DG-IC422A

4 Port G.SHDSL/G.bis LAN Extender

User Manual

V2.0
27-09-2013

As our product undergoes continuous development the specifications are subject to change without prior notice.

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Safety:

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines listed in this manual must therefore be followed at all times to ensure the safe use of the equipment.

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1. Introduction

1.1 PREFACE

The primary objective of this manual is to help user to operate DG-IC422A product. Strongly committed to user friendliness, this manual will guide the users step by step to turn the product up and running in the simplest way ever.

1.2 OVERVIEW

With the symmetrical data transmission up to 5.7 Mbps over the ordinary telephone line, SHDSL satisfies the needs of multiple users of small office/home office (SOHO), who need both bandwidth and permanent data connection. Although SHDSL transmits data over the telephone line, it does not interrupt the voice because it uses different frequency for data transmission.

DG-IC422A is designed to provide users all features needed in the SOHO environment. DG-IC422A is a high-speed G.SHDSL device which meets the needs of both bandwidth and ease of installation. It is designed to provide high performance, via a single G.SHDSL line. It can be easily configured through a user friendly CLI or GUI-based interface.

The DG-IC422A is an ideal product for SOHO users starving for high bandwidth and fast, reliable Internet connection with a minimum of operating expense. Service providers can also use it to offer DSL service with features beyond the normal need of the consumer.

2. Hardware Installation

2.1 FRONT PANEL LEDS INDICATORS

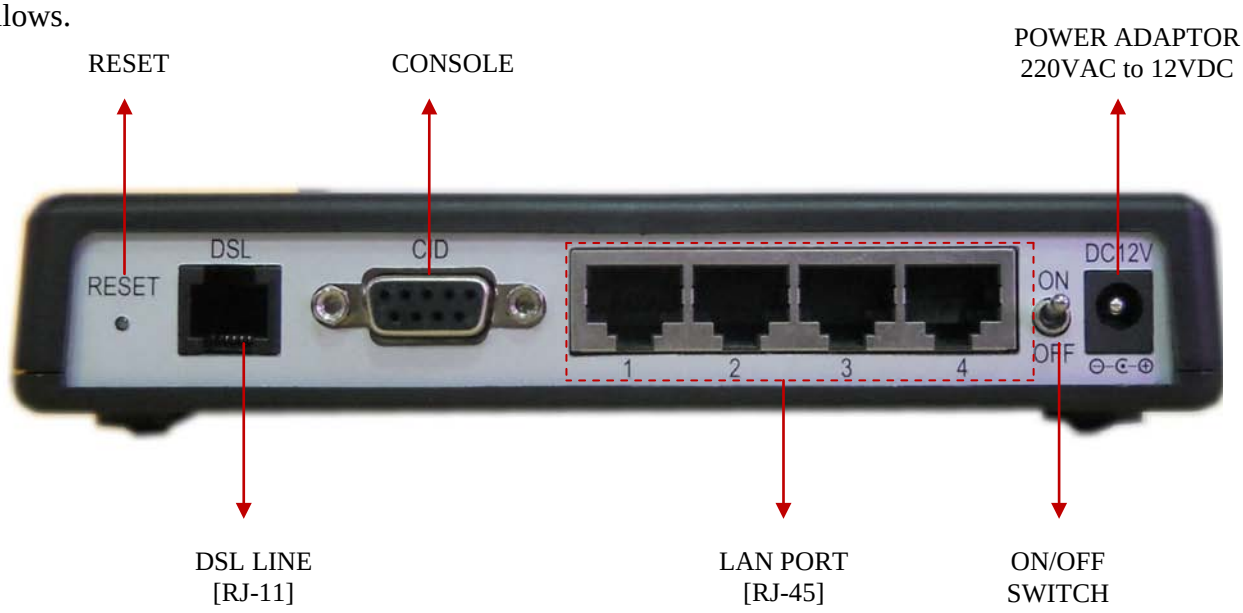
Front-Panel view

Table: Front Panel LED description

LED Name	LED Colour	Light Status	Description
PWR	Orange	Steady	The device is receiving input power.
SYS	Orange	Steady	The device has encountered a System error.
		Off	The device is functioning properly.
DSL	Orange	Steady	The device is connected to the other end device.
		Blinking	The link is synchronizing – this may take few minutes.
ACT	Orange	Steady	The device is ready for sending or receiving data.
		Off	The device is not ready for data sending or receiving.
LN1	Orange	Steady / Blinking	Link-1 – The LAN link is successfully established / sending or receiving data.
LN2	Orange	Steady / Blinking	Link-2 – The LAN link is successfully established / sending or receiving data.
LN3	Orange	Steady / Blinking	Link-3 – The LAN link is successfully established / sending or receiving data.
LN4	Orange	Steady / Blinking	Link-4 – The LAN link is successfully established / sending or receiving data.

2.2 REAR PANEL CONNECTORS

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



Back-Panel view

Table: Back Panel Description

Interfaces/ Pushbutton	Description
RESET button	Press the RESET button for more than 5 seconds, the device will reset to factory default and Restart automatically.
DSL interface	The DG-IC422A has one DSL port which terminates in a standard RJ-11 connector.
CID interface	The CID interface is used for device configuration and monitoring.
LAN interface [LN1, LN2, LN3, LN4]	This interface is a 4-port switch and is used to connect user network equipment.
ON/OFF switch	This switch is used to Power ON/OFF the device.
Power	Connect the adapter output (12V DC, 1.0A) connector to this interface to power ON the unit.

2.3 INSTALLATION PROCEDURE

Step 1. - Use RJ-11 cable to connect the device to xDSL line.

Step 2. - Use RS-232 DB-09 console cable to connect the console port of the device to serial port of the PC with terminal emulator software installed.

Step 3. - Use RJ-45 cable to connect 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 crossover cable.

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

Step 5. - Power the unit ON by putting ON/OFF switch to ON position.

3. Configuration of the Device through Console

3.1 CONSOLE SETUP

Step 1: Connect computer to the device through the console/CID port using console cable provided.

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
- Parity: None
- Baud rate: 115200 bps
- Stop bits: 1
- Data bits: 8
- Flow Control: None

Step 3: Turn on the DG-IC422A, then after few seconds of machine initialization, the system management terminal will display the login screen as shown below.

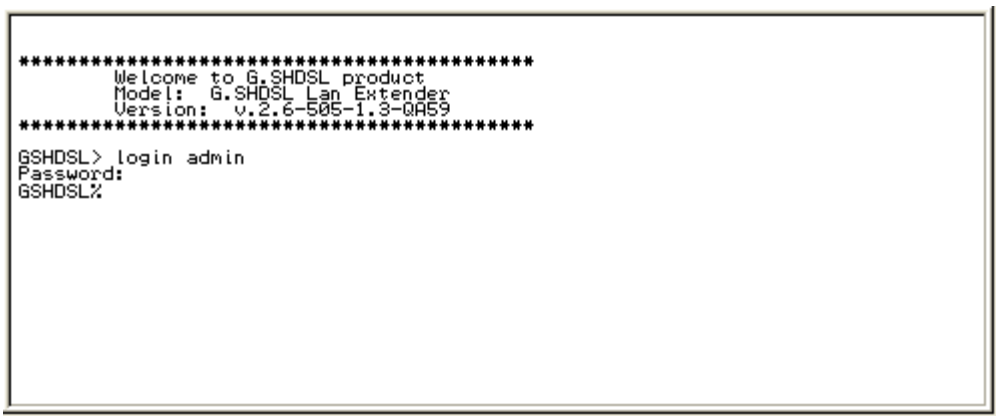
Step 4: User can login to LAN Extender either as ‘login root’ or ‘login admin’.

Command	Description / Comments	Format
list	Print command list available for menu.	list
login	Login to configure the device.	login admin
		login root

3.2 LOGIN ADMIN

1. To login as “login admin”

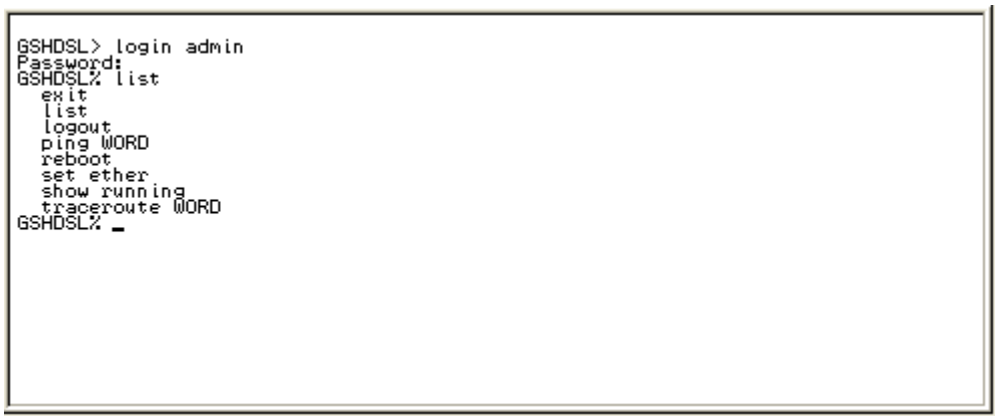
Command List
GSHDSL> login admin
Password: admin
GSHDSL%



- Enter “**login admin**” for the accessing limited console menus for device.
- Enter the correct Password. [Default Password “admin”].
- LAN Extender will prompt user with **GSHDSL%** prompt.

3.2.1 Command List for “Login admin”

Command List
GSHDSL% list



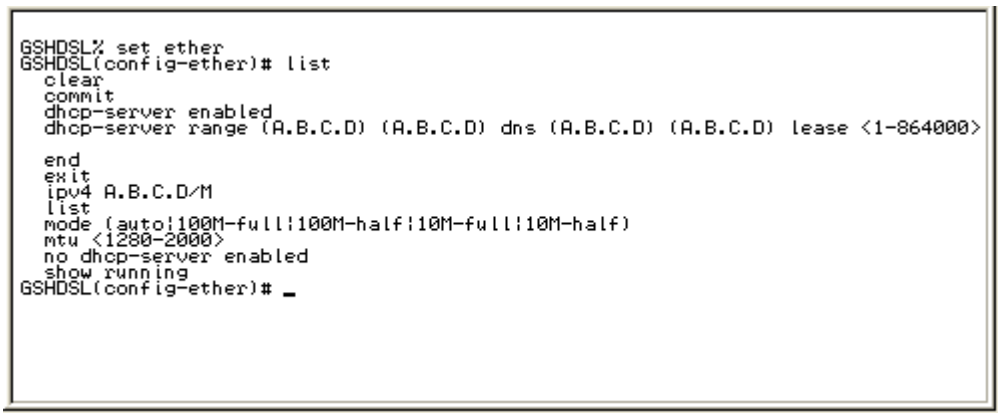
Command	Comments	Format
exit	Exit current mode/menu.	exit
list	Print command list available for menu.	list
logout	Logout to login menu of device.	logout
ping	Send echo messages to destination address.	ping A.B.C.D (*IPv4address)* e.g. ping 192.168.0.1
reboot	Reboot the device.	reboot

set ether	Select the Ethernet interface for configuration.	set ether
show	Show present configuration of device.	show running
traceroute	Trace route to destination.	traceroute A.B.C.D (*IPv4address)* e.g. traceroute 192.168.0.1

3.2.2 Configure Ethernet

Commands in this menu allow LAN related configurations such as: IPv4 address, Subnet Mask, MTU, Mode, DHCP server etc can be configured by user.

Command List
GSHDSL% set ether
GSHDSL(config-ether)# list



Command	Comments	Format
clear	Clear terminal screen.	clear
commit	Confirm pending configuration.	commit
dhcp-server	Dynamic Host Configuration Protocol.	dhcp-server enabled
		dhcp-server range (A.B.C.D) (A.B.C.D) dns (A.B.C.D) (A.B.C.D) lease <1-864000>
end	End mode and down to top mode.	end
exit	Exit current mode/menu.	exit
ipv4	Configuring IPv4 address for device.	ipv4 A.B.C.D/M e.g. ipv4 192.168.0.1/24
list	Print command list available for menu.	list
mode	Configuring LAN connectivity mode.	mode (auto | 100M-full | 100M-half | 10M-full | 10M-half) e.g. mode auto
mtu	Configuring MTU of interface.	mtu <1280-2000> e.g. mtu 1500
no dhcp-server enabled	Negate the configuration of element & disable DHCP-Server.	no dhcp-server enabled
show	Show configuration of interface.	show running

3.3 LOGIN ROOT

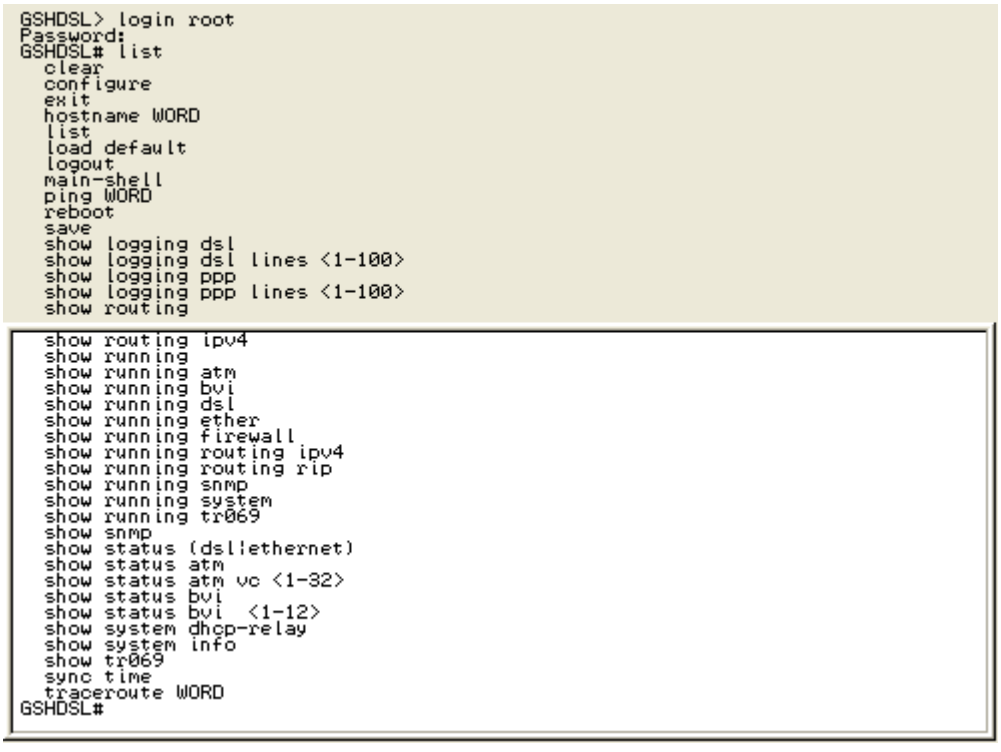
1. To login as “login root”

Command List
GSHDSL> login root
Password: admin
GSHDSL#

- Enter “**login root**” for the accessing all console menus for device.
- Enter the correct Password. [Default Password “admin”].
- LAN Extender will prompt user with **GSHDSL#** prompt.

3.3.1 Command List for “Login root”

Command List
GSHDSL# list



Command	Comments	Format
clear	Clear terminal screen.	clear
configure	Enter configuration mode.	configure
exit	Exit current mode/menu.	exit
hostname	Set hostname of device Text without space, maximum 32 chars is allowed.	hostname WORD e.g. hostname LANEXTENDER
list	Print command list available for menu.	list
load default	Load default configuration.	load default
logout	Logout from menu.	logout
main-shell	Maintenance shell command.	main-shell
ping	Send echo messages to destination address.	ping A.B.C.D (IPv4address) e.g. ping 192.168.0.1
reboot	Reboot the device.	reboot
save	Save present configuration of device.	save
show	Show configuration for specified parameter.	show logging dsl show logging dsl lines <1-100> show logging ppp show logging ppp lines <1-100> show routing show routing ipv4 show running show running atm show running bvi show running dsl show running ether show running firewall show running routing ipv4 show running routing rip show running snmp show running system show running tr069 show snmp show status dsl show status ethernet show status atm show status atm vc <1-32> show status bvi show status bvi <1-12> show system dhcp-relay show system info show tr069
sync	Show NTP (Network time protocol) status & time.	sync time
traceroute	Trace route to destination.	traceroute A.B.C.D (*IPv4address)* e.g. traceroute 192.168.0.1

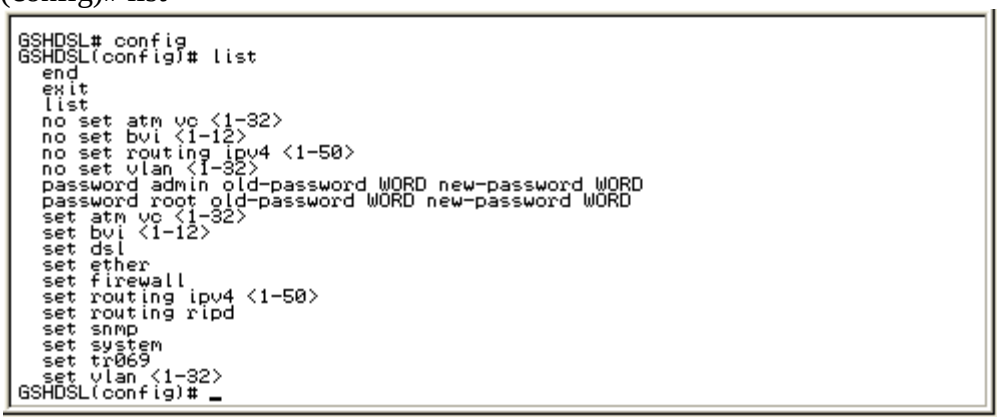
3.3.2 Configuration

Commands in this menu allow user to change passwords & access main configuration items such as ATM, Bridge virtual interface, DSL, Ethernet/LAN etc.

Command List

GSHDSL# config

GSHDSL(config)# list



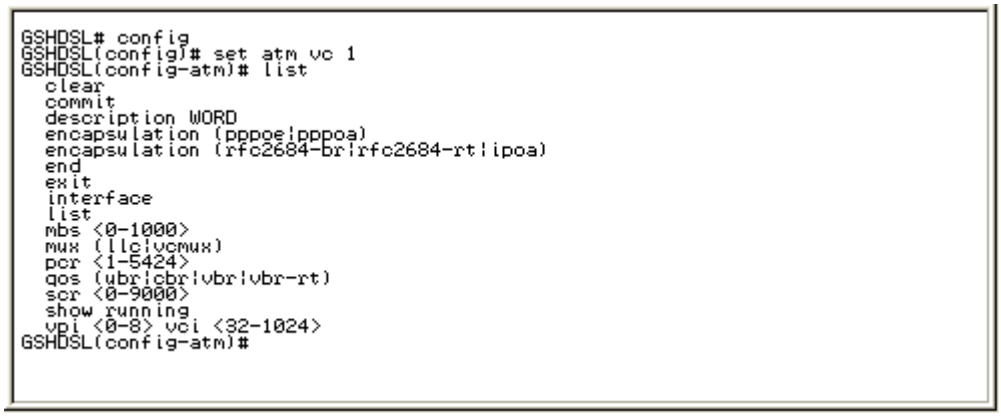
Command	Comments	Format
end	Close current menu and go down to top menu item.	end
exit	Exit current mode/menu.	exit
list	Print command list available for menu.	list
no	Negate the configuration of element.	no set atm vc <1-32> e.g. no set atm vc 1
		no set bvi <1-12>
		no set routing ipv4 <1-50>
		no set vlan <1-32>
password	Change password for login admin.	password admin old-password *WORD* new-password *WORD* e.g. password admin old-password *admin* new-password *admin123*
	Change password for login root.	password root old-password *WORD* new-password *WORD*
set	Select the element to configure.	set atm vc <1-32> e.g. set atm vc 1
		set bvi <1-12>
		set dsl
		set ether
		set firewall
		set routing ipv4 <1-50>
		set routing ripd
		set snmp
		set system
		set tr069
		set vlan <1-32>

3.3.2.1 Configure ATM

Commands in this menu allow user to configure Virtual channels, WAN interface & PPP options. LAN Extender supports both Bridge and Router function at the same time if required.

Command List

GSHDSL(config)# set atm vc 1
GSHDSL(config-atm)# list



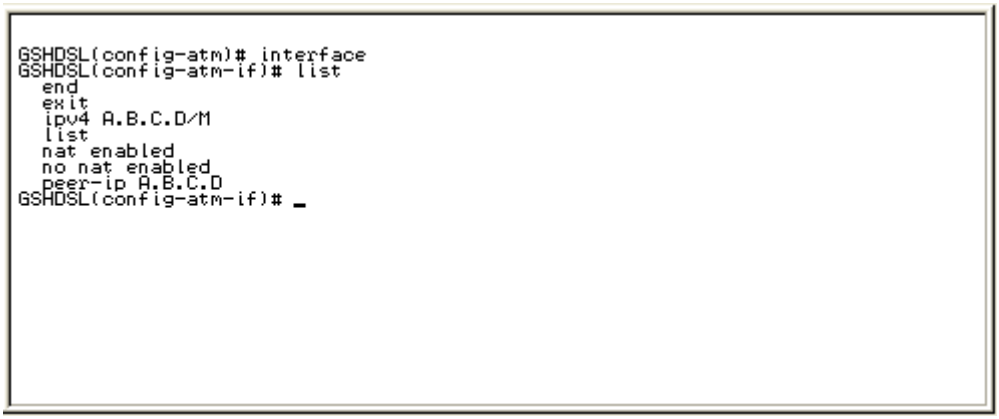
Command	Comments	Format
clear	Clear terminal screen.	clear
commit	Confirm pending configuration.	commit
description	Description of this ATM channel Text without space, maximum 32 chars is allowed.	description WORD
encapsulation	Encapsulation method on this ATM channel.	encapsulation (pppoe | pppoa) e.g. encapsulation pppoe
		encapsulation (rfc2684-br | rfc2684-rt | ipoa) e.g. encapsulation rfc2684-br
end	Close current menu and go down to top menu item.	end
exit	Exit current mode/menu.	exit
interface	Configuring ATM network interface.	interface
list	Print command list available for menu.	list
mbs	Maximum burst size of this ATM channel.	mbs <0-1000>
mux	ATM multiplexer for this ATM channel.	mux (llc | vcmux) e.g. mux llc
pcr	Peak cell rate of this ATM channel.	pcr <1-5424>
qos	Quality if Service on this ATM channel.	qos (ubr | cbr | vbr | vbr-rt)
scr	Sustained cell rate of this ATM channel.	scr <0-9000>
show	Show configuration for this ATM channel.	show running
vpi	Virtual path identifier for this ATM channel.	vpi <0-8> vci <32-1024> e.g. vpi 0 vci 32

3.3.2.1.1 Configure ATM interface

Commands in this menu allow user to configure IP Addresses & NAT for WAN Interface.

Command List

GSHDSL(config-atm)# interface
GSHDSL(config-atm-if)# list

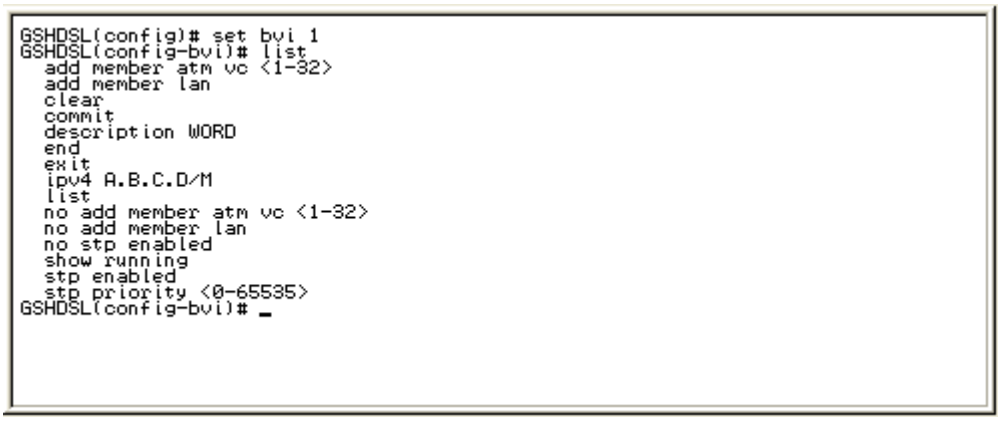


Command	Comments	Format
end	Close current menu and go down to top menu item.	end
exit	Exit current mode/menu.	exit
ipv4	Local IPv4 address for WAN Interface.	ipv4 A.B.C.D/M e.g. ipv4 1.1.1.1/24
list	Print command list available for menu.	list
nat enabled	Enable Network Address Translation of this ATM interface.	nat enabled
no nat enabled	Negate the configuration of element & disable NAT.	no nat enabled
peer-ip	Peer IPv4 address / IPv4 address of paired LAN Extender / IPv4 address of DSLAM for WAN interface.	peer-ip A.B.C.D e.g. peer-ip 1.1.1.2

3.3.2.2 Configure BVI (Bridge Virtual Interface)

If LAN Extender is to be used as BRIDGE, set Encapsulation - rfc2684-br (Bridged) in ATM configuration, you need to create BVI interface and add both LAN and ATM VC into that BVI, it means you create a Bridge for LAN and ATM channel.
User needs to configure LAN & ATM channel before configuring BVI. After this, add LAN interface & required ATM channel to BVI using 'add' command.

Command List
GSHDSL(config)# set bvi 1
GSHDSL(config-bvi)# list



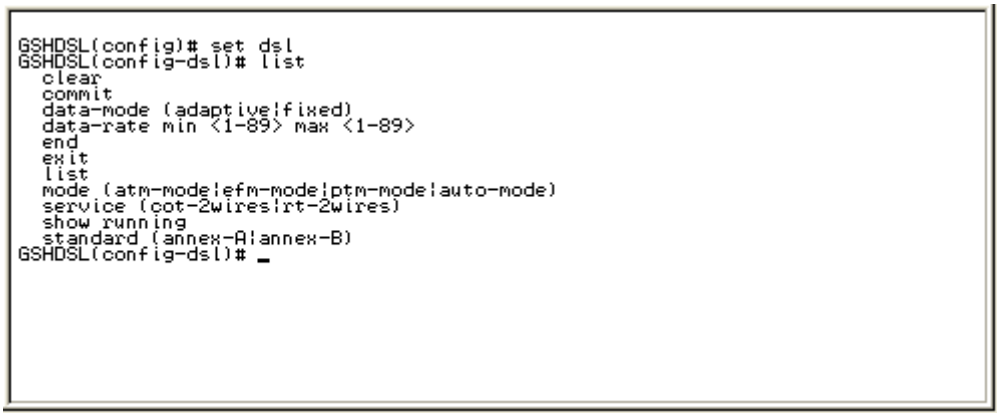
Command	Comments	Format
add	Adding interface to BVI.	add member atm vc <1-32> e.g. add member atm vc 1
		add member lan
clear	Clear terminal screen.	clear
commit	Confirm pending configuration.	commit
description	Description of this BVI Text without space, maximum 32 chars is allowed.	description WORD
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu.	exit
ipv4	Local IPv4 address.	ipv4 A.B.C.D/M e.g. ipv4 192.168.0.1/24
list	Print command list available for menu	list
no	Negate the configuration of element	no add member atm vc <1-32> e.g. no add member atm vc 1
		no add member lan
		no stp enabled
show	Show configuration for BVI	show running
stp	Spanning Tree Protocol	stp enabled
		stp priority <0-65535> e.g. stp priority 65535

3.3.2.3 Configure DSL Interface

Commands in this menu item allow user to configure DSL Interface of LAN Extender.

Command List

GSHDSL(config)# set dsl
GSHDSL(config-dsl)# list



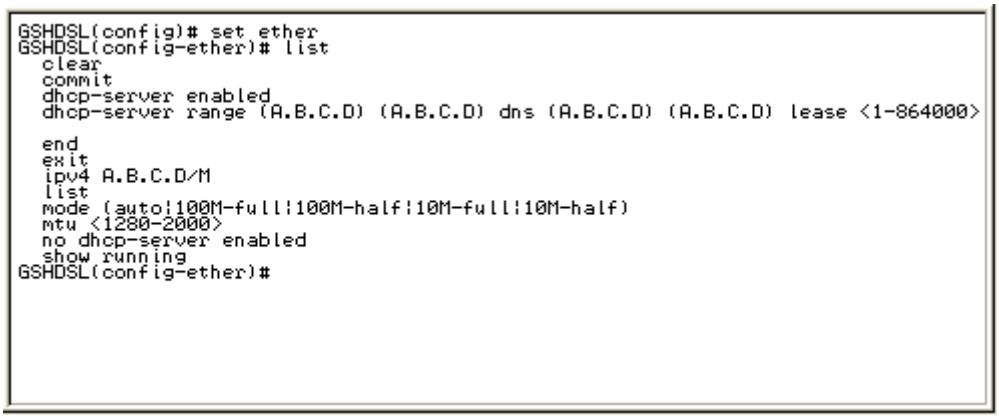
Command	Comments	Format
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
data-mode	DSL data mode DSL data mode must be same for both paired LAN Extenders.	data-mode (adaptive | fixed)
data-rate	DSL data rate For data-mode Fixed, data-rate min & max must be same.	data-rate min <1-89> max <1-89> e.g. data-rate min 1 max 89
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
list	Print command list available for menu	list
mode	DSL physical mode DSL mode must be same for both paired LAN Extenders.	mode (atm-mode | efm-mode | ptm-mode | auto-mode)
service	DSL operation service	service (cot-2wires | rt-2wires)
show	Show configuration DSL interface	show running
standard	DSL standard DSL Standard must be same for both paired LAN Extenders.	standard (annex-A | annex-B)

3.3.2.4 Configure Ethernet Interface

Commands in this menu allow LAN related configurations such as: IPv4 address, Subnet Mask, MTU, Mode, DHCP server etc can be configured by user.

Command List

GSHDSL(config)# set ether
GSHDSL(config-ether)# list



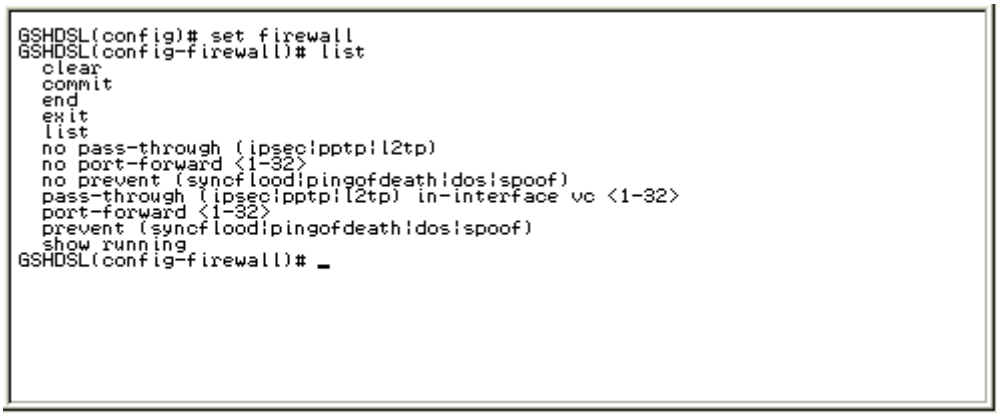
Command	Comments	Format
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
dhcp-server	Enable Dynamic Host Configuration Protocol	dhcp-server enabled
dhcp-server range	Dynamic Host Configuration Protocol IP address range	dhcp-server range (A.B.C.D) (A.B.C.D) dns (A.B.C.D) (A.B.C.D) lease <1-864000> e.g. dhcp-server range 192.168.0.10 192.168.0.100 dns 4.4.2.2 192.168.2.2 lease 864000
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
ipv4	Configuring IPv4 address	ipv4 A.B.C.D/M e.g. ipv4 192.168.0.1/24
list	Print command list available for menu	list
mode	Configuring LAN connectivity mode	mode (auto | 100M-full | 100M-half | 10M-full | 10M-half) e.g. mode auto
mtu	Configuring MTU of interface	mtu <1280-2000>
no	Negate the configuration of element	no dhcp-server enabled
show	Show configuration for Ethernet Interface	show running

3.3.2.5 Configure Firewall

Commands in this menu allow user to configure Port Forwarding, VPN Passthrough & Prevent attack features.

Command List

GSHDSL(config)# set firewall
GSHDSL(config-firewall)# list



Command	Comments	Format
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
list	Print command list available for menu	list
no	Negate the configuration of element	no pass-through (ipsec | pptp | l2tp)
		no port-forward <1-32>
		no prevent (syncflood | pingofdeath | dos | spoof)
pass-through	Set VPN passthrough	pass-through (ipsec | pptp | l2tp) in-interface vc <1-32>
port-forward	Configure Port forwarding Select index	port-forward <1-32>
prevent	Prevent DOS attacks	prevent (syncflood | pingofdeath | dos | spoof)
show	Show configuration for Firewall	Show running

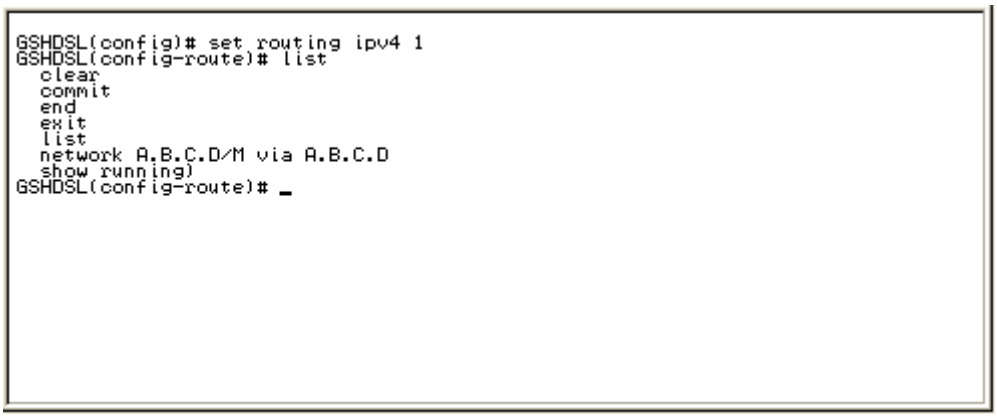
3.3.2.6 Configure IPv4 Routing

Commands in this menu allow user to configure static routes for LAN Extender.

Command List

GSHDSL(config)# set routing ipv4 1

GSHDSL(config-route)# list



Command	Comments	Format
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
list	Print command list available for menu	list
network	Network segment	network A.B.C.D/M via A.B.C.D e.g. network 192.168.2.0/24 via 1.1.1.2
show	Show configuration for IPv4 routing	show running

3.3.2.7 RIP

Commands in this menu allow user to configure dynamic routing for LAN Extender.

Command List

GSHDSL(config)# set routing ripd
GSHDSL(config-rip)# list

```
GSHDSL(config)# set routing ripd
GSHDSL(config-rip)# list
  commit
  end
  exit
  list
  no rip enabled
  rip enabled
  show running
  version <1-2>
GSHDSL(config-rip)#
```

Command	Comments	Format
commit	Confirm pending configuration	commit
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
list	Print command list available for menu	list
no rip enabled	Disable RIP protocol	no rip enabled
rip enabled	Enable RIP protocol	rip enabled
show	Show configuration for RIP	show running
version	Select RIP version	version <1-2>

3.3.2.8 SNMP

Commands in this menu allow user to configure SNMP (Simple Network Management Protocol) features which is a standard for managing of devices on IP Networks.

Command List

GSHDSL(config)# set snmp
GSHDSL(config-snmp)# list

```
GSHDSL(config)# set snmp
GSHDSL(config-snmp)# list
  clear
  commit
  community read-only (private|public)
  community read-write (private|public)
  community trap (private|public)
  end
  exit
  list
  no snmp enabled
  no trap <1-3>
  show running
  snmp enabled
  trap <1-3> description WORD version <1-2> A.B.C.D
GSHDSL(config-snmp)#
```

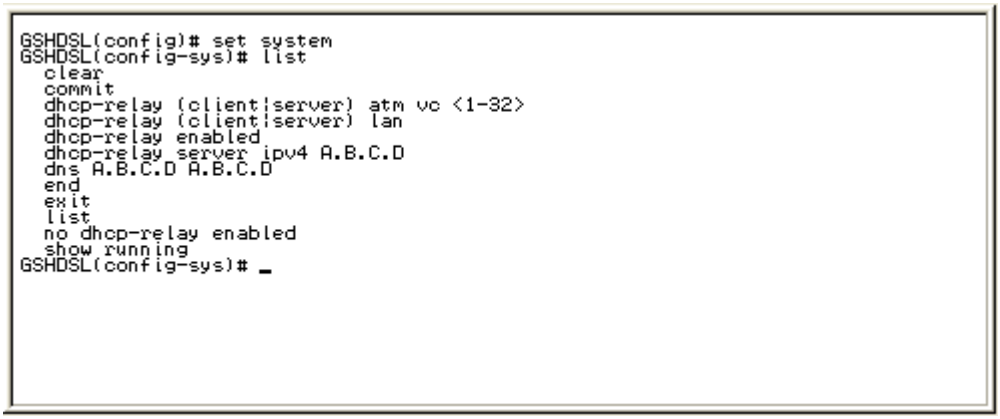
Command	Comments	Format
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
community	SNMP community	community read-only (private | public)
		community read-write (private | public)
		community trap (private | public)
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
list	Print command list available for menu	list
no	Negate the configuration of element	no snmp enabled
		no trap <1-3>
show	Show configuration for SNMP	show running
snmp enabled	Enable SNMP agent	snmp enabled
trap	Configure SNMP trap	trap <1-3> description WORD version <1-2> A.B.C.D e.g. trap 1 description PRINT version 1 192.168.10.1

3.3.2.9 System

Commands in this menu allow user to configure DNS & DHCP relay features.

Command List

GSHDSL(config)# set system
GSHDSL(config-sys)# list



Command	Comments	Format
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
dhcp-relay	Configure DHCP relay	dhcp-relay (client | server) atm vc <1-32> e.g. dhcp-relay server atm vc 1
		dhcp-relay (client | server) lan
		dhcp-relay enabled
		dhcp-relay server ipv4 A.B.C.D
dns	Configure DNS	dns A.B.C.D A.B.C.D e.g. dns 192.168.5.30 192.168.5.42
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
list	Print command list available for menu	list
no	Negate the configuration of element	no dhcp-relay enabled
show	Show configuration System parameters	show running

3.3.2.10 TR069

TR-069 (shortform for Technical Report 069) is a DSL Forum (which was later renamed as Broadband Forum) technical specification entitled CPE WAN Management Protocol (CWMP). It defines an application layer protocol for remote management of end-user devices.

As a bidirectional SOAP/HTTP based protocol it provides the communication between customer-premises equipment (CPE) and Auto Configuration Servers (ACS). It includes both a safe auto configuration and the control of other CPE management functions within an integrated framework.

Using TR-069 the terminals can get in contact with the Auto Configuration Servers (ACS) and establish the configuration automatically. Accordingly other service functions can be provided. TR-069 is the current standard for activation of terminals in the range of DSL Products.

Functions supported by TR-069:

- ❖ Auto configuration and dynamic service activation
  - · Initial CPE configuration
  - · Remote CPE configuration
- ❖ Firmware management
  - · Version management
  - · Update management
- ❖ Status and performance control
  - · Logfile analysis and dynamic messages
  - · Diagnostics
  - · Connectivity and service control.

LAN Extender can access ACS automatically and send periodic information with the interval time configured by customer. ACS can get detailed information of LAN Extender such as the hardware version, the software version and so on. User may presently have access to most functions for ‘get’ & limited functions/parameter for ‘set’.

Commands in this menu allow user to configure TR069 feature,

Command List

GSHDSL(config)# set tr069
GSHDSL(config-tr069)# list

```
GSHDSL(config)# set tr069
GSHDSL(config-tr069)# list
  acs (username|password|url) WORD
  clear
  commit
  cpe (username|password) WORD
  end
  exit
  list
  no periodic-check enabled
  no tr069 enabled
  periodic-check enabled interval <1-86400>
  server WORD
  show running
  tr069 enabled
GSHDSL(config-tr069)# _
```

Command	Comments	Format
acs	Configure TR069 Access Control Server	acs username WORD e.g. acs username admin
		acs password WORD
		acs url WORD
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
cpe	Configure TR069 customer-premise equipment	cpe username WORD e.g. cpe username admin
		cpe password WORD
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
list	Print command list available for menu	list
no	Negate the configuration of element	no periodic-check enabled
		no tr069 enabled
periodic-check	Configure periodic inform	periodic-check enabled interval <1-86400>
server	Configure remote TR069 server IP address:Port address	server A.B.C.D:X e.g. server 192.168.0.10:8082
show	Show configuration for TR069	show running
tr069	Enable TR069 management	tr069 enabled

3.3.2.11 VLAN

Commands in this menu allow user to configure VLAN feature available for LAN Extender.

Command List

GSHDSL(config)# set vlan 1
GSHDSL(config-vlan)# list

```
GSHDSL(config)# set vlan 1
GSHDSL(config-vlan)# list
  clear
  commit
  description WORD
  end
  exit
  id <1-2000>
  ipv4 A.B.C.D/M
  list
  show running
GSHDSL(config-vlan)#
```

Command	Comments	Format
clear	Clear terminal screen	clear
commit	Confirm pending configuration	commit
description	Description of this interface, text without space.x	description WORD e.g. description LANEXTENDER
end	Close current menu and go down to top menu item	end
exit	Exit current mode/menu	exit
id	Configure VLAN ID	id <1-2000> e.g. id 10
ipv4	Configuring IPv4 address	ipv4 A.B.C.D/M e.g. ipv4 192.168.0.10/24
list	Print command list available for menu	list
show	Show configuration for VLAN	show running

4. Configuring with WEB

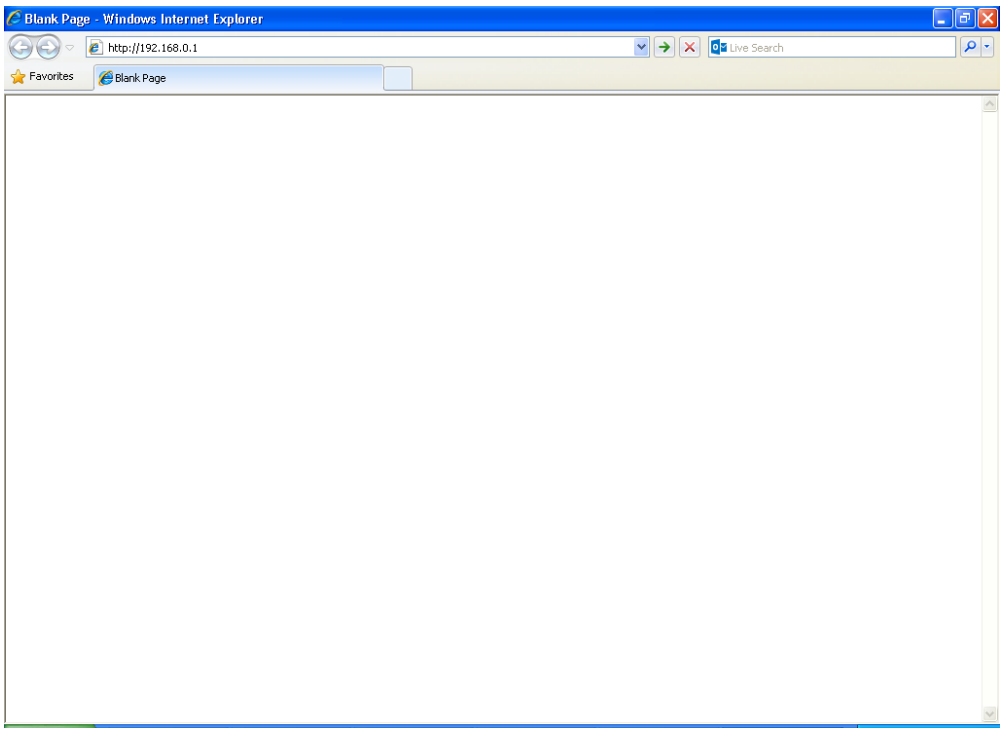
4.1 LOGIN

When connected for the first time, DG-IC422A has the following pre-configured host IP address 192.168.0.1/24 (IP Address: 192.168.0.1, Subnet mask: 255.255.255.0)
To access the Web Utility for device,

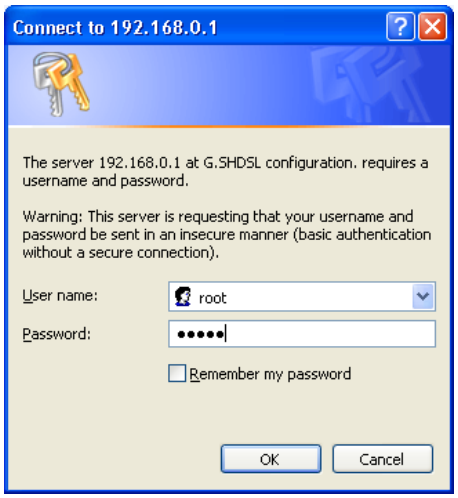
- Configure your PC to the same network segment as the DG-IC422A.

For example, you could set the PC to IP address: 192.168.0.10, subnet mask: 255.255.255.0

- Connect the PC to any of LAN port designated 1, 2, 3 or 4 on the Rear Panel.
- Open the any web browser on PC.
- Enter the IP address of the DG-IC422A in the address field of the browser as below, http://192.168.0.1 and then press <Enter> to connect.



- Type User name '**root**' and correct Password [Default password '**admin']** and click 'OK'

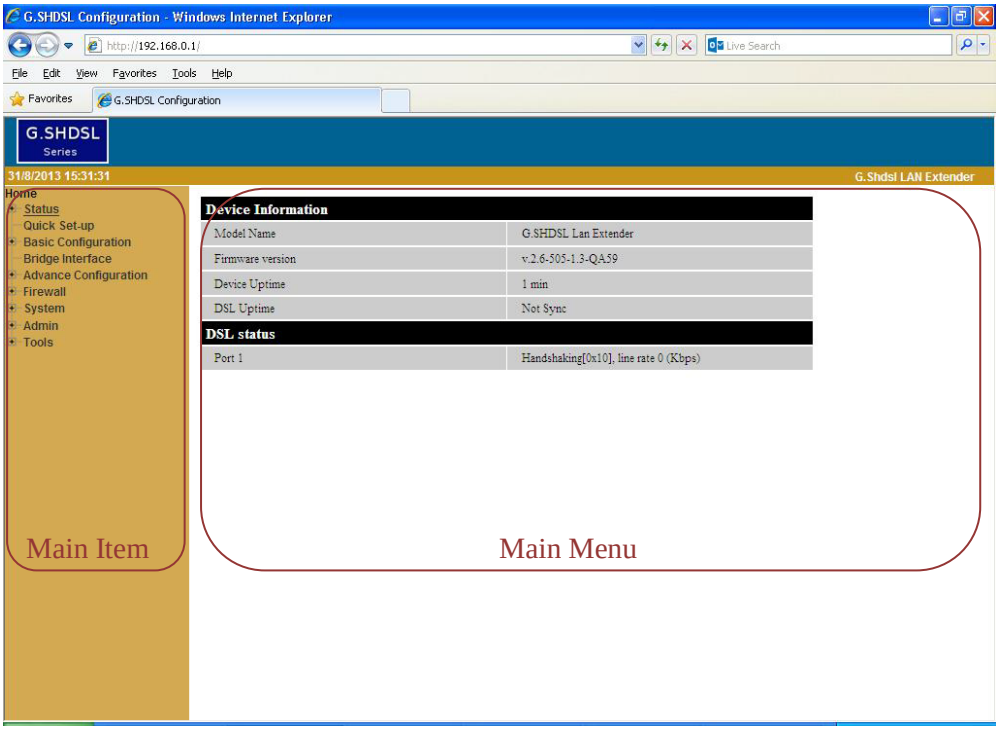


4.2 WEB MENUS

On each Web Menu, there are two areas to illustrate:

- Menu Item: On the left side of the Web Menu are the menu items.

- Main Menu: The remaining area of Web Menu provides fields for configuration, specific to each menu item, and displays prompt or Performance & Diagnostic data.

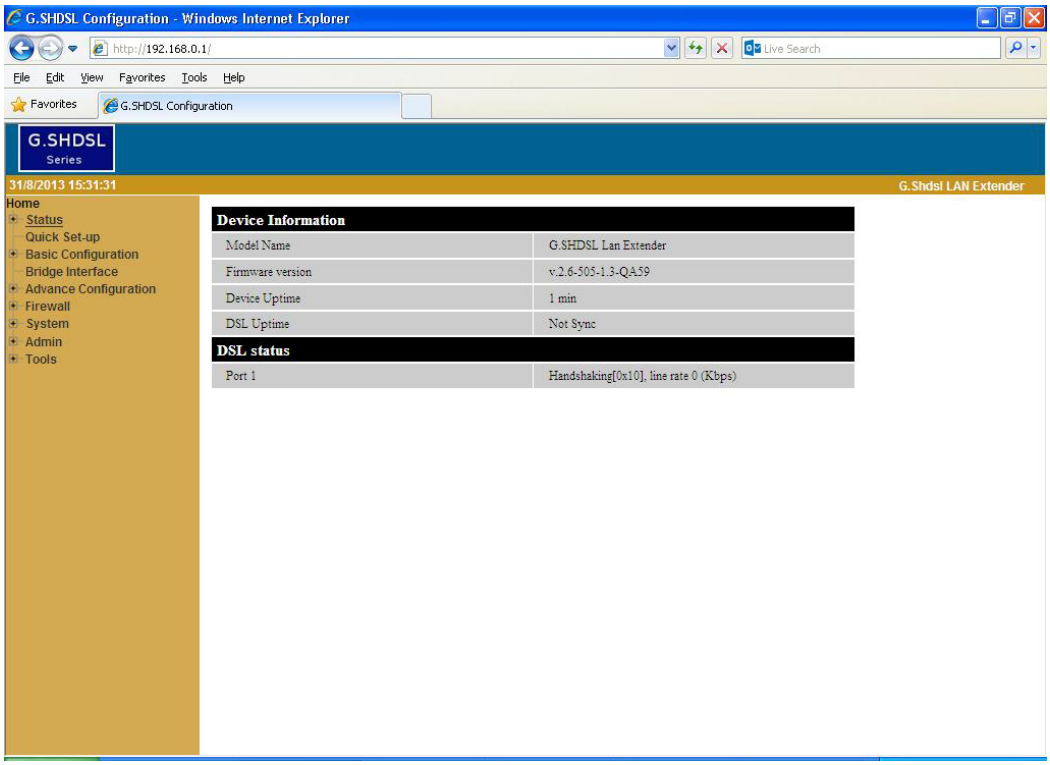


4.2.1 Status

Menu item STATUS allows user to view and verify the unit's identity information as shown below.

This menu item displays device information such as: model name, firmware version, device up time, DSL up time and DSL status.

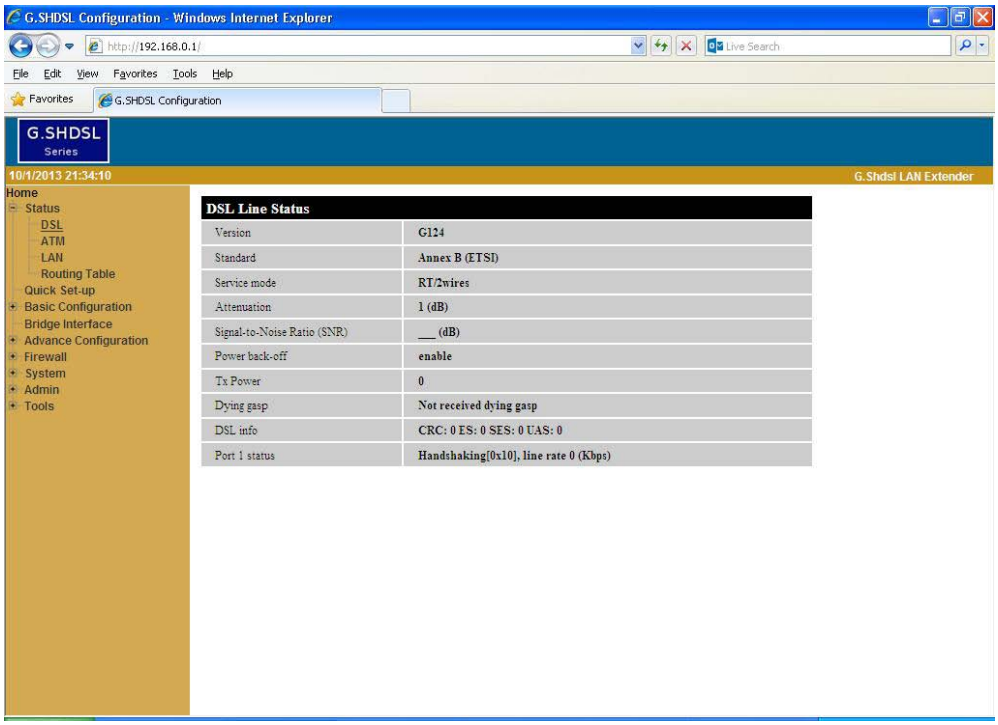
Also Menu item STATUS further allows user to view status for DSL, ATM, LAN & Routing Table for the device.



Items	Field Items	Description
DEVICE INFORMATION	Model Name	Display the model name of the device.
	Firmware Version	Display the current software version of the device.
	Device uptime	Display the total system running time of device.
	DSL uptime	Display the total time of DSL sync between 2 LAN Extenders.
DSL STATUS	DSL status of port1	Display the line status of DSL port.

4.2.1.1 DSL

This menu item allows user to view DSL Performance and Statistics of the device. User can view information such as version, standard, service mode etc.



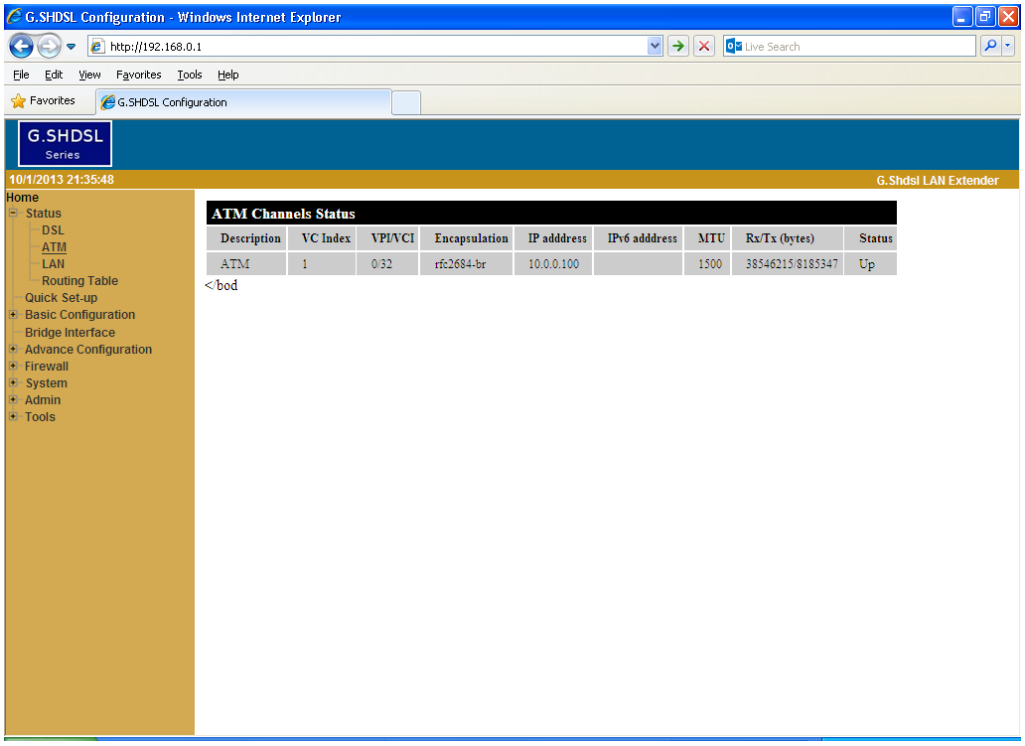
Items	Field Items	Description
DSL LINE STATUS	Version	Display the version of DSL driver
	Standard	Display the standard type of DSL configured for device.
	Service mode	Display the Service mode of DSL configured for device.
	Attenuation	Display the attenuation of DSL line.
	Signal-to-Noise Ratio(SNR)	Display the SNR of DSL line.
	Power back-off	Display power back-off status
	Tx Power	Display the Tx Power of DSL
	Dying Gasp	Display the dying gasp of remote device
	DSL info	Display DSL performance statistics
	Port 1 status	Display line status of DSL port

4.2.1.2 ATM

This menu item allows user to view ATM channel performance and statistics for all ATM channels available. User can view information such as VC Index, VPI/VCI, Encapsulation, MTU etc.

If the VC set with the encapsulation type of PPPoE or PPPoA, then in the Status field it displays the status of PPP connection: 'Down', 'Connecting' or 'Connected'.

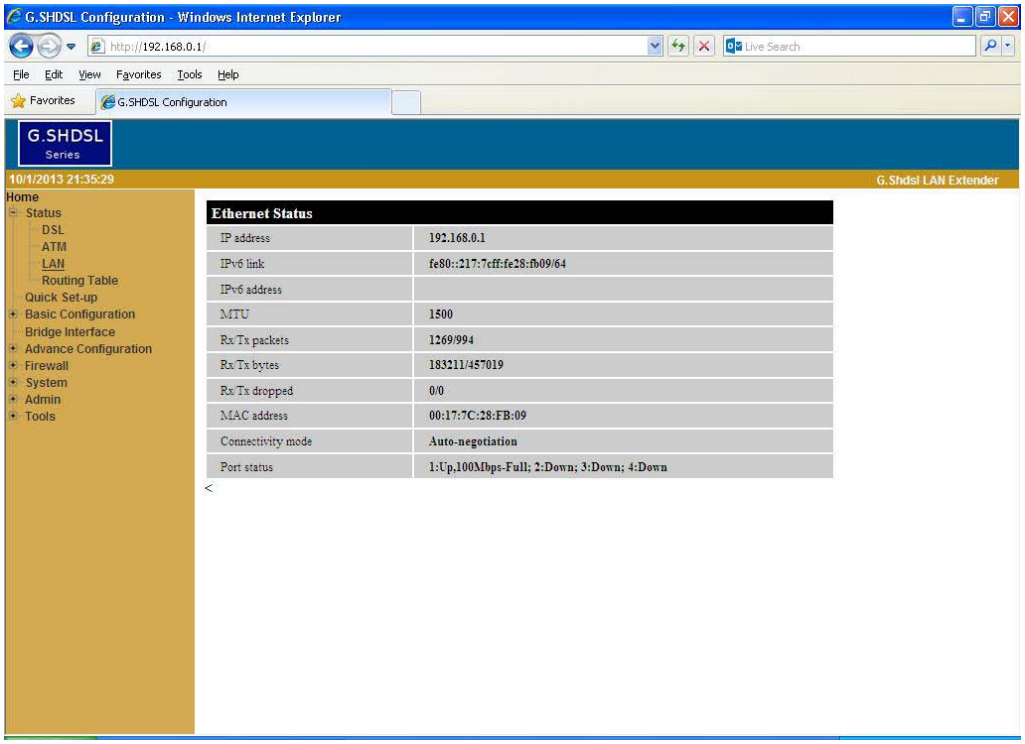
If the VC set with the encapsulation type RFC2684-bridge, RFC2684-routing, IPoA, then in the Status field it displays status of connection as 'Up', 'Down' or 'Connecting'.



Items	Field Items	Description
ATM CHANNEL STATUS	Description	Display the description of ATM channel set by user
	VC Index	Display the VC Index of ATM channel
	VPI/VCI	Display the VPI/VCI of ATM channel
	Encapsulation	Display the encapsulation of ATM channel
	IP address	Display the WAN IP of ATM channel
	IPv6 address	Display the WAN IPv6 address of ATM channel
	MTU	Display the MTU of ATM channel
	Rx/Tx(bytes)	Display the Rx/Tx of ATM channel
	Status	Display the status of ATM channel

4.2.1.3 LAN

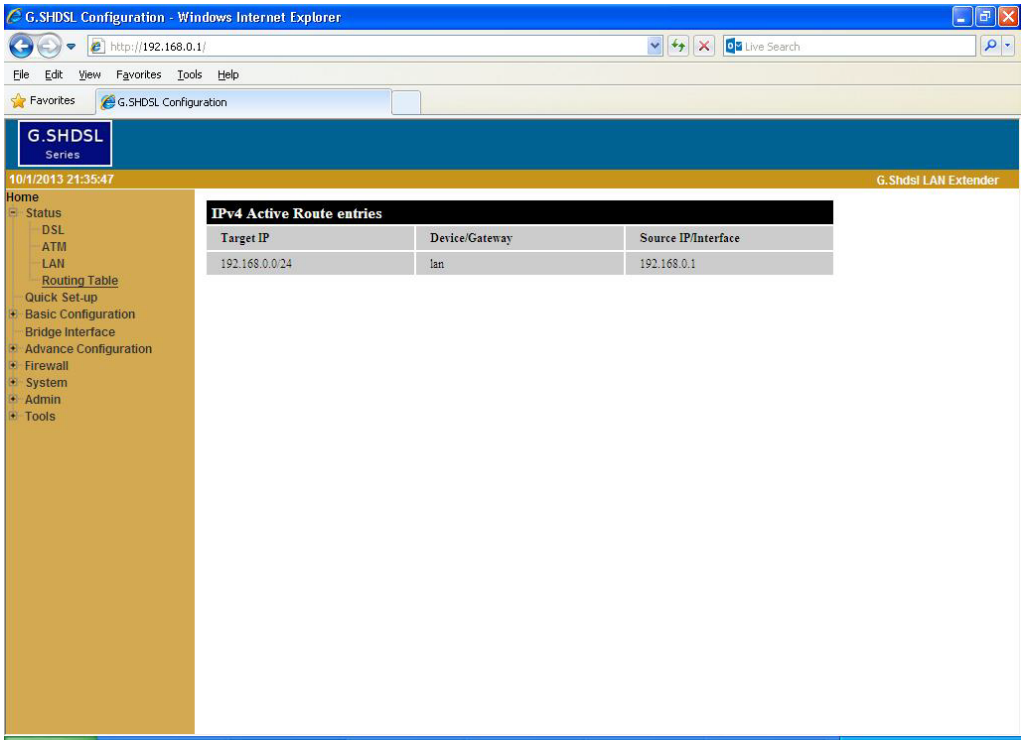
This menu item allows user to view LAN Performance and Status. User can view information such as IP address, MTU, MAC Address, Port Status etc.



Items	Field Items	Description
LAN STATUS	IP address	Display the IP address of LAN
	IPv6 link	Display the IPv6 link status
	IPv6 address	Display the IPv6 address
	MTU	Display the MTU of LAN port
	Rx/Tx packets	Display the Rx/Tx packets of LAN port
	Rx/Tx bytes	Display the Rx/Tx bytes of LAN port
	Rx/Tx dropped	Display the Rx/Tx dropped of LAN port
	MAC address	Display the MAC address of LAN
	Connectivity mode	Display the connectivity mode of LAN port
	Port status	Display the port status of LAN port

4.2.1.4 Routing Table

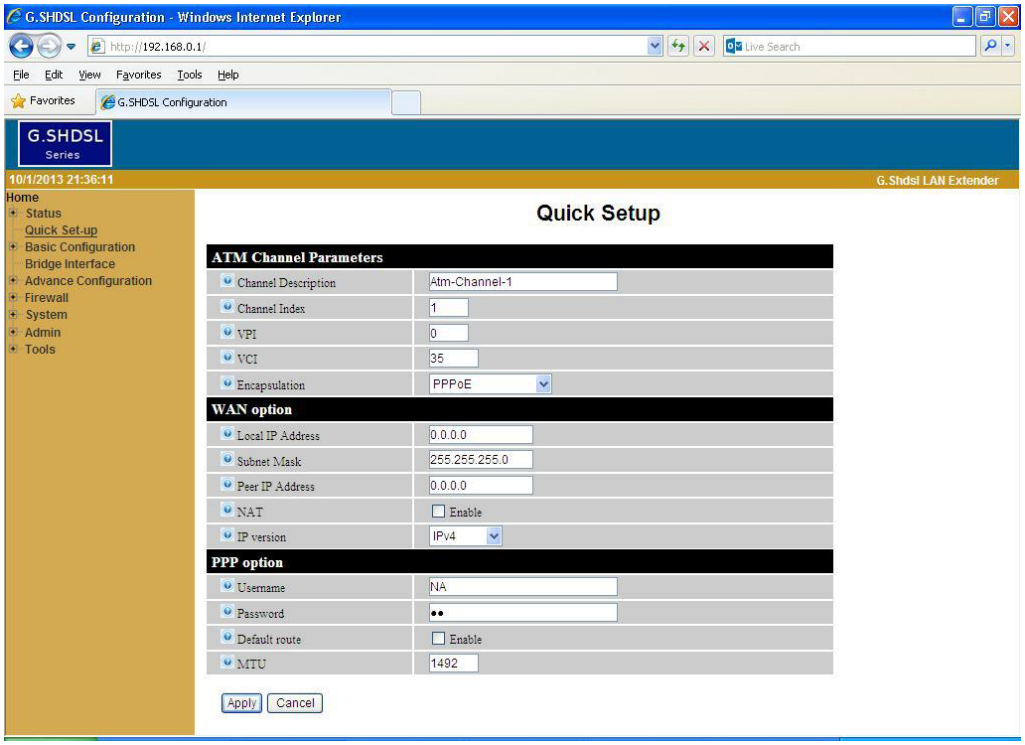
This menu item allows user to view all active route entries presently configured for LAN Extender.



Items	Field Items	Description
ROUTING TABLE	Target IP	Display target IP address of route entry
	Device/Gateway	Display Device/Gateway of route entry
	Source IP/Interface	Display Source IP/Interface of route entry

4.2.2 Quick Setup

Using this quick setup menu, device can be quickly configured for basic parameters for ATM channels, WAN interface & PPP.



Items	Field Name	Description	Value
ATM CHANNEL PARAMETER	Channel Description	Specify the description for ATM channel. The description must be one word, no space in between	Atm-Channel-1 to Atm-Channel-32 [User/System defined]
	Channel Index	The numeric index of creation	0 – 32 [Read only]
	VPI	Virtual Path Identifier for ATM channel	0 - 8
	VCI	Virtual Channel Identifier for ATM channel	32 - 4096
	Encapsulation	The encapsulation type is given by ISP. Select from the drop-down list.	RFC2684 – routed/ RFC2684 – bridged/ PPPoE/PPPoA/IPoA
WAN OPTION	Local IP Address	The WAN local IP Address of router.	xxx.xxx.xxx.xxx User defined
	Subnet Mask	The WAN local IP subnet mask of router.	xxx.xxx.xxx.xxx User defined
	Peer IP Address	The WAN IP Address of paired LAN Extender/DSLAM.	xxx.xxx.xxx.xxx User defined
	NAT	Enable Network Address Translation (NAT) if you want all system behind the LAN sharing a single local IP address of this channel	Enable/Disable
	IP version	Set IP version to be used	IPv4 or IPv4/IPv6

PPP OPTION	Username	ISP login user name, given by ISP. It is set for the encapsulation type of PPPoE or PPPoA	User defined
	Password	ISP login password, given by ISP. It is set for the encapsulation type of PPPoE or PPPoA	User defined
	Default route	Enable this if you want all un-defined IP traffic to go outside via this channel. Enable default Route if you design your device as a gateway	Enable/Disable
	MTU	Maximum Transmit Unit in bytes over PPP link	64-1500

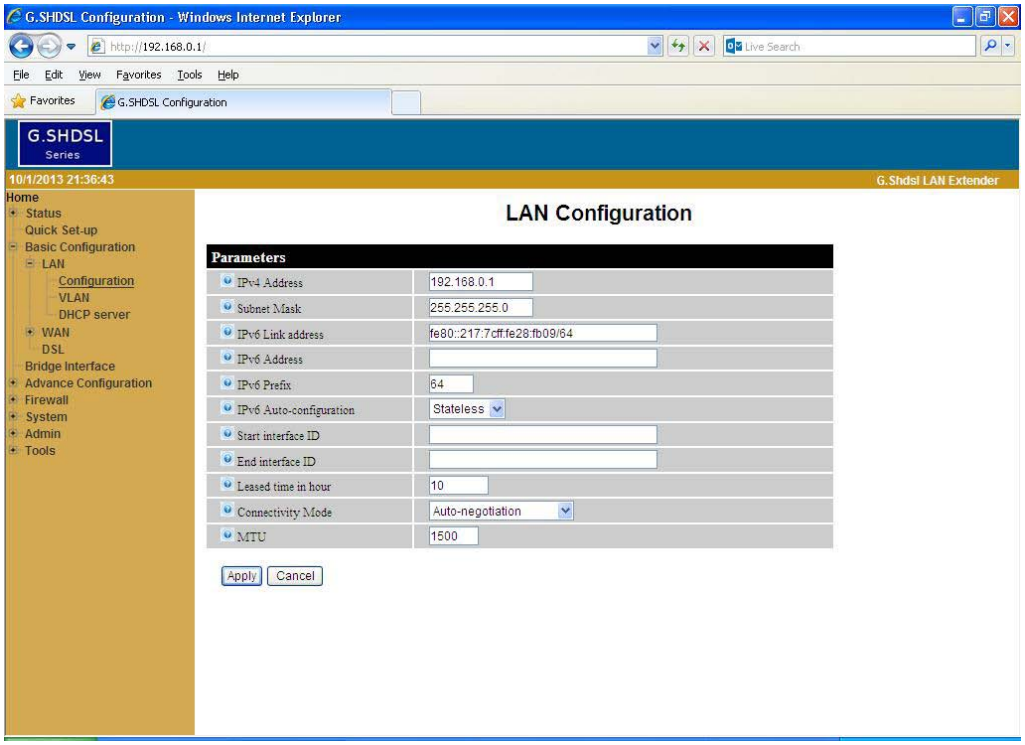
After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.3 Basic Configuration

In menu Basic Configuration, the device can be configured in individual submenu: LAN setup, WAN setup and DSL.

4.2.3.1 LAN Configuration

In LAN configuration menu, LAN related configurations such as: IPv4 address, Subnet Mask, MTU, Connectivity Mode etc can be configured by user.



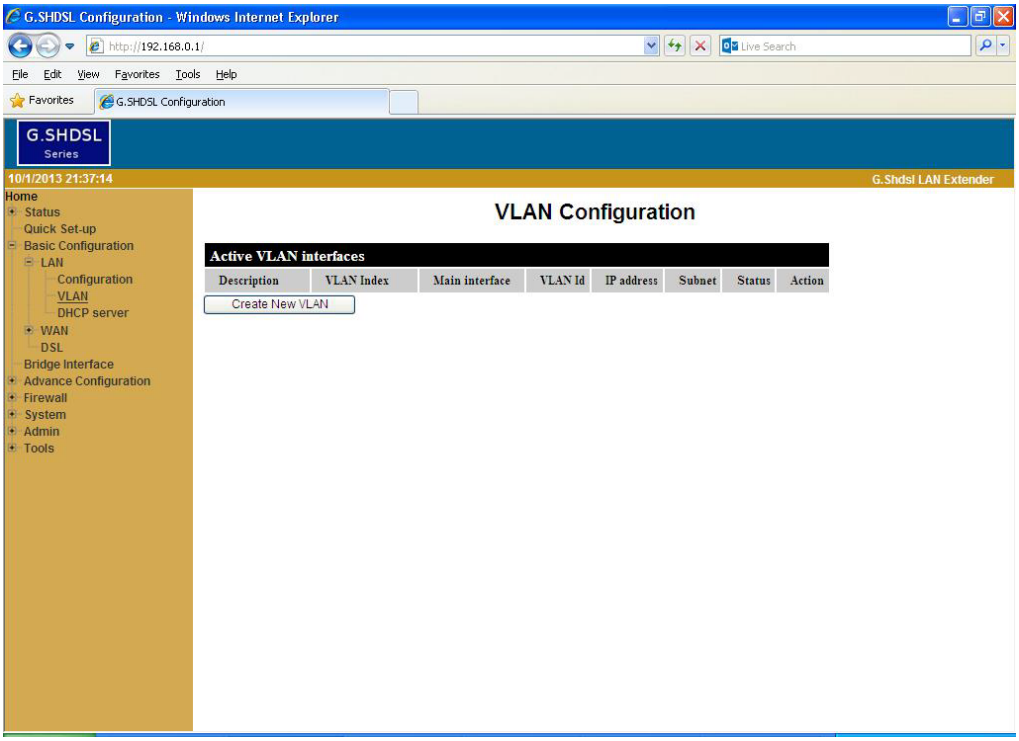
Item	Field Name	Description	Value
PARAMETER	IPv4 Address	IPv4 address format. This address is in the form of xxx.xxx.xxx.xxx	User defined [Default:192.168.0.1]
	Subnet Mask	Subnet mask IP address and divides the IP address into network address and host	User defined [Default: 255.255.255.0]
	IPv6 Link Address	A link-local address is an Internet Protocol address that is intended only for communications within the segment of a local network (a link) or a point-to-point connection that a host is connected to. Routers do not forward packets with link-local addresses	[Read only]
	IPv6 Address	IPv6 address format (xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx)	[Optional feature]
	IPv6 Prefix	Decimal value that indicates the number of contiguous, higher-order bits of ipv6	Default: 64
	IPv6 Auto-configuration	---	Stateless/ Stateful / None Default: Stateless

	Start Interface ID	Setup start interface ID (IPv6)	User defined
	End Interface ID	Setup end interface ID (IPv6)	User defined
	Leased Time in Hour	Setup leased time of IP pool address	User defined
	Connectivity Mode	Physical connectivity mode of Ethernet interface	Auto-negotiation 100 Mbps-Full Duplex 100Mbps-Half Duplex 10Mbps-Full Duplex 10Mbps-Half Duplex [Default: Auto-negotiation]
	MTU	Maximum Transmission Unit	1280~2000 Default: 1500

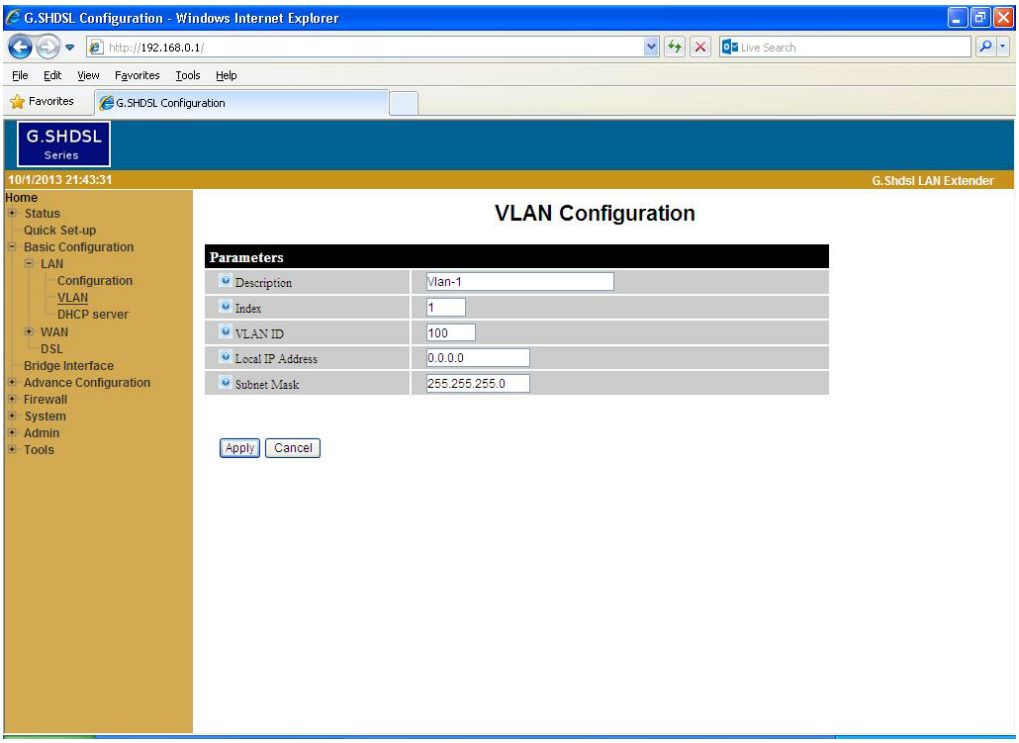
After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.3.2 VLAN Configuration

This menu item allows user to configure VLAN features available for LAN Extender.



To create and configure VLAN Configuration click on ‘Create New VLAN’

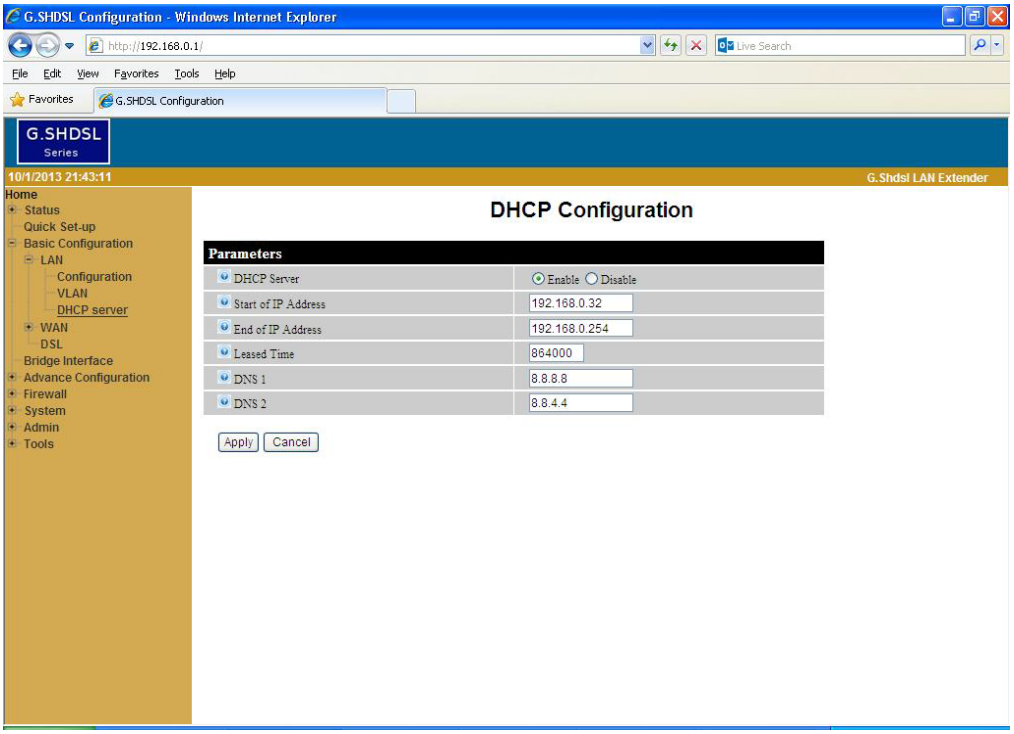


Item	Field Name	Description	Value
PARAMETER	Description	VLAN description	[User/System defined]
	Index	VLAN index	[Read only]
	VLAN ID	Configuration VLAN ID	1~2000 [Default: 100]
	Local IP Address	Configure local IP address in VLAN	xxx.xxx.xxx.xxx [Default: 0.0.0.0]
	Subnet Mask	Configure subnet mask in VLAN	xxx.xxx.xxx.xxx [Default: 255.255.255.0]

After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.3.3 DHCP Server

Dynamic Host Configuration Protocol (DHCP) feature allows acquiring IP addresses automatically for any host connected to device.

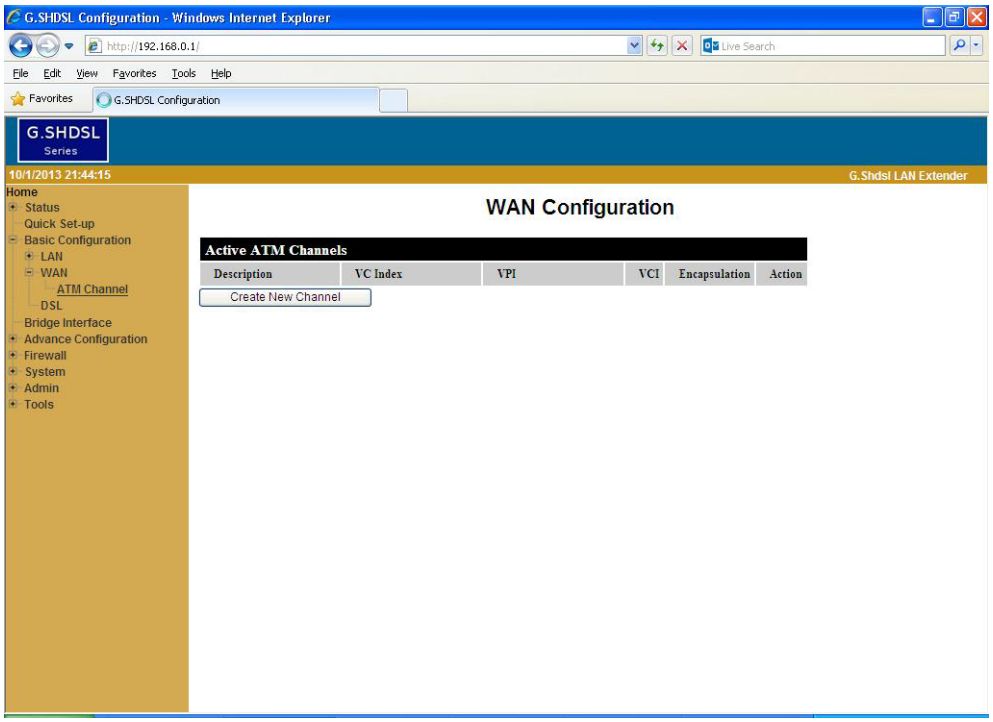


Item	Field Name	Description	Value
PARAMETER	DHCP Server	Dynamic Host Configuration Protocol allows dynamically for any connected hosts on LAN (supporting DHCP clients) to acquire IP address.	Enable / Disable [Default: Enable]
	Start of IP Address	Starting IP Address in the range in which the IP address of hosts on the LAN will be assigned, in case of DHCP server is enabled.	xxx.xxx.xxx.xxx [User defined] e.g. 192.168.0.120
	End of IP Address	End IP Address in the range in which the IP address of hosts on the LAN will be assigned, in case of DHCP server is enabled.	xxx.xxx.xxx.xxx [User defined] e.g. 192.168.0.254
	Leased Time	Amount of time that a given IP address will be valid.	0-99999 [Default: 86400]
	DNS 1	Domain Name System - Primary DNS server IP address for resolving the symbolic IP address to numeric IP address.	xxx.xxx.xxx.xxx [User Defined]
	DNS 2	Domain Name System - Secondary DNS server IP address for resolving the symbolic IP address to numeric IP address.	xxx.xxx.xxx.xxx [User Defined]

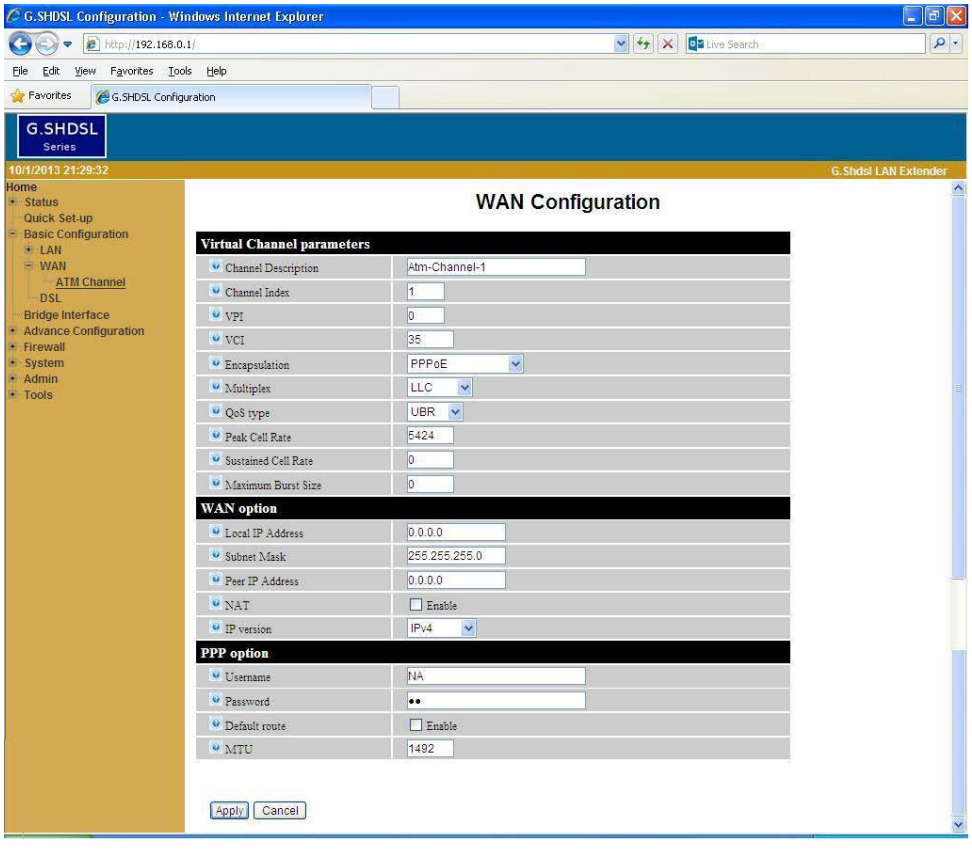
After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.3.4 WAN Configuration

Menu WAN Setup allows user to configure Virtual channels, WAN interface & PPP options. LAN Extender supports both Bridge and Router function at the same time if required.



To create and configure new WAN Channels click on 'Create New Channels'



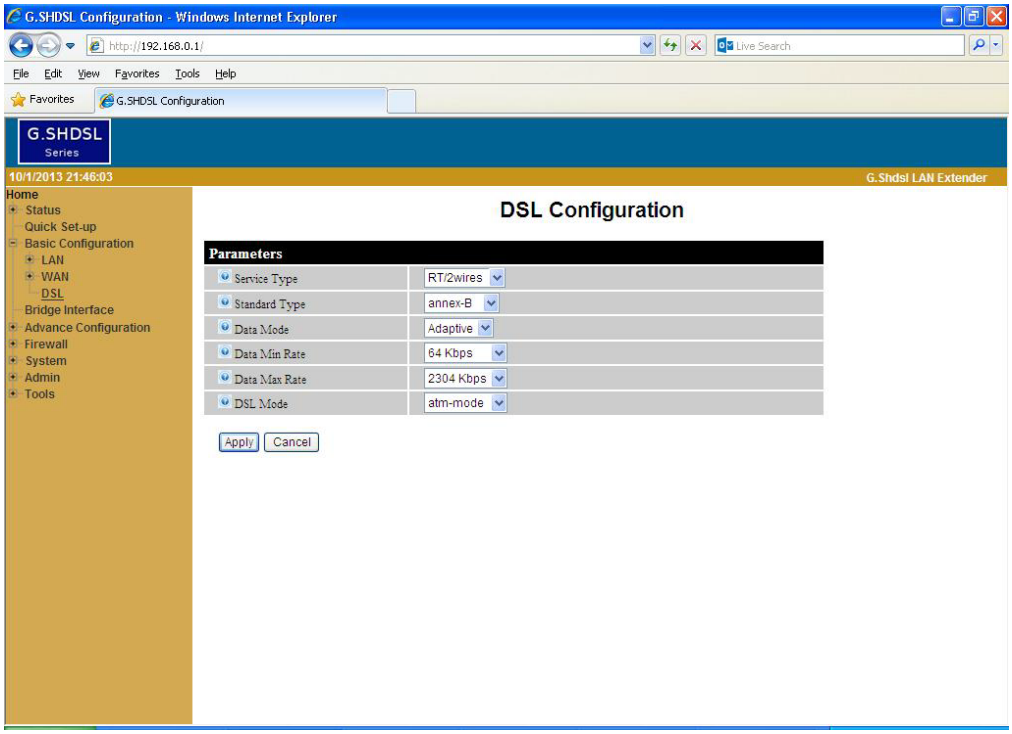
Items	Field Name	Description	Value
VIRTUAL CHANNEL PARAMETER	Channel Description	Specify the description of interface. The description must be one word, no space in between	[User/System defined]
	Channel Index	The numeric index of creation	0 – 32 [Read Only]
	VPI	Virtual Path Identifier	0 - 8[Default:0]
	VCI	Virtual Channel Identifier	32 - 4096[Default:35]
	Encapsulation	The encapsulation type is given by ISP. Select from the drop-down list.	RFC2684 – routed RFC2684 – bridged PPPoE PPPoA IPoA
	Multiplex	Header to identify the protocol that Virtual Circuit being carrying. LLC: Logical Link Control Multiplexing VCMUX : VC-based Multiplexing Select from the drop-down list.	LLC VCMUX
	QoS type	Quality of Services UBR: Unspecified Bit Rate. CBR: Constant Bit Rate. VBR: Variable Bit Rate. VBR-rt: Real-Time Variable Bit Rate.6000 Select from the drop-down list.	UBR CBR VBR VBR-rt
	Peak Cell Rate(PCR)	The maximum transmission rate.	0 – 9999 [Default:5424]
	Sustained Cell Rate(SCR)	The Transmission rate in burst traffic.	0 - 9999[Default:0]
	Maximum Burst Size(MBS)	Maximum number of transmission cell at the peak rate.	0 - 9999[Default:0]
WAN OPTION	Local IP Address	The WAN local IP Address of router.	xxx.xxx.xxx.xxx [Default:0.0.0.0]
	Subnet Mask	The WAN local IP subnet mask of router.	xxx.xxx.xxx.xxx [Default: 255.255.255.0]
	Peer IP Address	The WAN IP Address of paired LAN Extender/DSLAM.	xxx.xxx.xxx.xxx [Default: 0.0.0.0]
	NAT	Enable Network Address Translation (NAT) if you want all system behind the LAN sharing a single local IP address of this channel	Enable/Disable
	IP version	Select IP version for ATM Channel	IPv4 or IPv4/IPv6
PPP OPTION	Username	ISP login user name, given by ISP. It is set for the encapsulation type of PPPoE or PPPoA	User defined
	Password	ISP login password, given by ISP. It is set for the encapsulation type of PPPoE or PPPoA	User defined

	Default route	Enable this if you want all un-defined IP traffic to go outside via this channel. Enable default Route if you design your device as a gateway.	Enable/Disable
	MTU	Maximum Transmit Unit in bytes over PPP link	64-1500 [Default:1492]

After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.3.5 DSL Configuration

This menu item allows user to configure DSL Interface of LAN Extender.

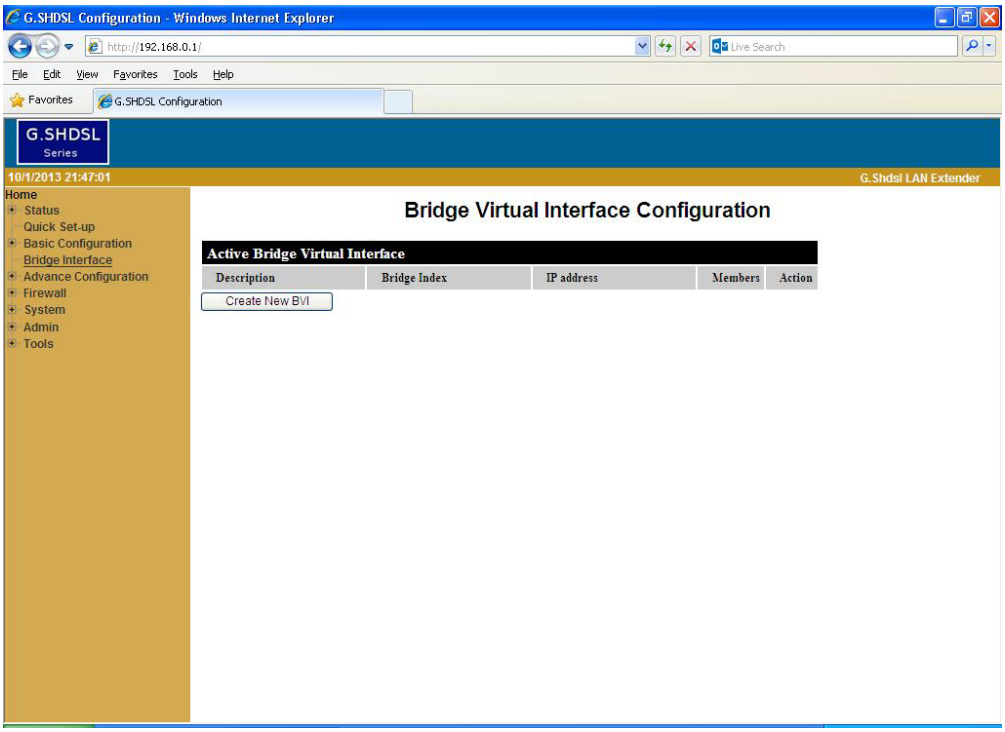


Item	Field Name	Description	Value
PARAMETERS	Service Type	DSL operation service. System can be operated as RT/2wires, CO/2wire. Select from the drop-down list.	CO/2wires or RT/2wires [Default: RT/2wires]
	Standard Type	Physical standard mode. Select from the drop-down list. DSL Standard type must be same for both paired LAN Extenders.	annex-A(ANSI) annex-B(ETSI) annex-AB [Default: annex-B]
	Data Mode	Data transfer rate mode. DSL data mode must be same for both paired LAN Extenders.	Adaptive Fixed [Default: Adaptive]
	Data Min Rate	DSL data speed negotiation. The Data rate negotiation both min & max applied must be same for Fixed data mode	Adaptive: 64~5696 kbps Fixed: 64 ~ 5696 kbps [Default: 64 kbps]
	Data Max Rate	DSL data speed negotiation. The Data rate negotiation both min & max applied must be same for Fixed data mode	Adaptive: 64 ~5696 kbps Fixed: 64 ~ 5696 kbps [Default: 2304kbps]
	DSL Mode	Select DSL physical line mode DSL mode must be same for both paired LAN Extenders.	atm-mode efm-mode ptm-mode auto-mode [Default: atm-mode]

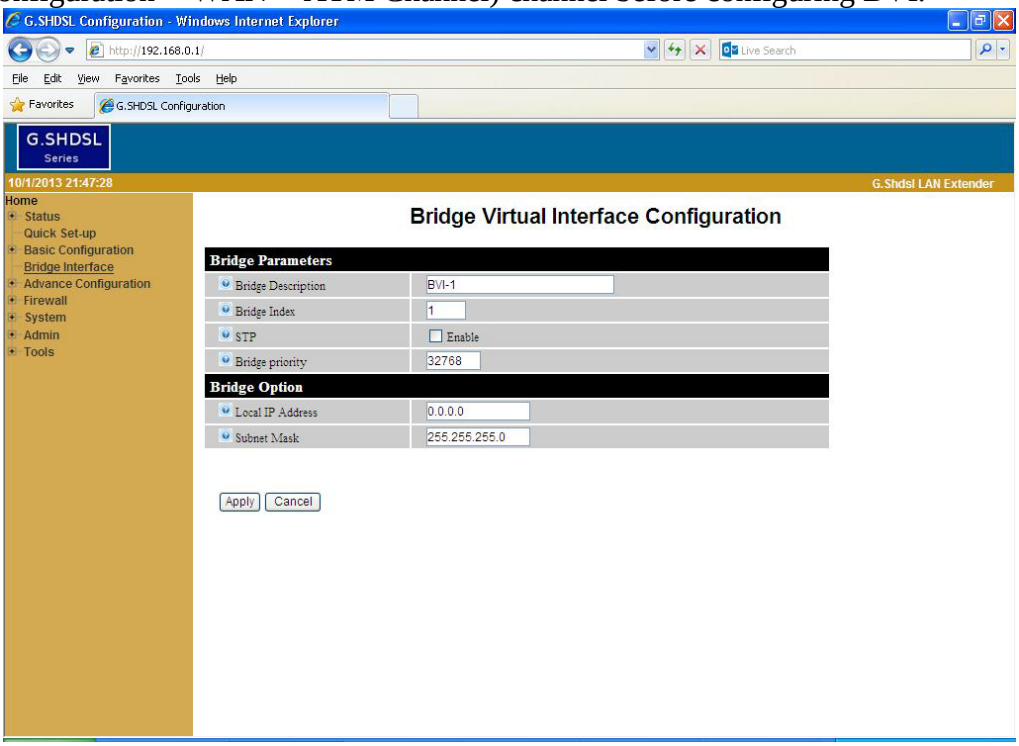
After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.4 Bridge Virtual Interface Configuration

If you set RFC2684-bridged encapsulation in WAN configuration, you need to create BVI interface and add both LAN and ATM VC into that BVI, it means you create a Bridge for LAN and ATM channel.



To create and configure new BVI Channels click on ‘Create New BVI’.
Note that User needs to configure LAN (Basic Configuration>>LAN>>Configuration) & ATM (Basic Configuration>>WAN>>ATM Channel) channel before configuring BVI.

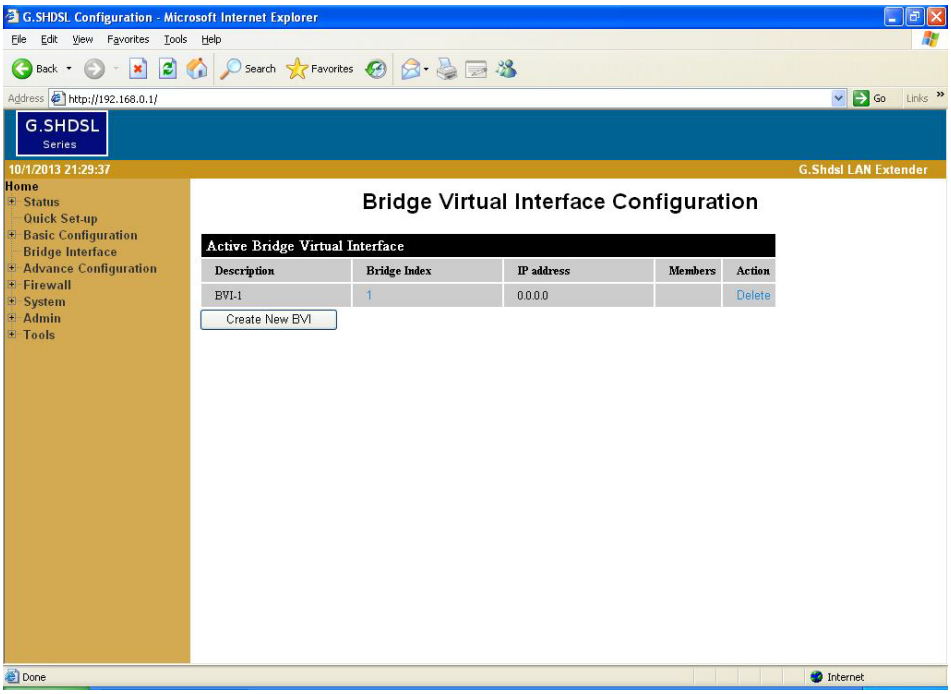


The details of the items are described in the table below:

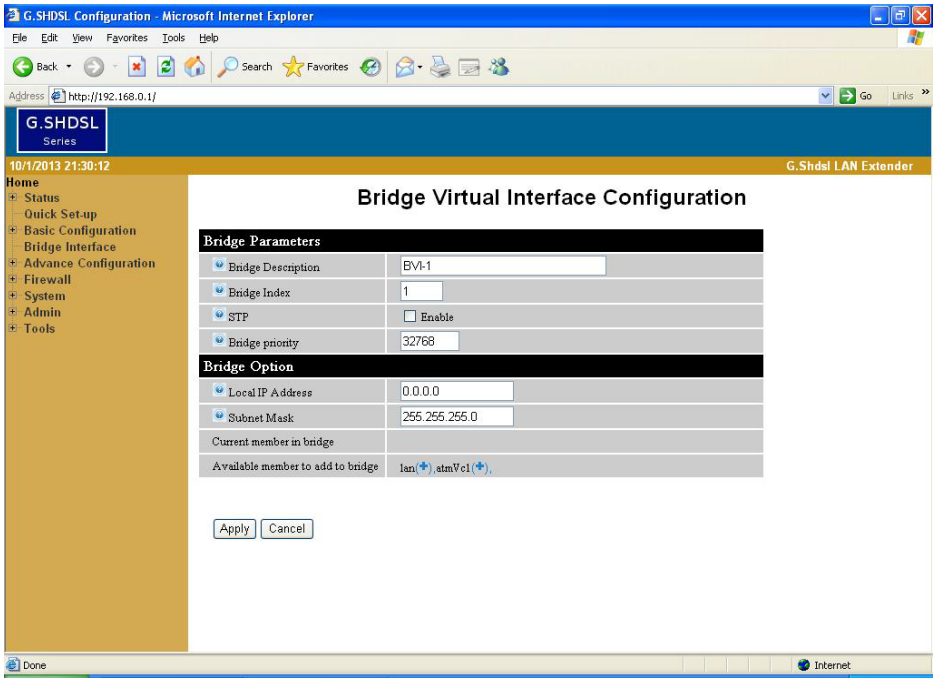
Item	Field Name	Description	Value
BRIDGE PARAMETERS	Bridge Description	Specify the description of interface. The description must be one word, no space in between.	[User/System defined] Default: BVI-1
	Bridge Index	The numeric index of creation	1-11 [Read only]
	STP	Spanning Tree Protocol	Enable / Disable [Default:Disable]
	Bridge priority	Bridge priority of STP	0-65535 [Default: 32768]
BRIDGE OPTION	Local IP Address	IPv4 address format.	xxx.xxx.xxx.xxx [Default: 0.0.0.0]
	Subnet Mask	Subnet mask IP address and divides the IP address into network address and host	xxx.xxx.xxx.xxx [Default: 255.255.255.0]

After configuring menu item, click the “Apply” button for configuration to be effective.

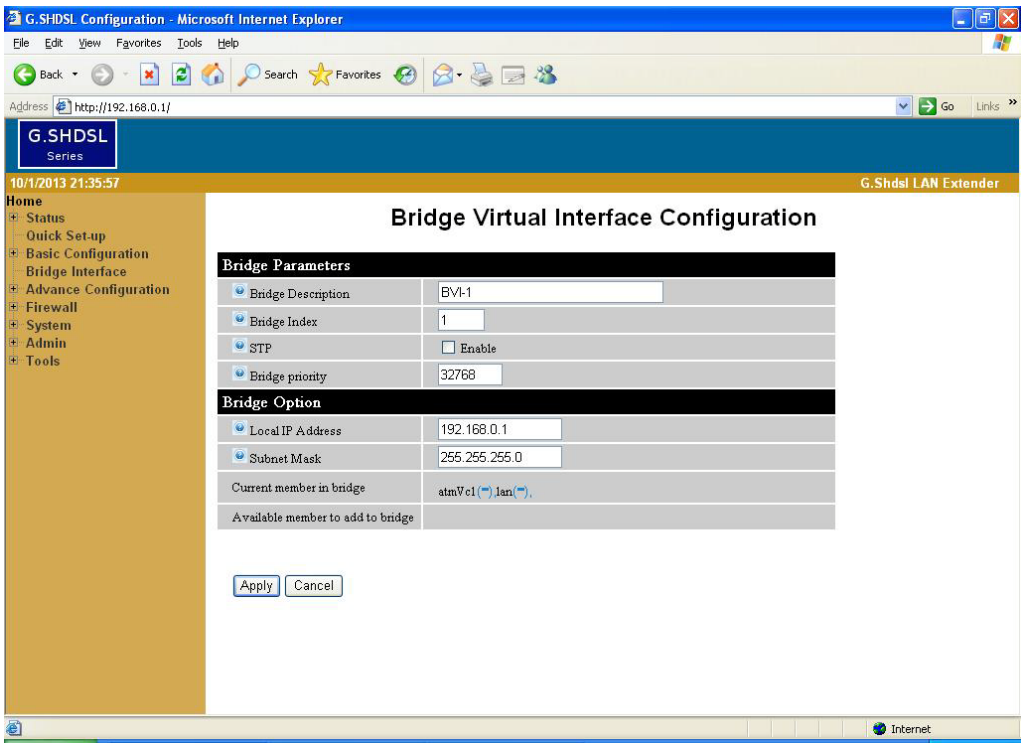
On creating new BVI, click on Bridge Index number (e.g. Bridge Index ‘1’)



Click on lan(+) & atm Vc1(+) (On ‘Available member to add to bridge’ item) separately, to add the interfaces to BVI.



If Interfaces have been successfully added to BVI, they will be shown in item ‘Current member in bridge’



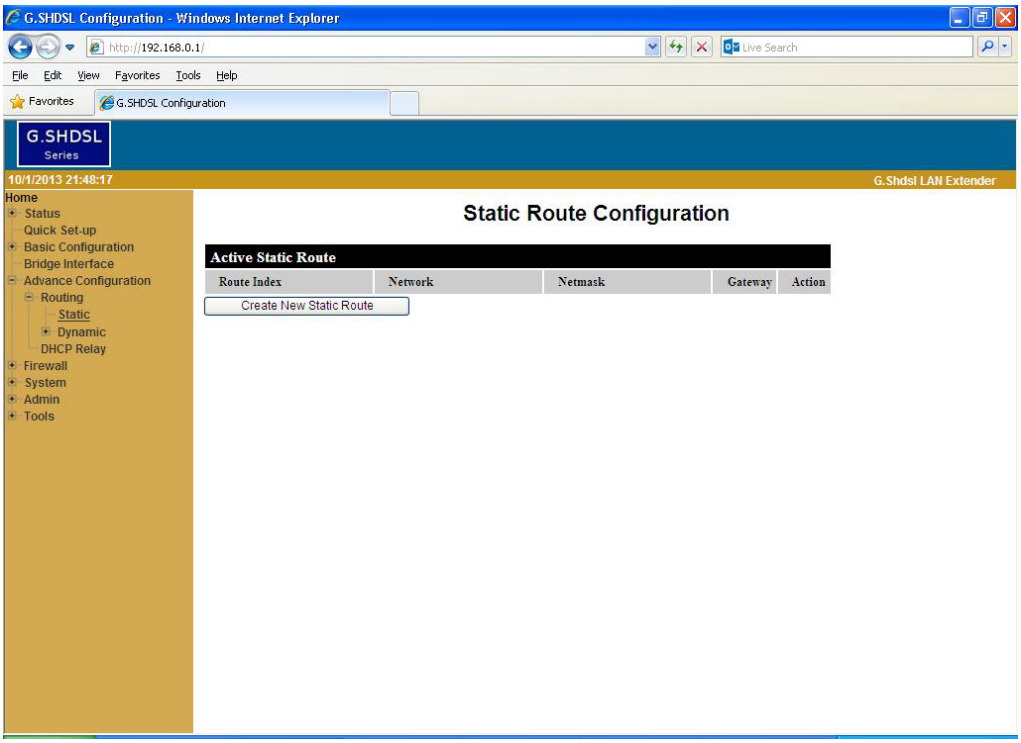
Click on lan(-) & atm Vc1(-) (On ‘Current member in bridge’ item) separately, incase interfaces need to be removed from BVI.

4.2.5 Advance Configuration

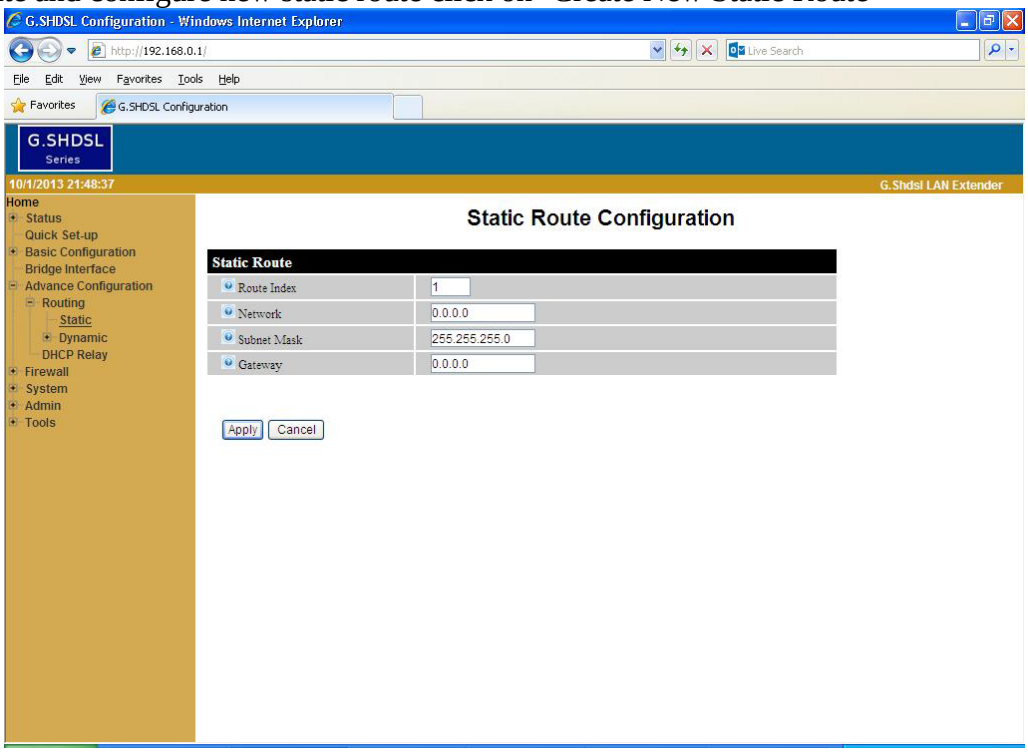
4.2.5.1Routing

This menu item allows user to configure static or dynamic routing for LAN Extender.

4.2.5.1.1 Static Route configuration



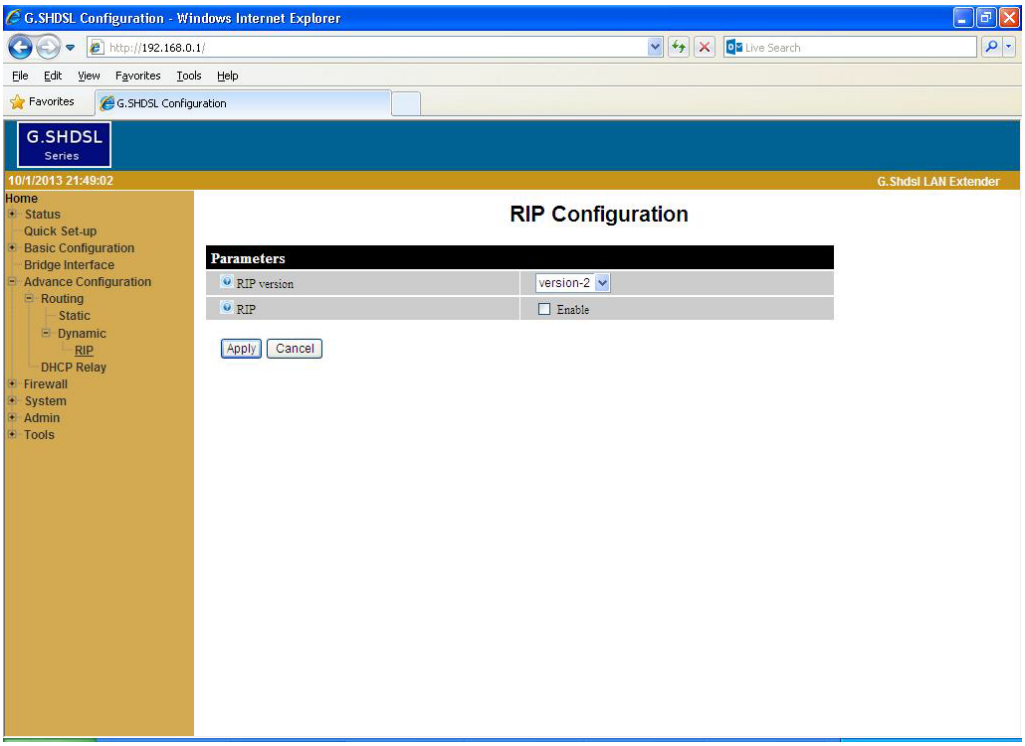
To create and configure new static route click on ‘Create New Static Route’



Item	Field Name	Description	Value
STATIC ROUTE	Route Index	The numeric index of creation	1-49 [Read only]
	Network	The destination IPv4 network address for which route needs to be added	xxx.xxx.xxx.xxx [Default:0.0.0.0]
	Subnet Mask	The Subnet Mask for the network configured in the static routing table	xxx.xxx.xxx.xxx [Default:255.255.255.0]
	Gateway	The IPv4 address of WAN interface of paired LAN Extender / Gateway	xxx.xxx.xxx.xxx [Default:0.0.0.0]

After configuring menu item, click the “Apply” button for configuration to be effective.

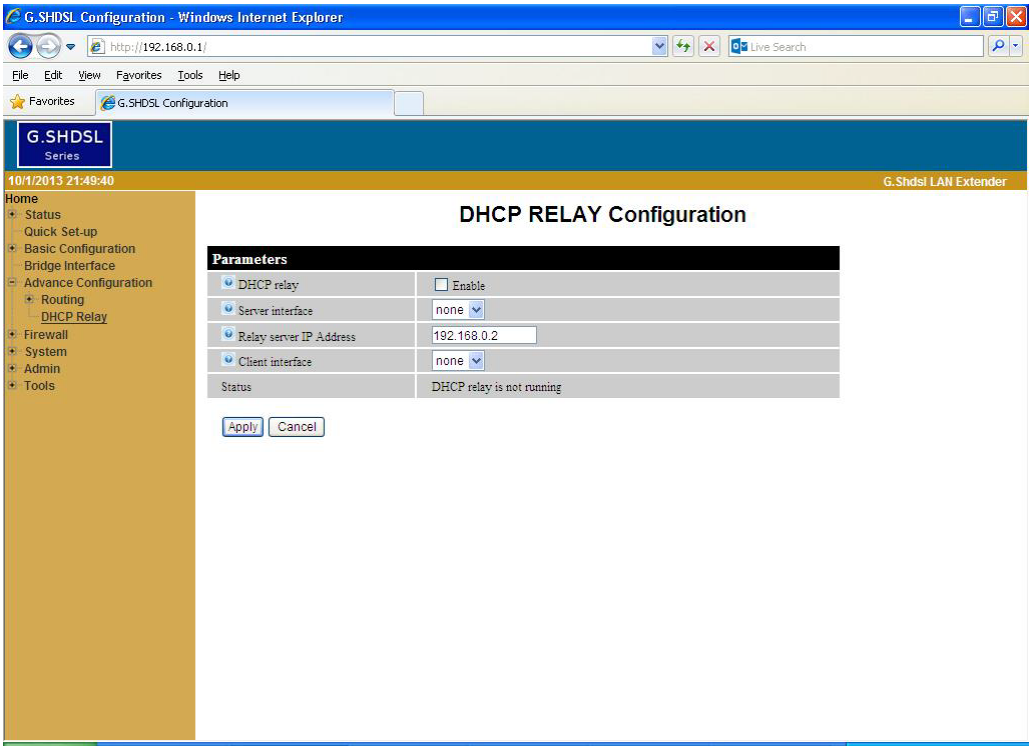
4.2.5.1.2 Dynamic Route Configuration >> RIP Configuration



Item	Field Name	Description	Value
PARAMETERS	RIP version	RIP version determines the format and broadcasting method of any RIP transmissions by the device	version-1 version-2 [Default: version-2]
	RIP	With Dynamic Routing, you can enable device to automatically adjust to physical changes in the network's topology.	Enable/Disable [Default: Disable]

After configuring menu item, click the "Apply" button for configuration to be effective.

4.2.5.2 DHCP Relay Configuration



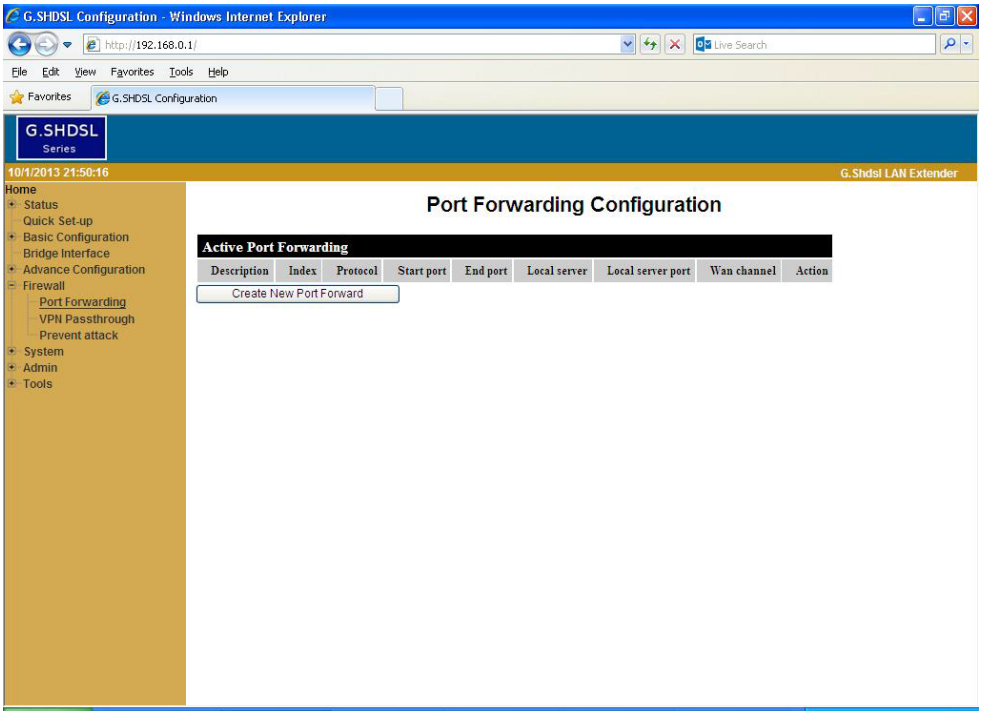
Item	Field Name	Description	Value
PARAMETERS	DHCP relay	Enable / Disable DHCP relay feature	Enable / Disable [Default: Disable]
	Server interface	The interface that the remote DHCP server is connected	None LAN atmVc1 [Default:None]
	Relay server IP Address	IP address of remote DHCP server that Router will forward client request.	xxx.xxx.xxx.xxx [Default: 192.168.0.2]
	Client interface	The interface that listens to DHCP client requests	None LAN atmVc1 [Default: None]
	Status	Status of DHCP relay	Running/Not running [Default: Not running]

After configuring menu item, click the “Apply” button for configuration to be effective.

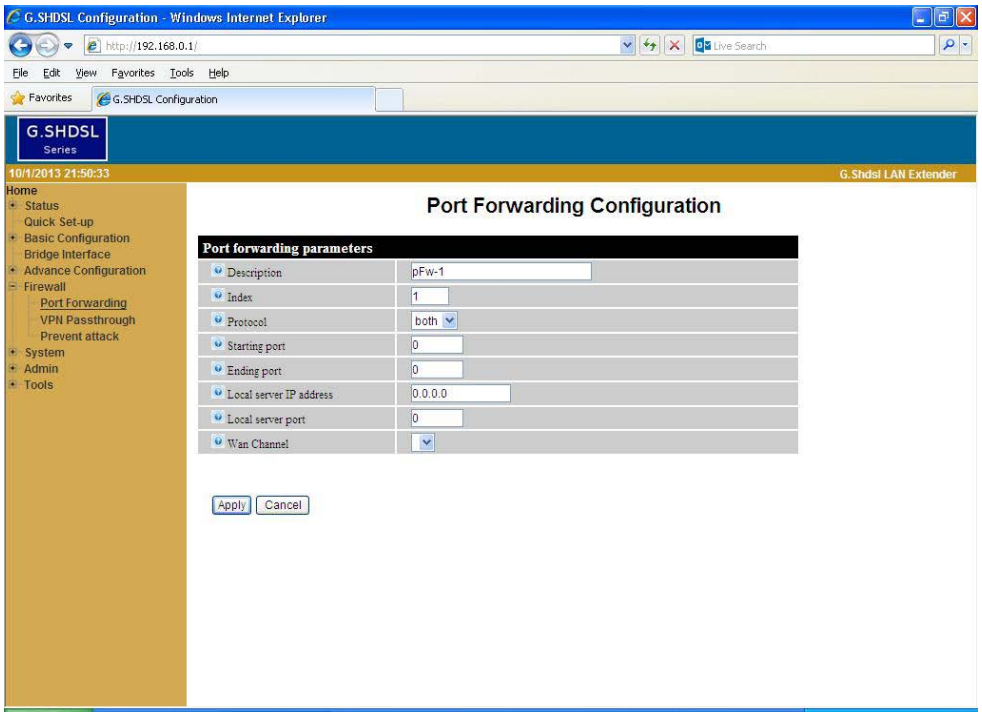
4.2.6 Firewall

Firewall menu item allows user to configure Port Forwarding, VPN Passthrough & Prevent attack features.

4.2.6.1 Port Forwarding



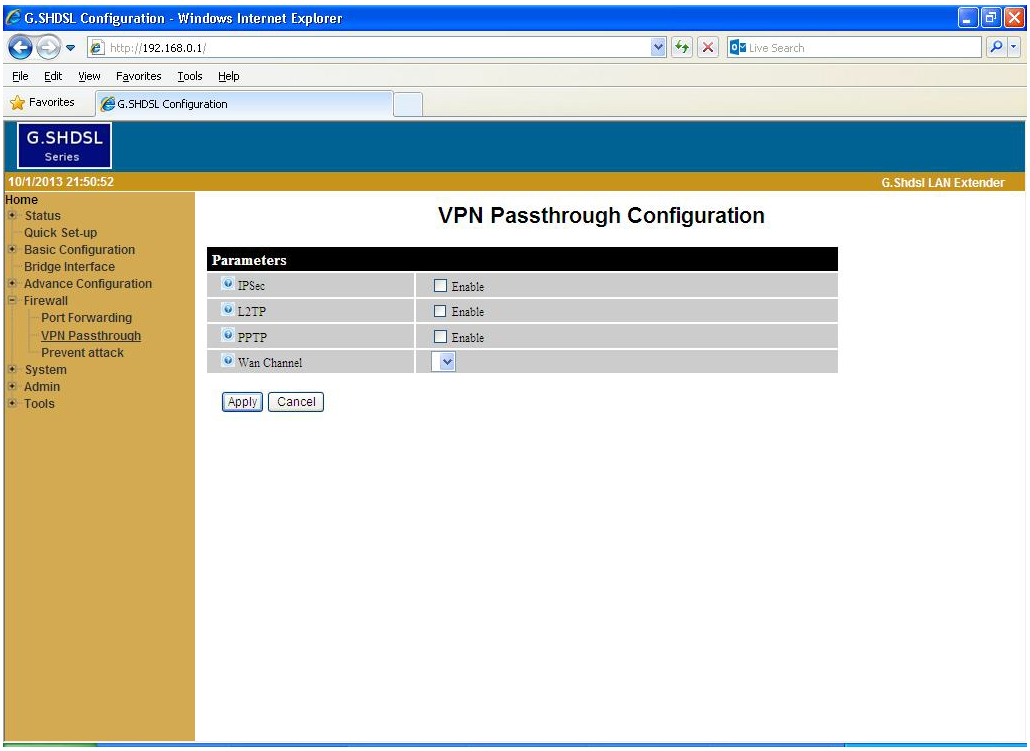
To create and configure new Port forward settings, click on ‘Create New Port Forward’



Item	Field Name	Description	Value
PORT FORWARDING PARAMETERS	Description	The designated port forwarding alias	User defined [Default: pFW-1]
	Index	Designated port forwarding sequence	[Read only]
	Protocol	Designated port forwarding the use of agreement	TCP UDP Both [Default: both]
	Starting port	The start of the designated port forwarding number	1-65535 [User defined]
	Ending port	The end of the designated port forwarding number	1-65535 [User defined]
	Local server IP address	Designated local server IP address	xxx.xxx.xxx.xxx [Default: 0.0.0.0]
	Local server port	Designated local server port number	1-65535 [User defined]
	WAN channel	Designated port forwarding WAN channel. Select option from drop down list.	[User defined]

After configuring menu item, click the “Apply” button for configuration to be effective.

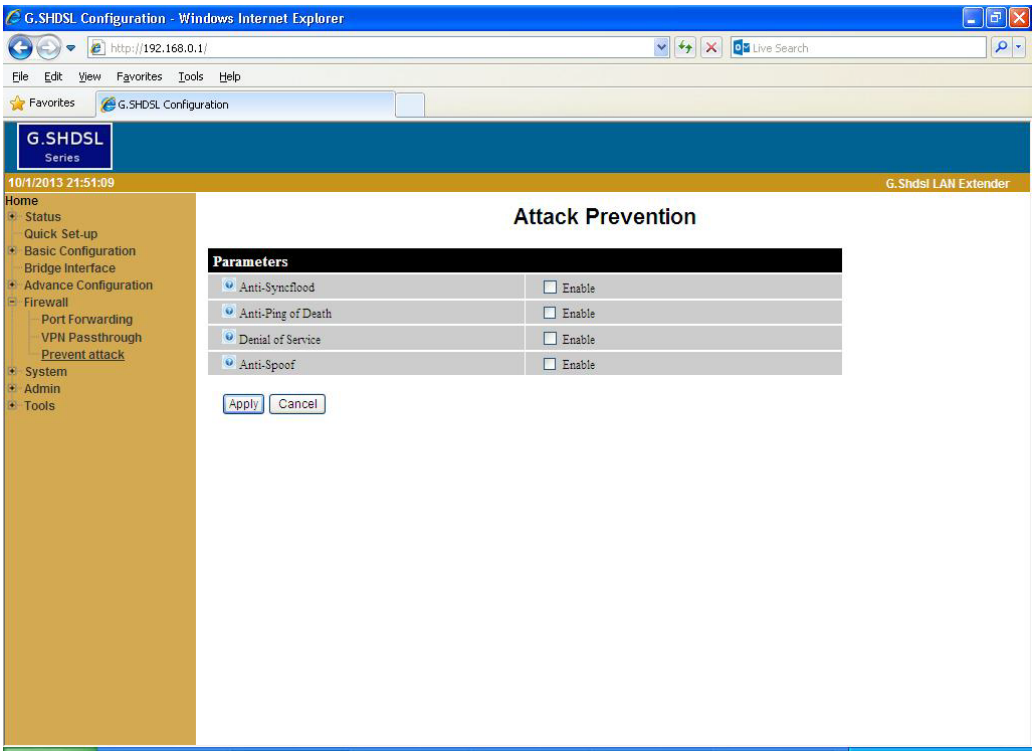
4.2.6.2 VPN Passthrough



Item	Field Name	Description	Value
PARAMETERS	IPSec	Enable / Disable use of internet protocol security	Enable / Disable
	L2TP	Enable / Disable use of Layer 2 Tunneling Protocol	Enable / Disable
	PPTP	Enable / Disable use of point to point tunneling protocol	Enable / Disable
	Wan channel	Designated WAN channel for VPN Passthrough. Select option from drop down list.	[User defined]

After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.6.3 Attack Prevention



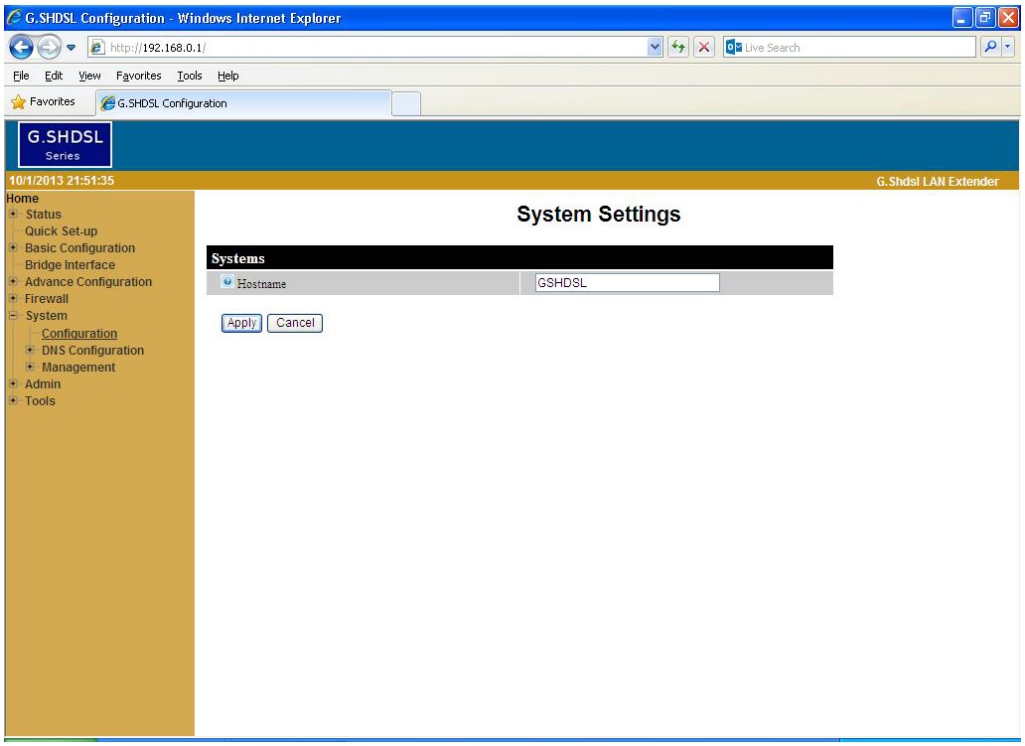
Item	Field Name	Description	Value
PARAMETERS	Anti-Syncflood	Prevent anti-syncflood	Enable / Disable
	Anti-Ping of Death	Prevent anti-ping of death	Enable / Disable
	Denial Service	Prevent denial of service attack	Enable / Disable
	Anti-Spoof	Prevent anti-spoof	Enable / Disable

After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.7 System

This menu item allows user to configure System settings, DNS Configuration along with management features TR069 & SNMP

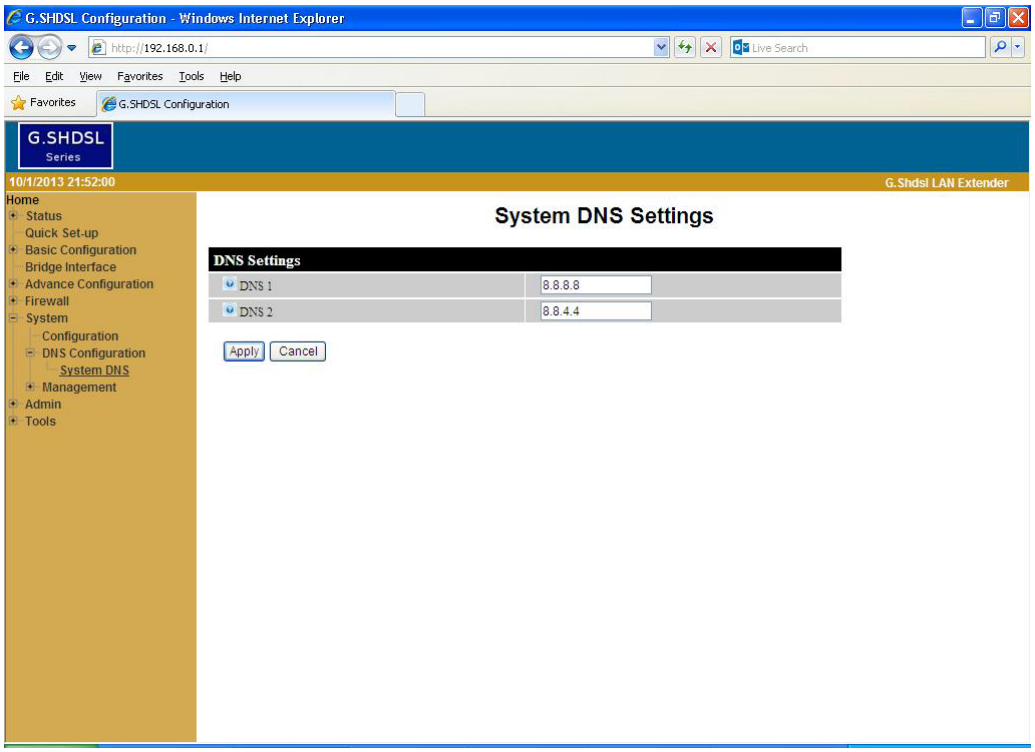
4.2.7.1 System settings



Item	Field Name	Description	Value
SYSTEMS	Hostname	Specify a hostname for LAN Extender	[User defined] [Default: GSHDSL]

After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.7.2 DNS Configuration >> System DNS



Item	Field Name	Description	Value
DNS SETTINGS	DNS1	Specify the remote Domain Name Server address	xxx.xxx.xxx.xxx [Default: 8.8.8.8]
	DNS2		xxx.xxx.xxx.xxx [Default: 8.8.4.4]

After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.7.3 Management

4.2.7.3.1 TR069

TR-069 (shortform for Technical Report 069) is a DSL Forum (which was later renamed as Broadband Forum) technical specification entitled CPE WAN Management Protocol (CWMP). It defines an application layer protocol for remote management of end-user devices.

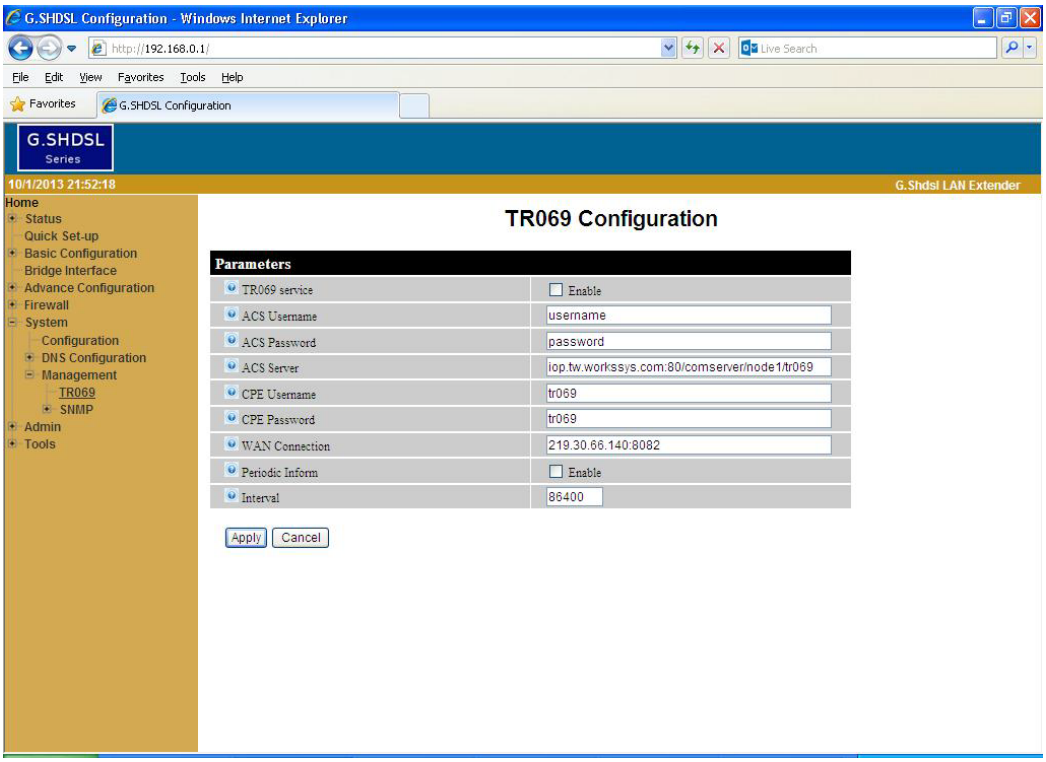
As a bidirectional SOAP/HTTP based protocol it provides the communication between customer-premises equipment (CPE) and Auto Configuration Servers (ACS). It includes both a safe auto configuration and the control of other CPE management functions within an integrated framework.

Using TR-069 the terminals can get in contact with the Auto Configuration Servers (ACS) and establish the configuration automatically. Accordingly other service functions can be provided. TR-069 is the current standard for activation of terminals in the range of DSL Products.

Functions supported by TR-069:

- ❖ Auto configuration and dynamic service activation
  - · Initial CPE configuration
  - · Remote CPE configuration
- ❖ Firmware management
  - · Version management
  - · Update management
- ❖ Status and performance control
  - · Logfile analysis and dynamic messages
  - · Diagnostics
  - · Connectivity and service control.

LAN Extender can access ACS automatically and send periodic information with the interval time configured by customer. ACS can get detailed information of LAN Extender such as the hardware version, the software version and so on. User may presently have access to most functions for ‘get’ & limited functions/parameter for ‘set’.



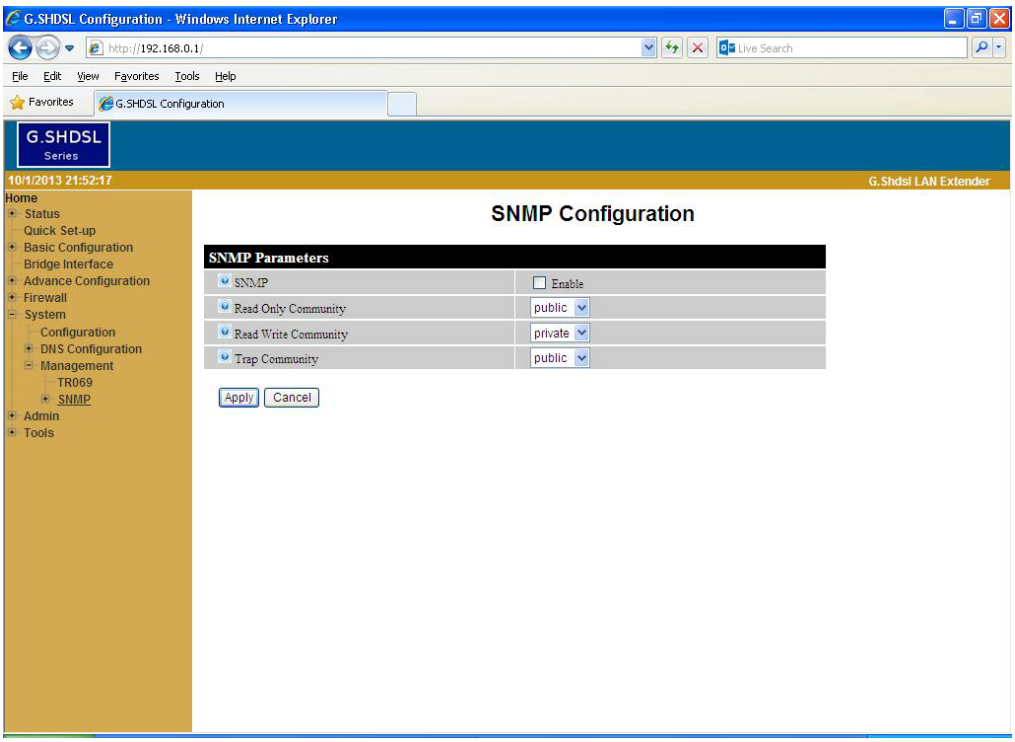
Item	Field Name	Description	Value
PARAM-ETERS	TR069 service	Enable/Disable TR069 functionality	Enable/Disable [Default:Disable]
	ACS Username	Username used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol.	[User Defined]
	ACS Password	Password used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol.	[User Defined]
	ACS Server	URL, for the CPE to connect to the ACS using the CPE WAN Management Protocol. The parameter must be in the form of a valid HTTP or HTTPS URL.	e.g.'http://192.168.1.57:8080/dps/TR069'sss [User Defined]
	CPE Username	Username used to authenticate an ACS making a Connection Request to the CPE.	[User Defined]
	CPE Password	CPE password to be authenticated	[User Defined]
	WAN Connection	The parameter must be in the form IP: PORT. The IP address and the PORT are used for the connection between CPE and ACS. ACS can access to CPE using the CPE WAN Management. Protocol through the	xxx.xxx.xxx.xxx:y e.g. '219.30.66.140:8082'

		IP and the PORT. The IP must be an external IP.	
	Periodic Inform	Enable / Disable if CPE must periodically send CPE information to the ACS using the Inform method call.	Disable / Enable [Default: Disable]
	Interval	The duration in seconds of the interval for which the CPE must attempt to connect with the ACS if Periodic Inform is enabled	1 – 86400s

After configuring, click the “Apply” button to save the configuration

4.2.7.3.2 SNMP & TRAP

Simple Network Management Protocol (SNMP) is an Internet-standard protocol for managing devices on IP networks.



Item	Field Name	Description	Value
SNMP PARAMETERS	SNMP	Enable/Disable SNMP functionality	Enable / Disable
	Read Only Community	Read Only community	Public / Private
	Read Write Community	Read and Write community	Public / Private
	Trap Community	Trap community	Public / Private

To configure the SNMP, go through the following steps.

- Click the button to **Enable** or **Disable** SNMP management.

Community

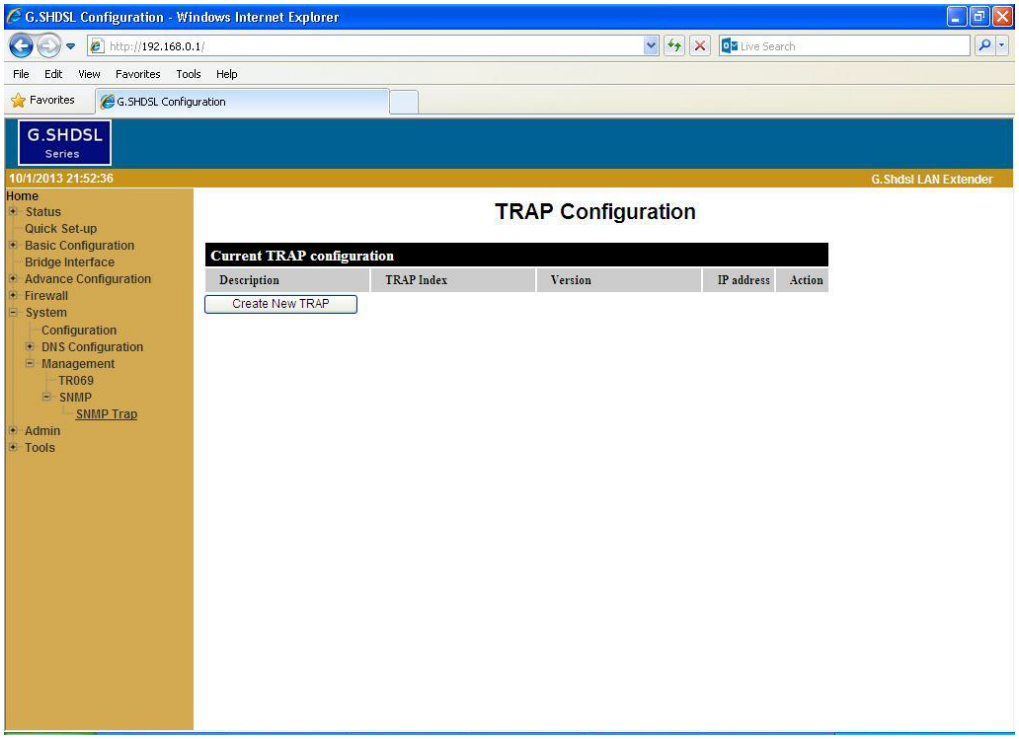
Read-Only Community:

- Specify the community name of external SNMP Managers allowed with access level of "Read" to the unit's MIB.

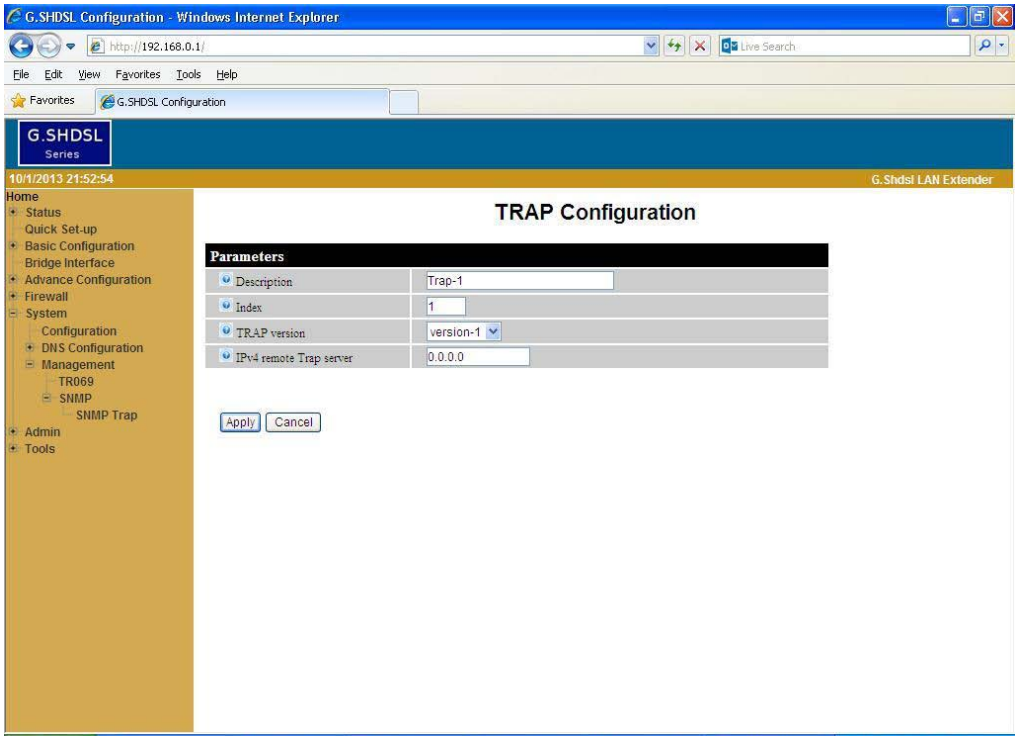
Read-Write Community:

- Specify the community name of external SNMP Managers allowed with access level of "Read & write" to the unit's MIB.

SNMP Trap



To create and configure new TRAP, click on ‘Create New TRAP’



Item	Field Name	Description	Value
PARAMETERS	Description	Set a description name	[User defined]
	Index	Designated sequence	[Read-only]

	TRAP version	Select TRAP version	Version-1 Version-2 [Default: Version-1]
	IPv4 remote Trap server	Set remote trap server IP address	xxx.xxx.xxx.xxx [User defined]

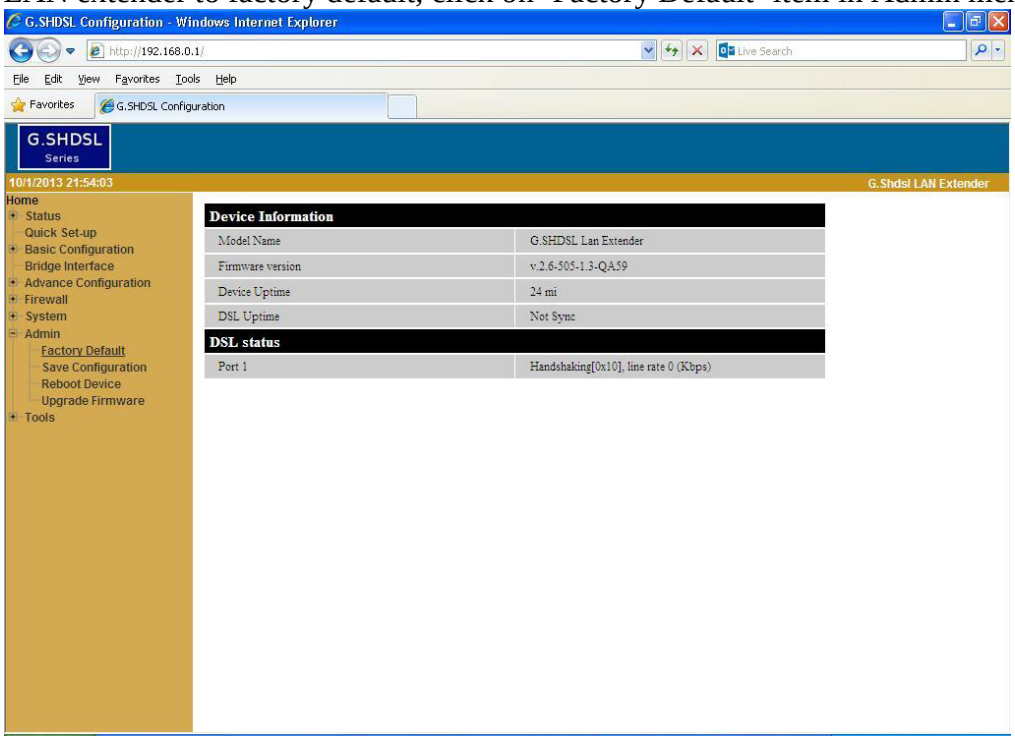
After configuring menu item, click the “Apply” button for configuration to be effective.

4.2.8 Admin

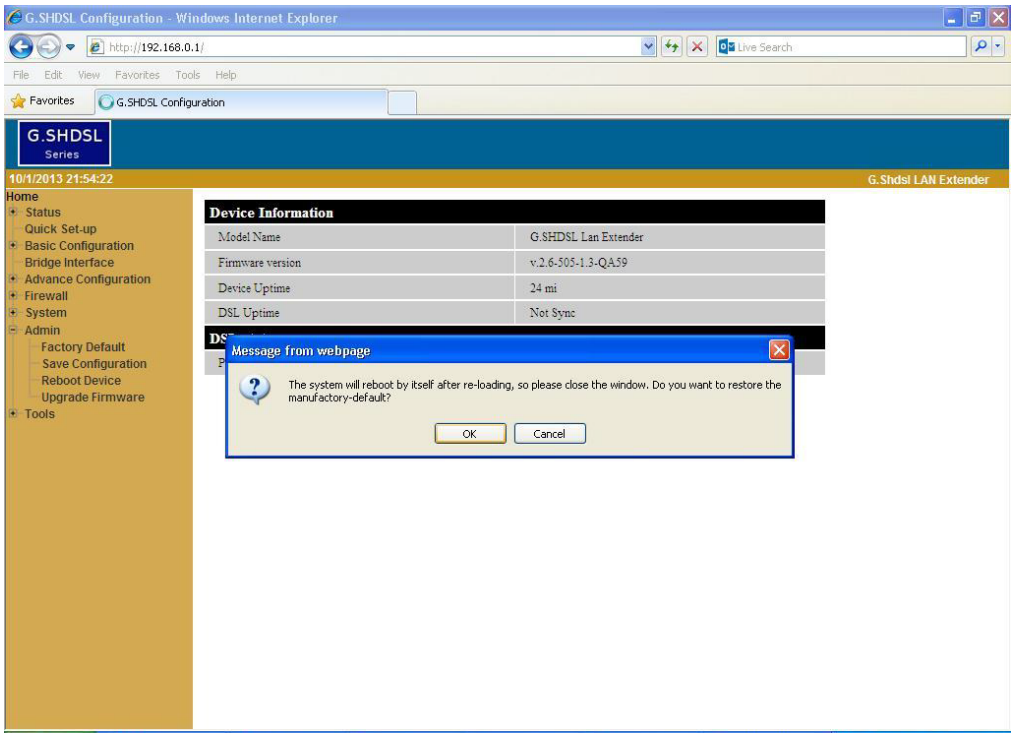
Admin menu item allows user to set unit to factory default, saving device parameters, Rebooting device & upgrading firmware for unit.

4.2.8.1 Factory Default

1. To set LAN extender to factory default, click on ‘Factory Default’ item in Admin menu.

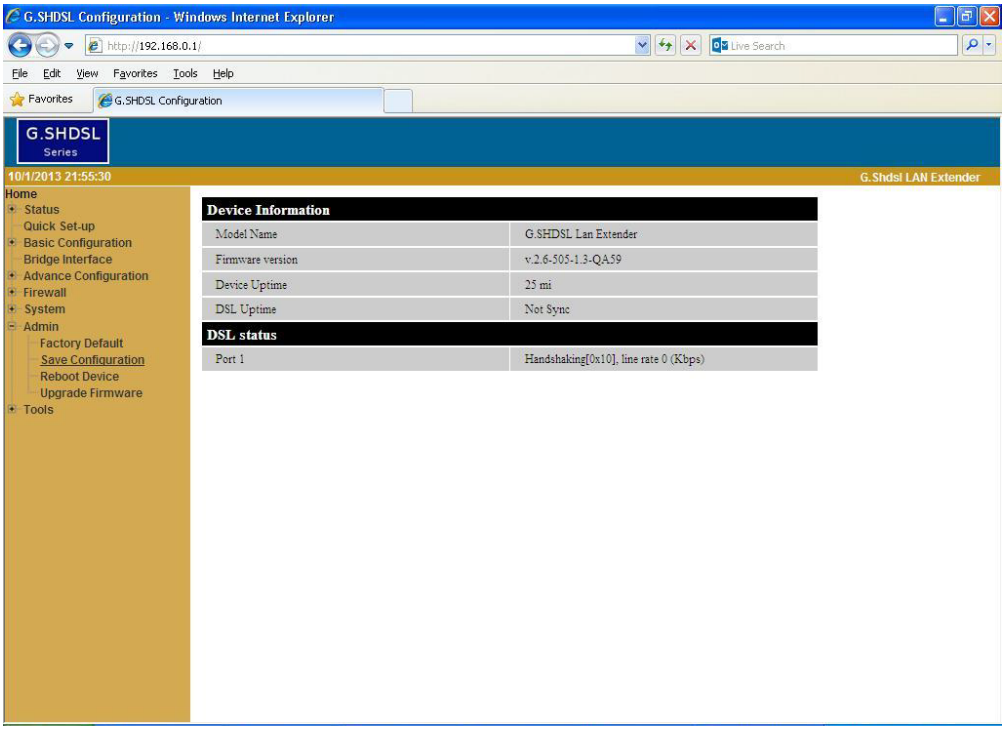


2. Click on ‘OK’ to confirm Factory default or ‘Cancel’ to abort command.

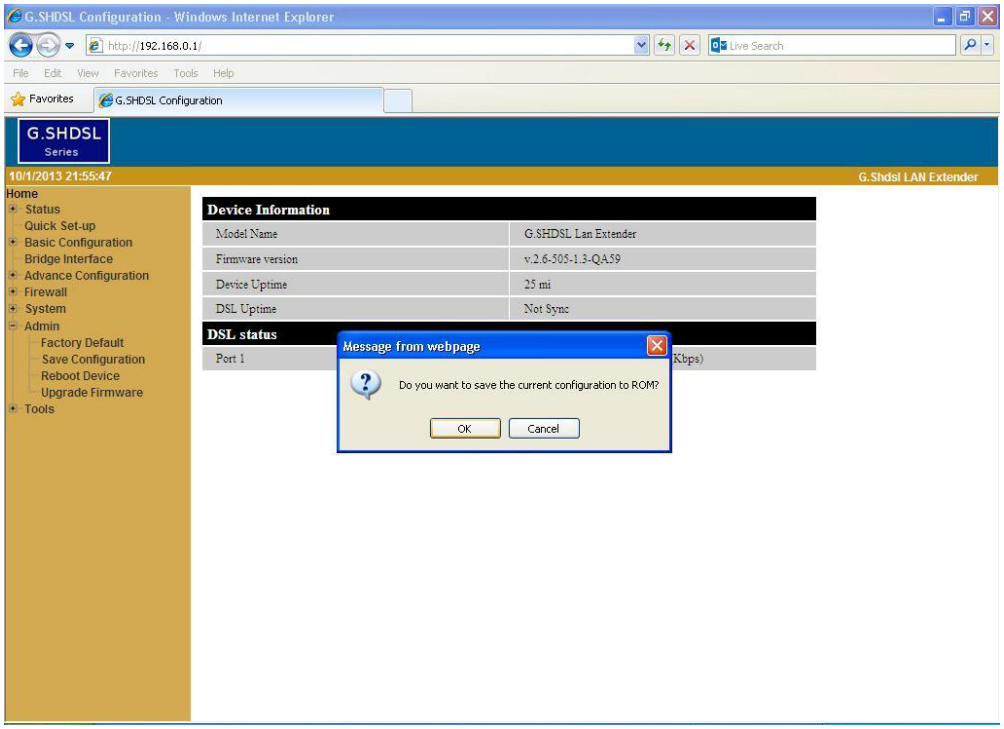


4.2.8.2 Save Configuration

1. To save all parameter set by user, click on ‘Save Configuration’ item in Admin menu.

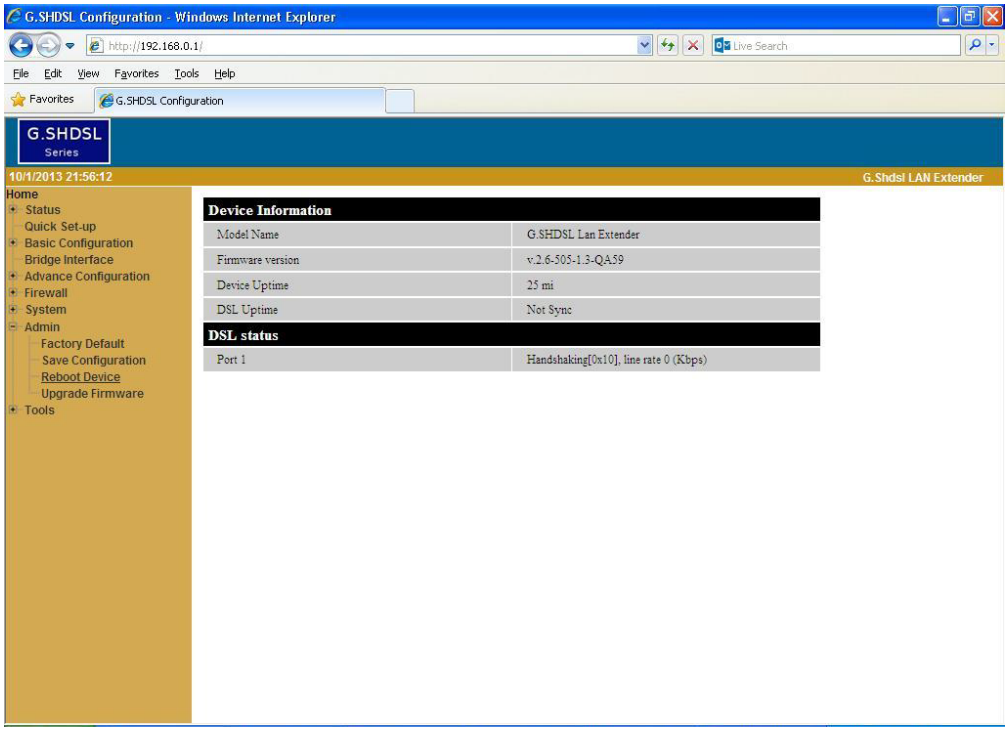


2. Click on ‘OK’ to save or ‘Cancel’ to abort command.

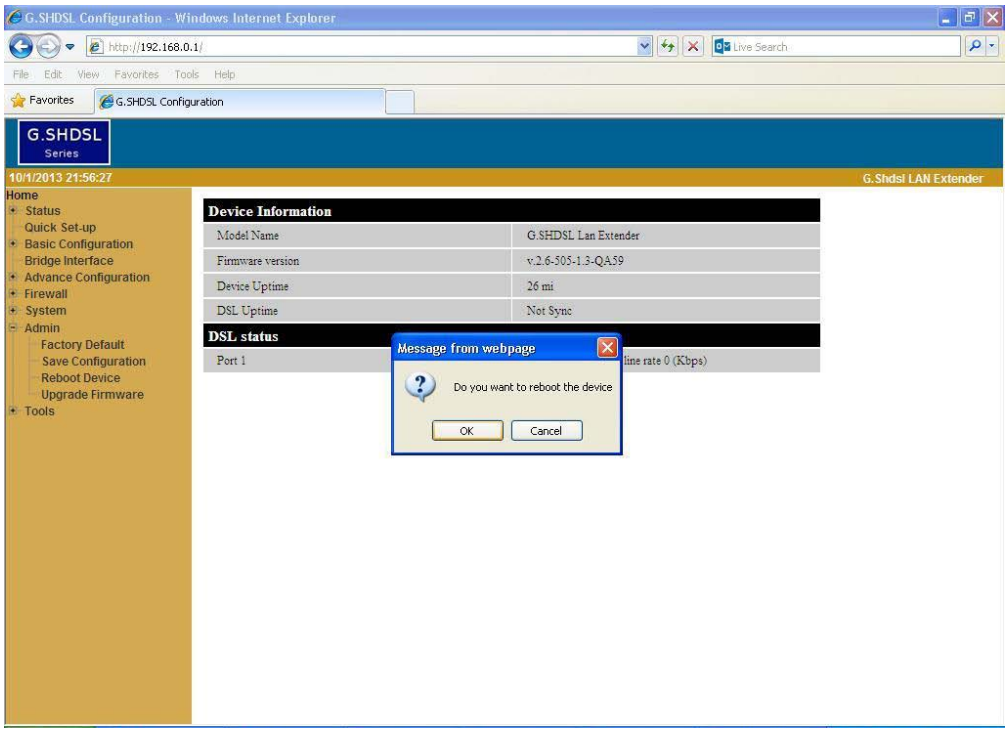


4.2.8.3 Reboot

1. To reboot LAN extender, click on ‘Reboot’ item in Admin menu.



2. Click on ‘OK’ to reboot or ‘Cancel’ to abort command.



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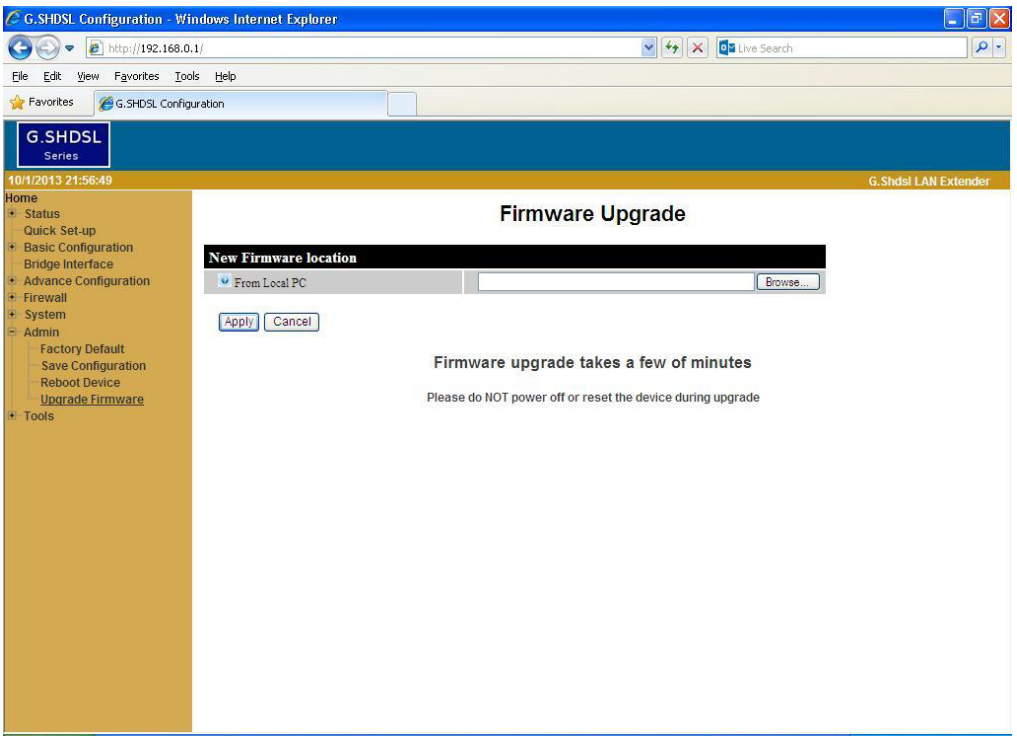
4.2.8.4 Firmware Upgrade

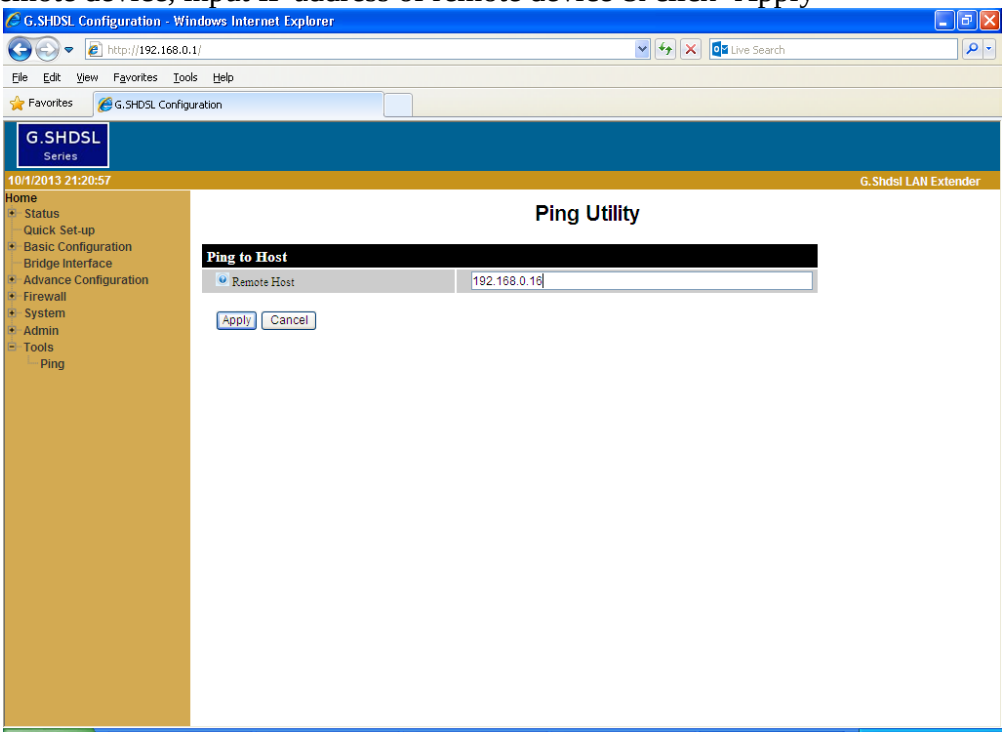
To upgrade firmware of LAN Extender, go to ‘Upgrade Firmware’ item in Admin menu. Browse to location where firmware file is stored & click ‘Apply’ for firmware update to begin.
Kindly note that upgrading the unit with the wrong file would render LAN Extender faulty.



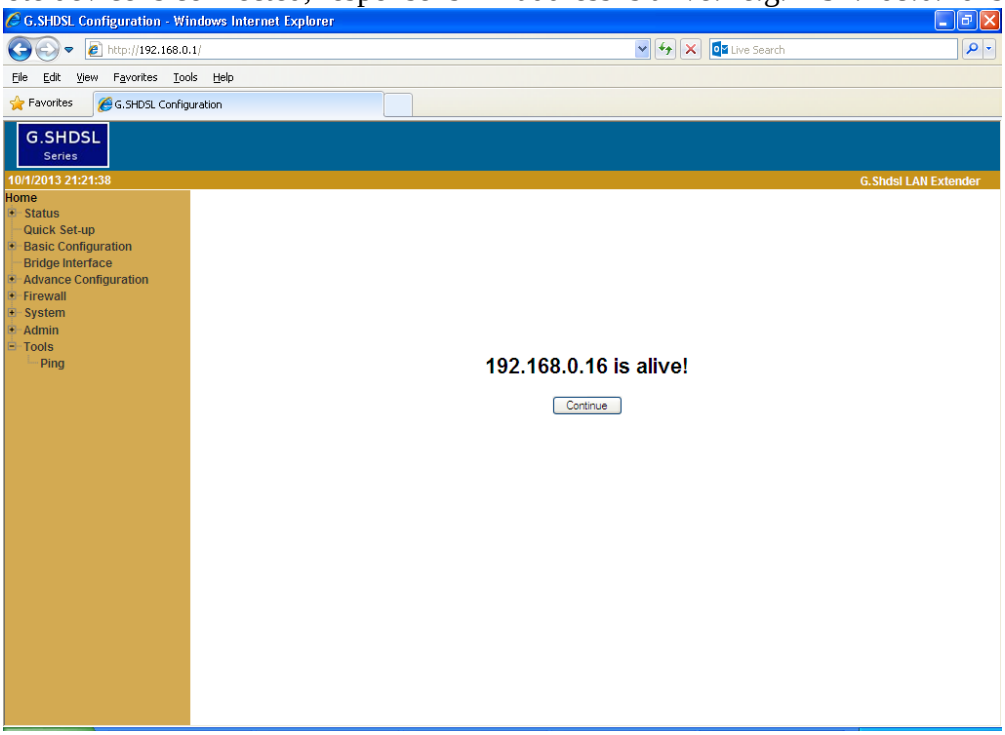
4.2.9 Tools

4.2.9.1 Ping

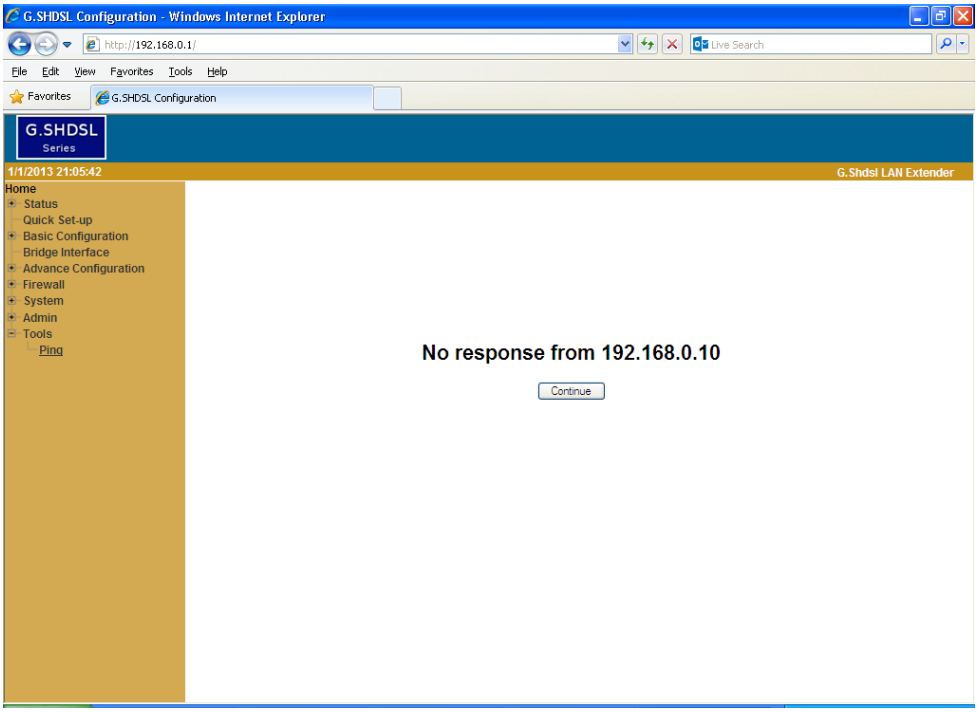
To ping remote device, input IP address of remote device & click ‘Apply’



If remote device is connected, response is ‘IP address is alive!’ e.g. ‘192.168.0.16 is alive!’.



If remote device in not connected, response is ‘No response from IP address’ e.g. ‘No response from 192.168.0.10’

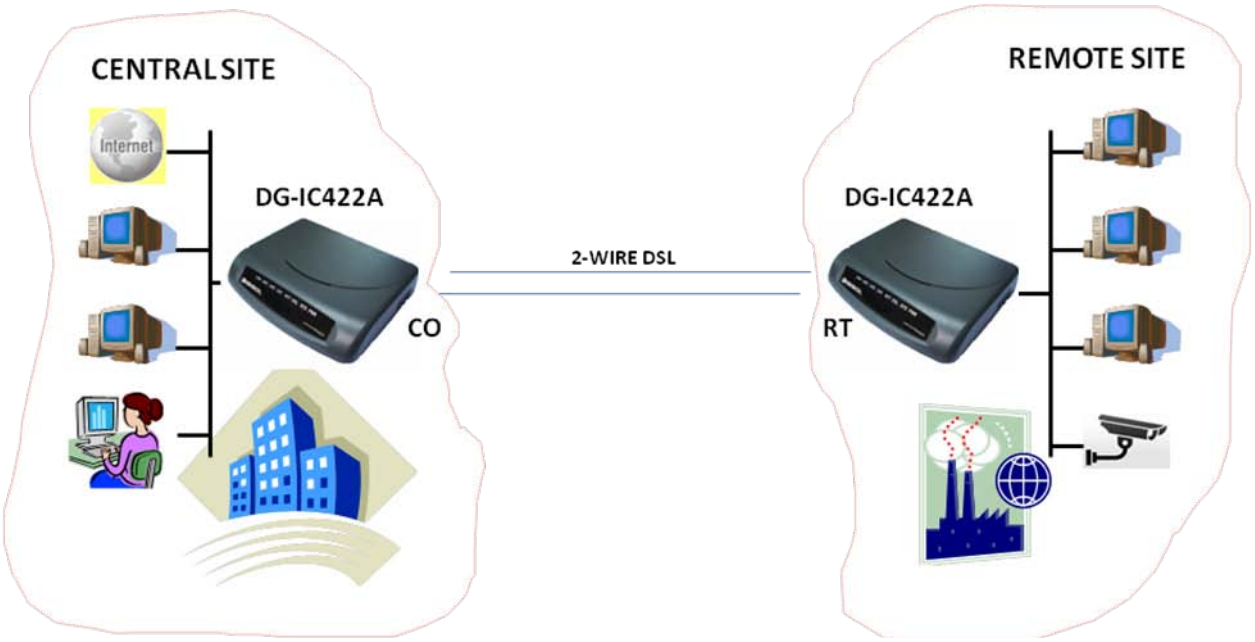


5. Typical Application

This chapter explains the typical applications of this device.

5.1 BRIDGE MODE

This typical application is used to extend the corporate LAN network from the central site to the remote site. User has to configure one unit as “CO” and second unit as “RT”. The device is configured in bridge mode since the central and remote sites are in same LAN IP class. Please follow the settings as shown below while configuring both the devices.



- Central Site LAN IP Range: 192.168.0.1 /24
- Remote Site LAN IP Range: 192.168.0.2 /24
- Note that IP addresses are in the same IP class in central site & remote site

CONFIGURATION THROUGH WEBPAGE

Refer the table below to configure the DG-IC422A devices for above application using Webpage:-

NOTE

Additional settings may have to be made on device depending on user application to make the setup work.
User is advised to put LAN Extender in Factory Default prior to configuring the Unit.

Menu item	DG-IC422A (CO)	DG-IC422A (RT)
Basic Configuration>>LAN>> Configuration	Parameters IPv4 Address: 192.168.0.1 Subnet Mask: 255.255.255.0 Click ‘Apply’	Parameters IPv4 Address: 192.168.0.2 Subnet Mask: 255.255.255.0 Click ‘Apply’

Basic Configuration>>LAN>> DHCP Server	Parameters DHCP Server: Disabled Click 'Apply'	Parameters DHCP Server: Disabled Click 'Apply'
Basic Configuration>>WAN>> ATM Channel>> Create new channel	Virtual Channel Parameters VPI: 0 VCI: 32 Encapsulation: RFC2684-bridged Click 'Apply'	Virtual Channel Parameters VPI: 0 VCI: 32 Encapsulation: RFC2684-bridged Click 'Apply'
Basic Configuration>> Bridge Interface>> Create new BVI	Bridge Parameters Bridge Description: BVI-1 Bridge priority: 32768 Click 'Apply' Active Bridge Virtual Interface Click '1' in Bridge Index Click 'lan(+)' and 'atmVc1(+)' in section. Available member to add to bridge: lan(+), atmVc1(+), Once LAN & ATM channel have been added to bridge they will be seen in section, Current member in bridge: lan(-), atmVc1(-),	Bridge Parameters Bridge Description: BVI-1 Bridge priority: 32768 Click 'Apply' Active Bridge Virtual Interface Click '1' in Bridge Index Click 'lan(+)' and 'atmVc1(+)' in section. Available member to add to bridge: lan(+), atmVc1(+), Once LAN & ATM channel have been added to bridge they will be seen in section, Current member in bridge: lan(-), atmVc1(-),
Basic Configuration>>DSL	Parameter Service Type: CO/2wires Standard Type: annex-A Data Mode: Adaptive Click 'Apply' NB: If user chooses Data Mode: Fixed - Data Rate Min & Max must be same.	Parameter Service Type: RT/2wires Standard Type: annex-A Data Mode: Adaptive Click 'Apply' NB: If user chooses Data Mode: Fixed - Data Rate Min & Max must be same.
Admin>>Save Configuration	Save Configuration	Save Configuration

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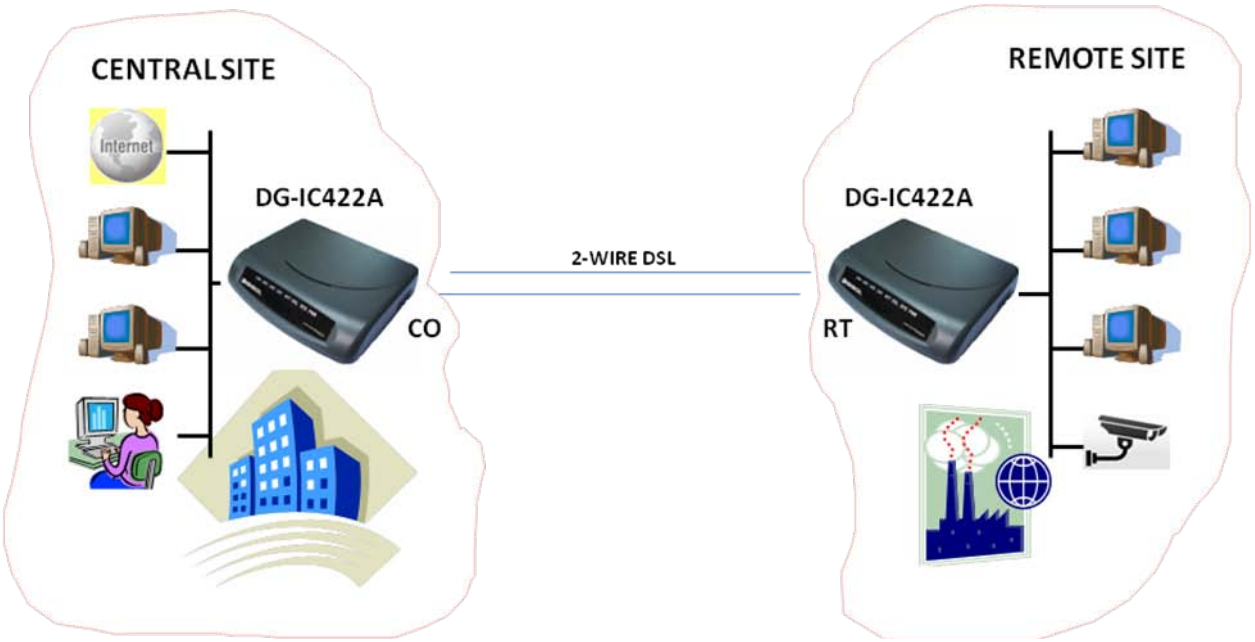
CONFIGURATION THROUGH CONSOLE

Refer the table below to configure the DG-IC422A devices for above application using Console:-

Menu	DG-IC422A (CO)	DG-IC422A (RT)
Login	GSHDSL> login root Password: admin GSHDSL#	GSHDSL> login root Password: admin GSHDSL#
Factory Default	GSHDSL# load default Do you want to load the factory configuration and system will reboot? [yes|no|cancel]: yes	GSHDSL# load default Do you want to load the factory configuration and system will reboot? [yes|no|cancel]: yes
Configure Ethernet	GSHDSL# config GSHDSL(config)# set ether GSHDSL(config-ether)# ipv4 192.168.0.1/24 GSHDSL(config-ether)# no dhcp-server enabled GSHDSL(config-ether)# commit -Commit successfully will appear on screen GSHDSL(config-ether)# ex GSHDSL(config)#	GSHDSL# config GSHDSL(config)# set ether GSHDSL(config-ether)# ipv4 192.168.0.2/24 GSHDSL(config-ether)# no dhcp-server enabled GSHDSL(config-ether)# commit -Commit successfully will appear on screen GSHDSL(config-ether)# ex GSHDSL(config)#
Configure ATM	GSHDSL(config)# set atm vc 1 GSHDSL(config-atm)# encapsulation rfc2684-br GSHDSL(config-atm)# vpi 0 vci 32 GSHDSL(config-atm)# commit -Commit successfully will appear on screen GSHDSL(config-atm)# ex	GSHDSL(config)# set atm vc 1 GSHDSL(config-atm)#encapsulation rfc2684-br GSHDSL(config-atm)# vpi 0 vci 32 GSHDSL(config-atm)# commit -Commit successfully will appear on screen GSHDSL(config-atm)# ex
Configure BVI	GSHDSL(config)# set bvi 1 GSHDSL(config-bvi)# add member atm vc 1 GSHDSL(config-bvi)# add member lan GSHDSL(config-bvi)# commit -Commit successfully will appear on screen GSHDSL(config-bvi)# ex GSHDSL(config)#	GSHDSL(config)# set bvi 1 GSHDSL(config-bvi)# add member atm vc 1 GSHDSL(config-bvi)# add member lan GSHDSL(config-bvi)# commit -Commit successfully will appear on screen GSHDSL(config-bvi)# ex GSHDSL(config)#
Configure DSL	GSHDSL(config)# set dsl GSHDSL(config-dsl)# data-mode adaptive GSHDSL(config-dsl)# data-rate min 1 max 89 GSHDSL(config-dsl)# service cot-2wires GSHDSL(config-dsl)# standard annex-A GSHDSL(config-dsl)# commit -Commit successfully will appear on screen GSHDSL(config-dsl)# ex GSHDSL(config)#	GSHDSL(config)# set dsl GSHDSL(config-dsl)#data-mode adaptive GSHDSL(config-dsl)# data-rate min 1 max 89 GSHDSL(config-dsl)# service rt-2wires GSHDSL(config-dsl)# standard annex-A GSHDSL(config-dsl)# commit -Commit successfully will appear on screen GSHDSL(config-dsl)# ex GSHDSL(config)#
Save	GSHDSL(config)# ex GSHDSL# save Do you want to save the configuration? [yes|no|cancel]: yes GSHDSL#	GSHDSL(config)# ex GSHDSL# save Do you want to save the configuration? [yes|no|cancel]: yes GSHDSL#

5.2 ROUTING MODE

This typical application is used to connect the corporate LAN network from the central site to the LAN network at the remote site. User has to configure one unit as “CO” and second unit as “RT”. The device is configured in routing mode since the central and remote sites are in different LAN IP class. Please follow the settings as shown below while configuring both the devices.



- Central Site LAN IP Range: 192.168.1.1/24
- Remote Site LAN IP Range: 192.168.2.1/24
- Note that IP addresses are in the different IP class in central site & remote site

CONFIGURATION THROUGH WEBPAGE

Refer the table below to configure the DG-IC422A devices for above application using Webpage:-

NOTE

Additional settings may have to be made on device depending on user application to make the setup work.
User is advised to put LAN Extender in Factory Default prior to configuring the Unit.

Menu	DG-IC422A (CO)	DG-IC422A (RT)
Basic Configuration>>LAN>> Configuration	Parameters IPv4 Address: 192.168.1.1 Subnet Mask: 255.255.255.0 Click ‘Apply’	Parameters IPv4 Address: 192.168.2.1 Subnet Mask: 255.255.255.0 Click ‘Apply’
Basic Configuration>>LAN>> DHCP Server	Parameters DHCP Server: Disabled Click ‘Apply’	Parameters DHCP Server: Disabled Click ‘Apply’

Basic Configuration>>WAN>> ATM Channel>> Create new channel	Virtual Channel Parameters VPI: 0 VCI: 32 Encapsulation: RFC2684-routed WAN option Local IP Address: 1.1.1.1 Subnet mask: 255.255.255.0 Peer IP Address: 1.1.1.2 NAT: Enable Click 'Apply'	Virtual Channel Parameters VPI: 0 VCI: 32 Encapsulation: RFC2684-routed WAN option Local IP Address: 1.1.1.2 Subnet mask: 255.255.255.0 Peer IP Address: 1.1.1.1 NAT: Enable Click 'Apply'
Basic Configuration>>DSL	Parameters Service Type: CO/2wires Standard Type: annex-A Data Mode: Adaptive Click 'Apply' NOTE: If user chooses Data Mode: Fixed - Data Rate Min & Max must be same.	Parameters Service Type: RT/2wires Standard Type: annex-A Data Mode: Adaptive Click 'Apply' NOTE: If user chooses Data Mode: Fixed - Data Rate Min & Max must be same.
Advance configuration>> Routing>>static>> Create new static route	Static Route Network: 192.168.2.0 Subnet Mask: 255.255.255.0 Gateway: 1.1.1.2 Click 'Apply'	Static Route Network: 192.168.1.0 Subnet Mask: 255.255.255.0 Gateway: 1.1.1.1 Click 'Apply'
Admin>>Save Configuration	Save Configuration	Save Configuration

CONFIGURATION THROUGH CONSOLE

Refer the table below to configure the DG-IC422A devices for above application using Console:-

Menu	DG-IC422A (CO)	DG-IC422A (RT)
Login	GSHDSL> login root Password: admin GSHDSL#	GSHDSL> login root Password: admin GSHDSL#
Factory Default	GSHDSL# load default Do you want to load the factory configuration and system will reboot? [yes|no|cancel]: yes	GSHDSL# load default Do you want to load the factory configuration and system will reboot? [yes|no|cancel]: yes
Configure Ethernet	GSHDSL# config GSHDSL(config)# set ether GSHDSL(config-ether)# ipv4 192.168.1.1/24 GSHDSL(config-ether)# no dhcp-server enabled GSHDSL(config-ether)# commit -Commit successfully will appear on screen GSHDSL(config-ether)# ex GSHDSL(config)#	GSHDSL# config GSHDSL(config)# set ether GSHDSL(config-ether)# ipv4 192.168.2.1/24 GSHDSL(config-ether)# no dhcp-server enabled GSHDSL(config-ether)# commit -Commit successfully will appear on screen GSHDSL(config-ether)# ex GSHDSL(config)#
Configure ATM	GSHDSL(config)# set atm vc 1 GSHDSL(config-atm)# encapsulation rfc2684-rt GSHDSL(config-atm)# vpi 0 vci 32 GSHDSL(config-atm)# interface GSHDSL(config-atm-if)# ipv4 1.1.1.1/24 GSHDSL(config-atm-if)# peer-ip 1.1.1.2 GSHDSL(config-atm-if)# nat enabled GSHDSL(config-atm-if)# ex GSHDSL(config-atm)# commit -Commit successfully will appear on screen GSHDSL(config-atm)# ex	GSHDSL(config)# set atm vc 1 GSHDSL(config-atm)#encapsulation rfc2684-rt GSHDSL(config-atm)# vpi 0 vci 32 GSHDSL(config-atm)# interface GSHDSL(config-atm-if)#ipv4 1.1.1.2/24 GSHDSL(config-atm-if)# peer-ip 1.1.1.1 GSHDSL(config-atm-if)# nat enabled GSHDSL(config-atm-if)# ex GSHDSL(config-atm)# commit -Commit successfully will appear on screen GSHDSL(config-atm)# ex
Configure Static route	GSHDSL(config)# set routing ipv4 1 GSHDSL(config-route)# network 192.168.2.0/24 via 1.1.1.2 GSHDSL(config-route)# commit -Commit successfully will appear on screen GSHDSL(config-route)# ex	GSHDSL(config)# set routing ipv4 1 GSHDSL(config-route)# network 192.168.1.0/24 via 1.1.1.1 GSHDSL(config-route)# commit -Commit successfully will appear on screen GSHDSL(config-route)# ex
Configure DSL	GSHDSL(config)# set dsl GSHDSL(config-dsl)# data-mode adaptive GSHDSL(config-dsl)# data-rate min 1 max 89 GSHDSL(config-dsl)# service cot-2wires GSHDSL(config-dsl)# standard annex-A GSHDSL(config-dsl)# commit -Commit successfully will appear on screen GSHDSL(config-dsl)# ex GSHDSL(config)#	GSHDSL(config)# set dsl GSHDSL(config-dsl)#data-mode adaptive GSHDSL(config-dsl)# data-rate min 1 max 89 GSHDSL(config-dsl)# service rt-2wires GSHDSL(config-dsl)# standard annex-A GSHDSL(config-dsl)# commit -Commit successfully will appear on screen GSHDSL(config-dsl)# ex GSHDSL(config)#
Save	GSHDSL(config)# ex GSHDSL# save Do you want to save the configuration? [yes|no|cancel]: yes GSHDSL#	GSHDSL(config)# ex GSHDSL# save Do you want to save the configuration? [yes|no|cancel]: yes GSHDSL#

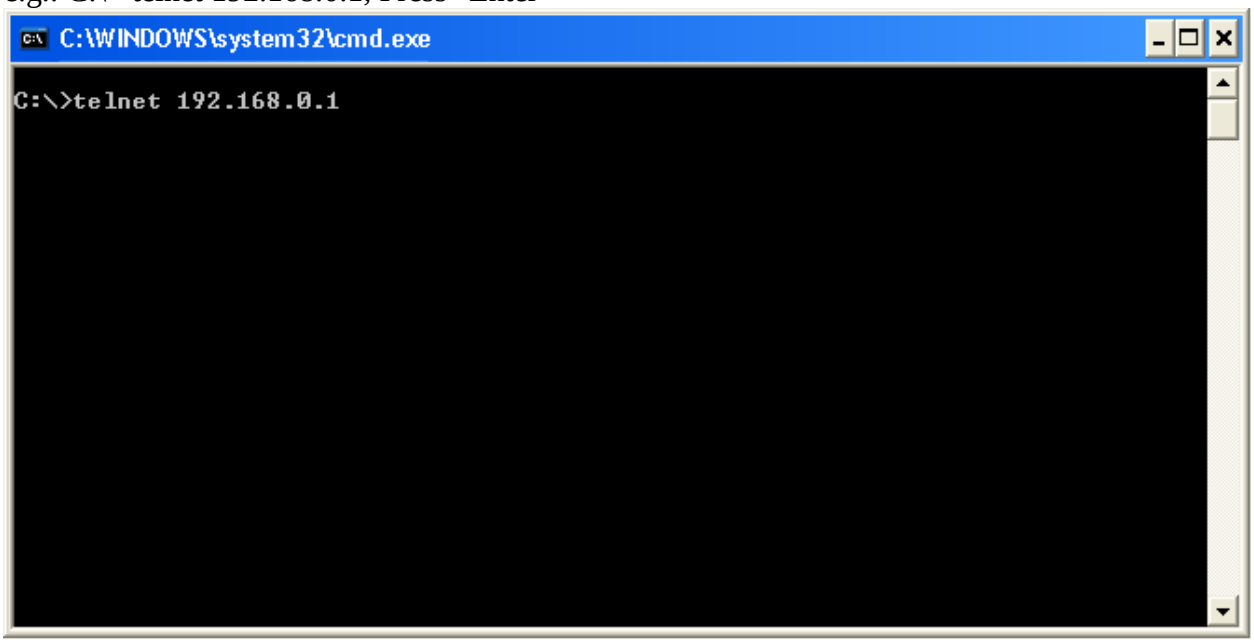
6. Appendix

6.1 TELNET

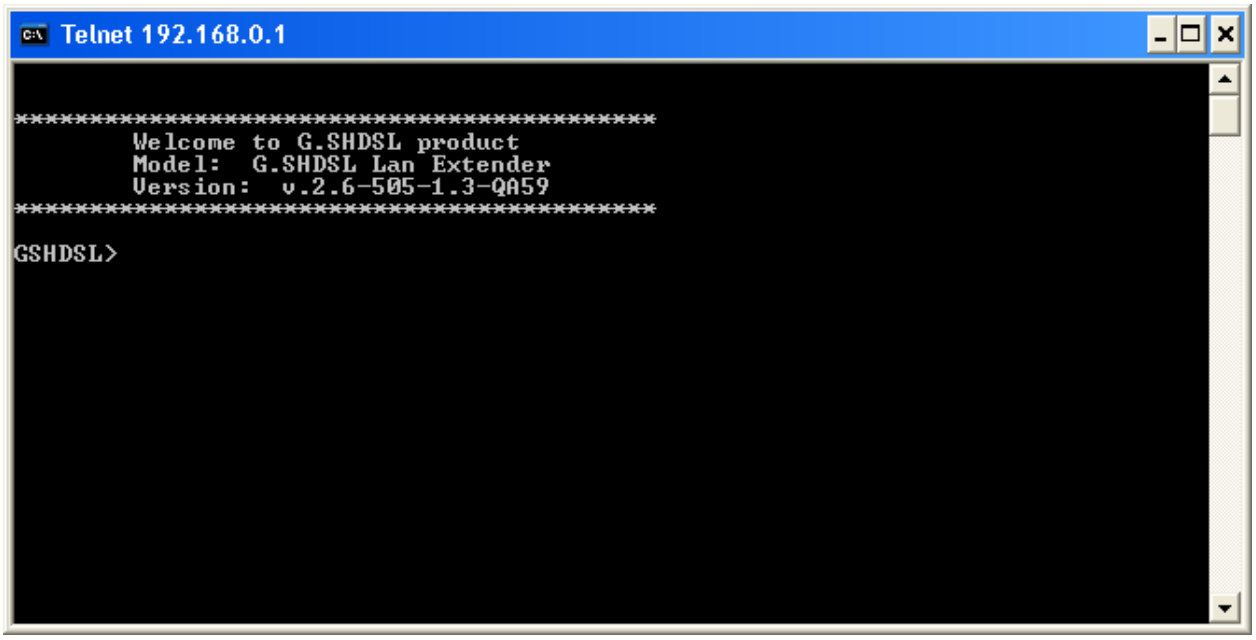
The DG-IC422A can be configured through TELNET.
Procedure:

1. Open the DOS prompt and type the command given below,
   telnet 'IP address of the device', Press "Enter".

e.g.: C:\> telnet 192.168.0.1, Press "Enter"



2. The following screen will be displayed.



3. Menu items & options for Telnet menu are same as those of Console. Kindly refer chapter 3. Configuration of the Device through Console for more details.

6.2 TROUBLESHOOTING

If you find that the device is not working properly or stops responding kindly use steps listed below. Before approaching your dealer of purchase for help, please read this troubleshooting section first. Some problems can be solved by you within very short time.

Scenario	Solution
1) Unit not powering ON	a) Check if the Main's power supply is working. b) If the power supply is fine then check if the adapter connected to the unit is of the correct specification as supplied with the unit. c) Check the Power ON/OFF switch which is at the Rear end of the unit. The switch has to be in ON position.
2) Nothing/Junk characters displayed at the console	a) Check the baud rate set. It should be 115200 bps. b) Check if emulation is set to VT-100.
3) DSL not syncing.	a) Check if the RJ-11 cable is properly inserted at the RJ-11 port. b) Next, check the configurations of the unit. One unit has to be in RT mode and the other has to be in COT mode to sync with each other. c) Check if there is connectivity between 2 ends of the cable. The DSL line should show OPEN between both limbs, & when looped at one end (customer side) should show loop resistance. d) Check if DSL of units are configured in Data-mode –FIXED, if so check if Min & Max data rates are the same.
4) Web page not opening	a) Check if the LAN cable is properly connected from the PC to the unit and also check if corresponding LAN LED glows. b) Check if PC & LAN Extender IP addresses are in the same class.

6.3 GLOSSARY

DHCP: Dynamic Host Configuration Protocol. This protocol automatically gives every computer on your home network an IP address.

DNS Server IP Address: DNS stands for Domain Name System, which allows Internet servers to have a domain name (such as www.google.com) and one or more IP addresses (such as 209.85.231.104). A DNS server keeps a database of Internet servers and their respective domain names and IP addresses, so that when a domain name is requested (as in typing "google.com" into your Internet browser), the user is directed to the proper IP address. The DNS server IP address used by the computers on your home network is the location of the DNS server your ISP has assigned to you.

SHDSL Modem: SHDSL stands for Symmetric High Bit Rate Digital Subscriber Line.

Ethernet: A standard for computer networks. Ethernet networks are connected by special cables and hubs, and move data around at up to 10/100 mega bits per second (Mbps).

LAN: Local Area Network. A LAN is a group of computers and devices connected together in a relatively small area (such as a home or office). Your home network is considered a LAN.

MAC Address: MAC stands for Media Access Control. A MAC address is the hardware address of a device connected to a network. The MAC address is a unique identifier for a device with an Ethernet interface. It is comprised of two parts: 3 bytes of data that corresponds to the Manufacturer ID (unique for each manufacturer), plus 3 bytes that are often used as the product's serial number.

NAT: Network Address Translation. This process allows all of the computers on your home network to use one IP address. Using the broadband Access Point's NAT capability, you can access the Internet from any computer on your home network without having to purchase more IP addresses from your ISP.

PPPoE: Point-to-Point Protocol over Ethernet. Point-to-Point Protocol is a secure data transmission method originally created for dial-up connections; PPPoE is for Ethernet connections. PPPoE relies on two widely accepted standards, Ethernet and the Point-to-Point Protocol. It is a communication protocol for transmitting information over Ethernet between different manufacturers

Port: Network Clients (LAN PC) uses port numbers to distinguish one network application/protocol over another. Below is a list of common applications and protocol/port numbers:

Application	Protocol	Port Number
Telnet	TCP	23
FTP	TCP	21
SMTP	TCP	25
POP3	TCP	110

H.323	TCP	1720
SNMP	UCP	161
SNMP Trap	UDP	162
HTTP	TCP	80
PPTP	TCP	1723
PC Anywhere	TCP	5631
PC Anywhere	UDP	5632

PPPoE: Point-to-Point Protocol over Ethernet. Point-to-Point Protocol is a secure data transmission method originally created for dial-up connections; PPPoE is for Ethernet connections. PPPoE relies on two widely accepted standards, Ethernet and the Point-to-Point Protocol. It is a communication protocol for transmitting information over Ethernet between different manufacturers

Protocol: A protocol is a set of rules for interaction agreed upon between multiple parties so that when they interface with each other based on such a protocol, the interpretation of their behavior is well defined and can be made objectively, without confusion or misunderstanding.

TCP/IP, UDP: Transmission Control Protocol/Internet Protocol (TCP/IP) and Unreliable Datagram Protocol (UDP). TCP/IP is the standard protocol for data transmission over the Internet. Both TCP and UDP are transport layer protocols. TCP performs proper error detection and error recovery, and thus is reliable. UDP on the other hand is not reliable. They both run on top of the IP (Internet Protocol), a network layer protocol.

WAN: Wide Area Network. A network that connects computers located in geographically separate areas (e.g. different buildings, cities, countries). The Internet is a wide area network.

Web-based management Graphical User Interface (GUI): Many devices support a graphical user interface that is based on the web browser. This means the user can use the familiar Netscape or Microsoft Internet Explorer to Control/configure or monitor the device being managed.

STP: STP stands for Spanning Tree Protocol and is defined as IEEE 802.1d standard for preventing loops in a network.

VPI: VPI stands for Virtual Path Identifier and is 8 bits in length. Used along with VCI (Virtual Channel Identifier) in ATM networks

VCI: VCI stands for Virtual Channel Identifier and is 16 bits in length. Used along with VPI in ATM networks.

RT: RT stands for Remote Terminal. When the LAN extenders are connected back to back in pairs one device has to be RT and the other has to be COT (Central Office Terminal). In case when the LAN extenders are connected to a G.SHDSL DSLAM, then the LAN extender is always the RT and the corresponding port on the DSLAM is configured as COT.

COT: COT stands or Central office terminal. When the LAN extenders are connected back to back in pairs one device has to be RT and the other has to be COT.

RIP: RIP stands for Routing Information Protocol. When the devices are configured in routing mode, and RIP is enabled, the devices share their respective routing tables with each other automatically.

TR069: TR069 is Technical Report 069. This is used to remote manage any device.

NTP: NTP stands for Network Time Protocol. Any NTP server can be used to synchronize the device time with the server.

This product comes with one year warranty. For further details about warranty policy and Product Registration, please visit support section of www.digisol.com