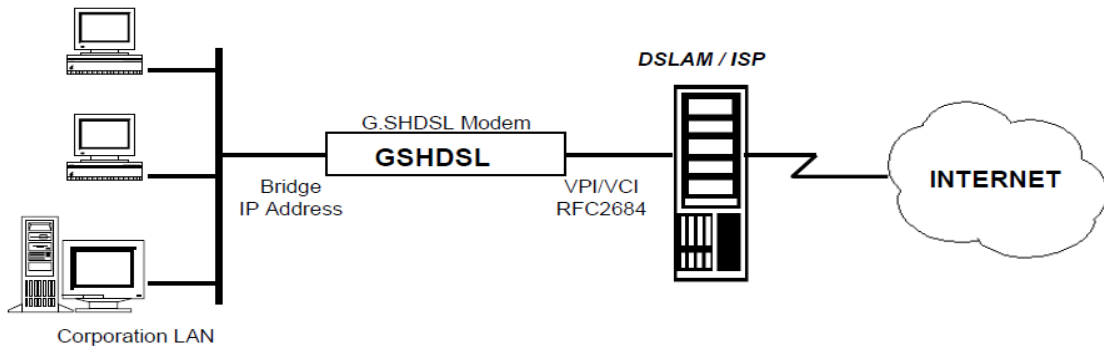The application of the G.SHDSL Modem in Bridge are illustrated in the following figures

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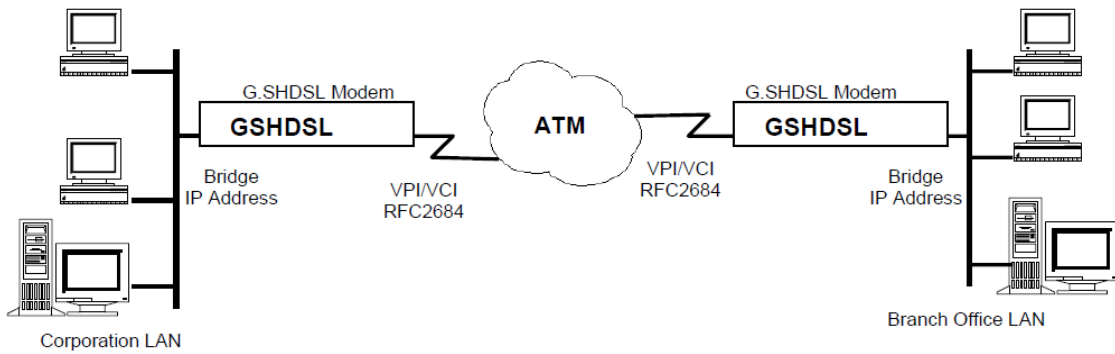**Figure 4** Bridge - Application of GSHDSL: Internet Access

Figure 5 Bridge - Application of GSHDSL: LAN-to-LAN

4.2 Router

The Encapsulation of the system must set to RFC2684 – routed. To change the Encapsulation,

The application of the G.SHDSL Modem in Router mode are illustrated in the following figures
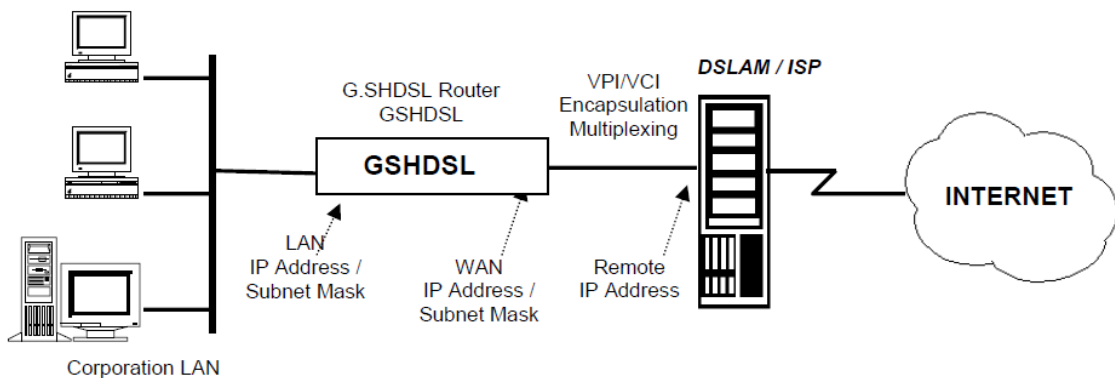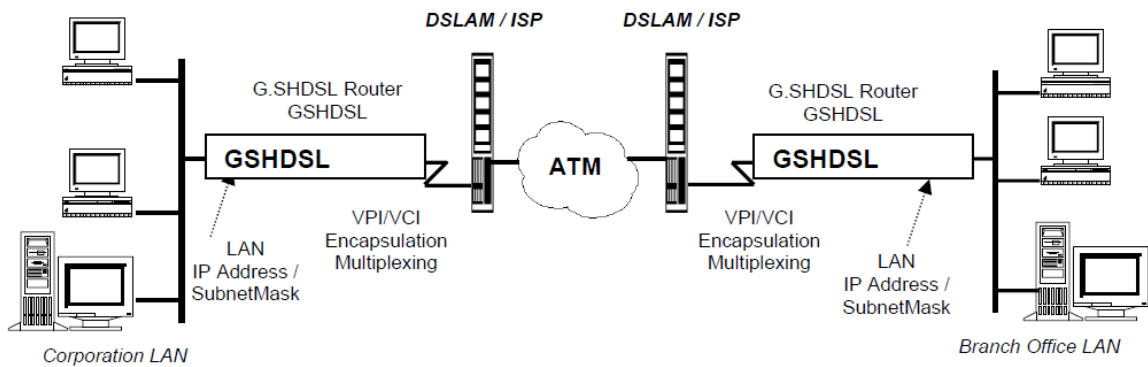

Figure 6 Router - Application of GSHDSL: Internet Access

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Figure 7 Router - Application of GSHDSL: LAN-to-LAN

5. Configuring with WEB

5.1 Login

When connected, the GSHDSL has the following pre-configured host IP addresses "**192.168.0.1** " as shown below.

To access the Web Utility,

- Configure your PC to the same network segment as the GSHDSL. For example, you could set the PC to IP address **192.168.0.10** with a subnet mask of 255.255.255.0.
- Connect the PC to any of LAN port designated 1, 2, 3 or 4 on the Front Panel.

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- Open the Web browser.
- Enter the IP address of the GSHDSL.in the address field of the browser as example: **http://192.168.0.1** and then press **<Enter>** to connect.
- There is a default User Name "**admin**" for the GSHDSL.
- Enter Password "**admin** ".

5.2 Web Menus

This section introduces how to use web browser to configure G.SHDSL modem, check the system status and the administration for doing the system maintenance. There are 3 main items, Configure, System status & Administration will be introduces as the following sections.

5.3 Configuration

In menu Configuration, the system can be configured in individual submenu: G.SHDSL, LAN, SNMP.
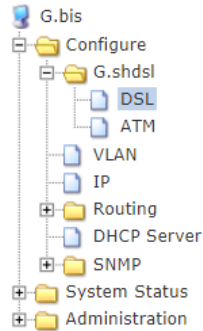
5.3.1 G.SHDSL setup

In menu G.SHDSL, the system can be configured in 2 submenu: DSL and ATM setup.

5.3.1.1 DSL

The details of the items are described in the following picture:

open all | close all
- G.bis
  - Configure
    - G.shdsl
      - DSL
      - ATM
    - VLAN
    - IP
    - Routing
    - DHCP Server
    - SNMP
  - System Status
  - Administration

Digital Subscriber Line

You may configure DSL settings here.

DSL Configuration	
Service Type	RT
CapList Style	New_Style
Wire Mode	2wires
Line Probe	Enable
Extend Mode	Disable
Minimum Rate	192 Kbps
Maximum Rate	5696 Kbps
DSL Mode	efm-mode

Apply   Cancel

The details of the items are described in the following table:

Item	Field Name	Description	Value
Parameters	Service Type	DSL operation service. System can be operated as RT, CO.	RT / CO Default :RT
	CapList Style	For accessing the common fields of a capability (data rates, Annex x, clock Mode, Line probing...)	Auto/ New_Style/ Old_Style Default: New Style
	Wire Mode	DSL wire mode. System can be operated as 2wires & 4wires	Default:2wires
	Line Probe	Enable or disable the optional line probing one or two G.hs section can be executed during preactivation	Enable/Disable Default: Enable
	Extend Mode	TC-PAM 16/32/128	Enable/Disable Default: Disable
	Minimum Rate	The minimum Data rate for DSL line	64~5696 Default: 192 Kbps
	Maximum Rate	The maximum Data rate for DSL line	64~5696 Default: 5696 Kbps
	DSL Mode	Select DSL physical line mode	atm-mode/efm-mod Default: etm-mode

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5.3.1.2 ATM

In menu ATM Setup, it can setup VPI/VCI number from channel 1 to channel 4.

The details of the items are described in the following table:

Items	Field Name	Description	Value
ATM Channel parameters	: Index	The numeric index of creation(Read-only)	1
	: VID (1~4096)	VLAN ID	1~4095
	: VPI (0~255)	Virtual Path Identifier, given by ISP	0 - 255
	: VCI	Virtual Channel Identifier, given by ISP	32 - 2000
	: CPCS Protocol	Common Part Convergence Sublayer	LLC / VCMUX Default: LLC

5.3.2 VLAN

Port VLAN Configuration let you create VLAN interface at each physical port. There are 2 Mode for selecting, Port base and 802.1q.
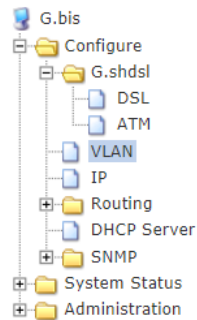
The details of the items are described in the following table:

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Item	Field Name	Description	Value
Parameters	VLAN Mode	Select Virtual LAN working mode	802.1q/Port base Default : 802.1q

802.1P mode

The details of the items are described in the following table:

Item	Field Name	Description	Value
Parameters	Port	Physical port number from 1~4, DSL & E1 port	
	Mode	Based on the tag handling mode, a port's link type can be one of the following three :Access, Trunk and Hybrid	Access/ Trunk/ Hybrid Default: Hybrid
	Port VLAN	The vlan ID of the VLAN interface. Must be in the range 1 - 4095	1 - 4095 Default: '1'
	Egress Tagging	The egress rules how to process a packet that is sent out on a switch port.	Untagged port VLAN/ Tagged all Default: Untagged port VLAN
	Allowed VLANs	The specify VLAN ID will be allowed to send out on a switch port	1 - 4095 Default: '1'

Port Base mode

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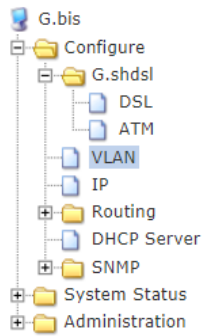
Virtual Local Area Network

You may configure VLAN settings here. Warning: When VLAN Mode is 802.1Q, the maximum number of allowed vlan should not be larger than 16.

Global VLAN Configuration	
VLAN Mode	Port Base ▾

Port Based VLAN Configuration					
	Port 1	Port 2	Port 3	Port 4	G.SHDSL
Port 1	☐	✔	✔	✔	✔
Port 2	✔	☐	✔	✔	✔
Port 3	✔	✔	☐	✔	✔
Port 4	✔	✔	✔	☐	✔
G.SHDSL	✔	✔	✔	✔	☐

Apply   Cancel

5.3.3 IP

You may configure WAN settings here. Warning: the maximum numbers should not be larger than 16.

Active WAN Channels			
Description	VLAN ID	Protocol	Action
IPs1	1	STATIC	ⓔ ⊗
IPs2	2	STATIC	ⓔ ⊗
IPs3	3	STATIC	ⓔ ⊗
IPs4	4	STATIC	ⓔ ⊗

Create New Channel

Click ⓔ to edit

Click ⊗ to delete

Click Create New Channel to add

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Item	Field Name	Description	Value
Parameters	Description	Show the name of the VLAN interface(Read-only).	Default: 'IPs1*'
	VLAN ID	The VLAN ID of the VLAN interface. Must be in the range 1 - 4095	'1'
	Egress Priority	Setup the QoS of the WAN port	'0'
	Protocol	Setup internet connection.	Static, PPPoE
	Default Route	Provide routing feature and DNS caching/proxy.	Blank
	NAT	Network address transfer	Blank

5.3.4 Routing

5.3.4.1 Static route

Static Route

You may configure Static Route here. The maximum number is 8.

Static Route Configuration			
Delete	Network	Netmask	Gateway
☐			

Add New Route

Apply

5.3.4.2 RIP

Routing Information Protocol

You may configure RIP settings here.

RIP Configuration	
RIP	⦿ Disable ○ Enable
RIP Version	version-2 ▾

Network Configuration	
Delete	Network

Add New Netwok

Apply   Cancel

5.3.5 DHCP

open all | close all

- 🖥 G.bis
  - 📂 Configure
    - ⊞ 📁 G.shdsl
    - 📄 VLAN
    - 📄 IP
    - ⊞ 📁 Routing
    - 📄 DHCP Server
    - ⊞ 📁 SNMP
  - ⊞ 📁 System Status
  - ⊞ 📁 Administration
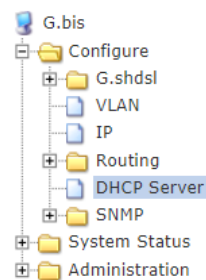
DHCP Server

You may configure DHCP Server settings here.

DHCP Server Configuration		
Status	Disable ▾	
IP Start	192.168.0.100	
IP End	192.168.0.200	
Subnet Mask	255.255.255.0	
Lease Time	60	seconds(1-99999)
Default Router	0.0.0.0	
DNS Server	8.8.8.8	
	8.8.4.4	

Apply

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5.3.6 SNMP

This function is used to configure the Simple Network Management Protocol (SNMP). The entry sequence as [Configure]>>[SNMP]>> [system]

SNMP Configuration	
SNMP	○ Disable ● Enable
SNMP V2	
Read Only Community	public
Read Write Community	private
Trap Community	trap
SNMP V3	
User Name	
Password MD5	
Password DES	

Apply   Cancel

The details of the items are described in the following table:

Item	Field Name	Description	Value
Parameters	SNMP	Configuration SNMP mode is enable or disable	Default: Disable
	Read Only Community	Configuration Read Only community mode is public or private	Default: public
	Read Write Community	Configuration Read Write community mode is public or private	Default: private
	Trap Community	Configuration Trap community	Default: trap
	User Name	Configuration user name	Default:
	Password MD5	Configuration password MD5	Default:
	Password DES	Configuration password DES	Default:

5.4 System Status

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5.4.1 DSL Status

Display the DSL operating status, there are server mode, standard, attenuation, SNR and line speed.

Digital Subscriber Line

Take a look at the DSL link status here.

DSL Status						
Channel	Service	Mode	Standard	Attenuation	SNR	Status
1	RT	ATM	ANNEX A (ANSI)	4 dB	21 dB	Data; line rate 5696 (Kbps)
2	RT	ATM	___	___(dB)	___(dB)	Not Supported

The details of the items are described in the following table:

Items	Description
Service mode	: Display the Service mode of DSL
Standard	: Display the standard type of DSL
Attenuation	: Display the attenuation of DSL
Signal-to-Noise Ratio(SNR)	: Display the SNR of DSL
DSL 1 ~ 4 status	: Line status of DSL port 1 ~ 4

5.4.2 Status

The status show you the unit's identity information as shown below.

In this menu, it shows the current system information such as: System Name, Model, Firmware Version, system up time, DSL up time and DSL status.

System information

Let's take a look at the status of the system.

System Info	
Firmware Version	1.0 (Jun 22 2017)
IP Address	192.168.0.182
MAC Address	00:d0:0a:00:00:37
Operation Mode	Bridge Mode
System Up Time	2 hours, 1 min, 15 secs
DSL Up Time	0(day):01:40:10

Items	Description

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Firmware Version	: Display the current software version.
IP Address	: Display the IP address
MAC Address	: Display the MAC address of LAN port
Operation Mode	: Display operating mode
System Uptime	: Display the system running time
DSL Uptime	: Display the time of DSL get sync

5.4.3 Statistic

Displaying the WAN & LAN port Statistics. You can see WAN & LAN port statistical number of the transmitted and received packets in detail.

Statistic

Take a look at the Ralink SoC statistics

Memory	
Memory total:	62452 kB
Memory left:	41824 kB
WAN/LAN	
WAN Rx packets:	82776
WAN Rx bytes:	5063440
WAN Tx packets:	24047
WAN Tx bytes:	9455350
LAN Rx packets:	82776
LAN Rx bytes:	5063440
LAN Tx packets:	24047
LAN Tx bytes:	9455350
All interfaces	
Name	eth2
Rx Packet	111856
Rx Byte	8123906
Tx Packet	24048
Tx Byte	9456218
Name	br0
Rx Packet	82777
Rx Byte	5063486
Tx Packet	24048
Tx Byte	9456218

Items	Description
Memory total:	: The total memory
Memory left:	: The Remaining memory
WAN Rx packets:	: The number of received packets on the WAN port
WAN Rx bytes:	: The number of received Bytes on the WAN port
WAN Tx packets:	: The number of transmitted packets on the WAN port
WAN Tx bytes:	: The number of transmitted Bytes on the WAN port
LAN Rx packets:	: The number of received packets on the LAN port
LAN Rx bytes:	: The number of received Bytes on the LAN port

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LAN Tx packets:	: The number of transmitted packets on the LAN port
LAN Tx bytes:	: The number of transmitted Bytes on the LAN port

5.4.4 IP Statistic

Lookup active IPs and those value.

Active WAN Channels						
Description	VLAN ID	Protocol	IP Address	Netmask	Gateway	Status
IPs1	1	STATIC	192.168.0.182	255.255.255.0	0.0.0.0	UP
IPs2	2	STATIC	10.10.0.11	255.255.255.0	10.10.0.10	UP
IPs3	3	STATIC	10.3.0.1	255.255.255.0	0.0.0.0	UP
IPs4	4	STATIC	10.4.0.1	255.255.255.0	0.0.0.0	UP

5.5 Administration

The follow functions are used for system administration. There are Change the user name & password, firmware upgrade and upload/download Configuration File.

5.5.1 Management

Use this menu to change your user name & password. This is the same password used to access the web configurator.

System Management

You may configure administrator account and password, NTP settings, and Dynamic DNS settings here.

Adminstrator Settings	
Account	admin
Password	•••••
WatchDog	○ Enable ○ Disable

Apply   Cancel

Item	Field Name	Description	Value
Parameters	Original Password	Enter the current administrator password for the modem	

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	New Password	Enter the new administrator password for the modem	

If you click "OK" to reboot the device, the device will reboot by itself.

5.5.2 Upgrading Firmware

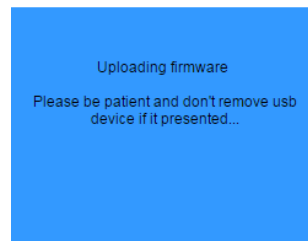Use this menu to upload new firmware or bootloader to your modem.

Upgrade firmware

1. Click [choose file] to select the firmware
2. Click [open] and then click [Apply] to upgrade firmware
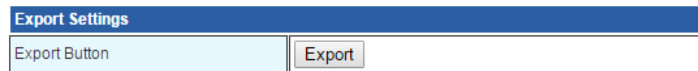

5.5.3 Setting Management

This function is used to Export/Import the configuration file to/from the PC. For download configuration file, click [Browse] icon as the below figure.

Export Setting
For uploading the configuration file, select [export setting] and click [Export] icon as the below

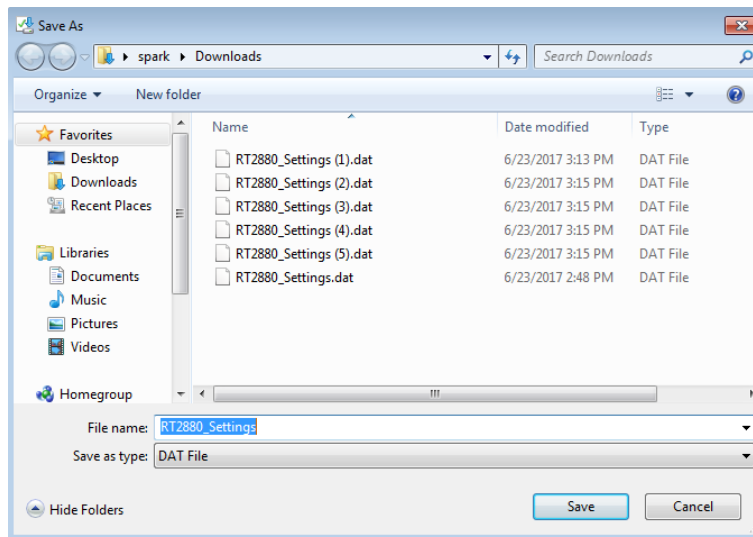**YODA COMMUNICATIONS, INC. www.yoda.com.tw**

figure.

A dialog panel will appear as the below

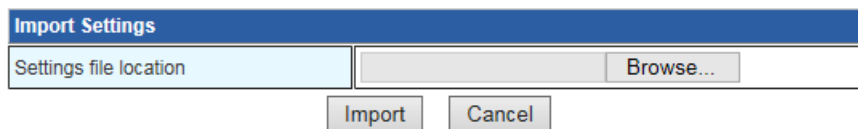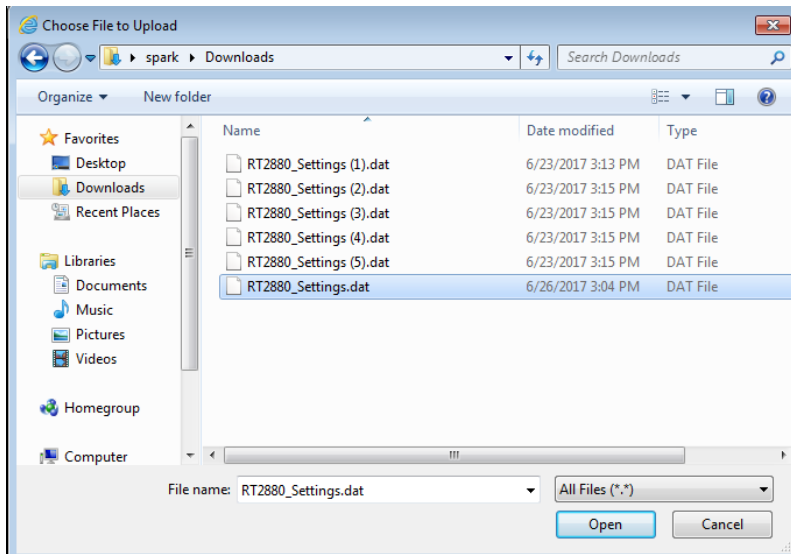Right click [Save] icon to select the location to save the file as the below
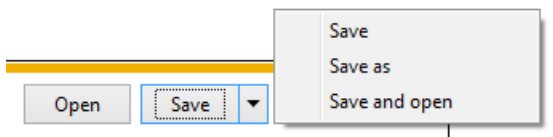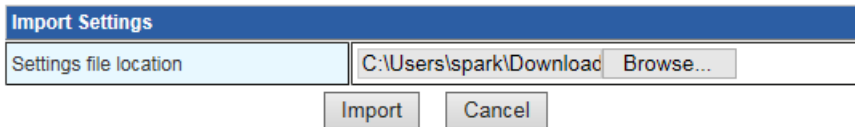

Click [Save]

Import Setting

For downloading the configuration file, click [Browser] icon to select the configuring file as the below figure.
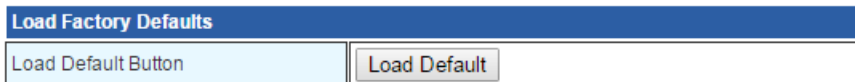
Click [Open]

Click [Import] to download the configuring file and system will reboot for reloading new configuration.

Load Factory Default

From Factory Default Menu, you'll get a dialog as following picture:

If you click [Load Default] to re-load factory default, the device will reboot by itself.

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