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**Note:** This equipment has been tested and found to comply with the limts for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, this device may cause harmful interference to radio communications. However, there is no gurantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, (which can be determined by switching the equipment on/off) the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or locate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that of the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that any change or modifications to the equipment not expressly approved by the party responsible for compliance could void your authority to operate such equipment.

# **Revision Marks**

Revision	Date	Notes
V2.0	May 14, 2003	Annex A Software Version: 5.06XAF0.AWR Annex B Software Version: 5.06XAF0.BWR

## Chapter 1

## **Getting Started**

#### I. Overview

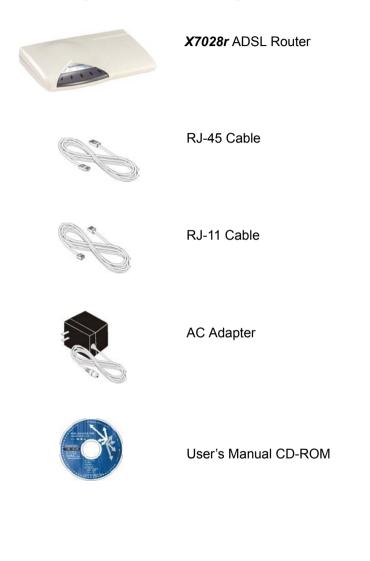
*X7028r* is multi-mode ADSL router, which complies with ANSI T1.413 issue 2, ITU G.992.1 Annex A/B and ETSI ITS 101388 ADSL Standards. *X7028r* provides high-speed Internet access via one WAN port over ATM over ADSL, and also connects to a corporate network via four 10/100BaseT Ethernet ports and one 802.11b WLAN for LAN users.

### II. Features

- ✓ High Speed Asymmetrical Data Transmission on Single Twisted Copper Pair
- ✓ Full rate operations up to 8Mbps downstream and up to 1Mbps upstream. G.lite operation up to 1.5Mbps downstream rate and 512Kbps upstream rate.
- ✓ Four 10/100BaseT Ethernet ports for PC or LAN connection
- ✓ HP auto-MDIX detects and corrects crossover cables
- ✓ Service provider can deploy ADSL rapidly over existing wire infrastructure (POTs or ISDN line)
- ✓ 802.11b WLAN support up to 11Mbps
- ✓ DHCP server supported for easy LAN IP address management
- ✓ Support PPPoE (RFC2516), PPP (RFC2364), and IP (RFC 2225/RFC1577) over ATM over ADSL
- ✓ RFC2684 (RFC1483) Bridged/Routed for both LLC/VC MUX
- ✓ Allows LAN users to access Internet through Network Address Translation (NAT, IP sharing) simultaneously
- ✓ Local OAM&P through command line interface via RS-232 Craft port
- Configuration and management by local Telnet and WEB Browser through the Ethernet interface and remotely through ADSL interface
- ✓ Firmware upgradeable through TFTP

## III. Packaging

This package consists of the following items:



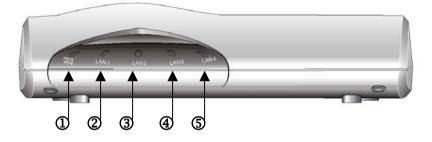
## IV. Safety Guidelines

In order to reduce the risk of fire, electric shock and injury, please adhere to the following safety guidelines.

- ✓ Carefully follow the instructions in this manual; also follow all instruction labels on this device.
- ✓ Except for the power adapter supplied, this device should not be connected to any other adapters.
- ✓ Do not spill liquid of any kind on this device.
- ✓ Do not place the unit on an unstable stand or table. This unit may drop and become damaged.
- ✓ Do not expose this unit to direct sunlight.
- ✓ Do not place any hot devices close to this unit, as it may degrade or cause damage to it.
- ✓ Do not place any heavy objects on top of this unit.
- ✓ Do not use liquid cleaners or aerosol cleaners. Use a soft dry cloth for cleaning.

## V. Appearance

#### Front Panel



	Label	Status	Color	Description
	PWR/ WAN	ON	Orange	Power adapter is properly connected.
	WAIN		Green	ADSL line is connected.
2	LAN 1	ON	Green	100M data transfer
e			Orange	10M data transfer
3	LAN 2	ON	Green	100M data transfer
			Orange	10M data transfer
4	LAN 3	ON	Green	100M data transfer
G	LANG		Orange	10M data transfer
5	LAN 4	ON	Green	100M data transfer
9			Orange	10M data transfer

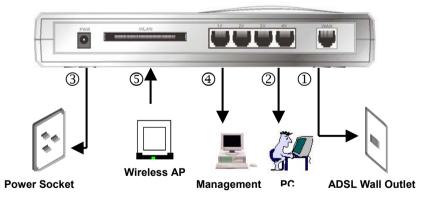
## **Rear Panel**



	Label	Description
1	PWR	DC-inlet for AC adapter
2		Wireless LAN AP slot
3	1X ~ 4X	Four RJ-45 ports for LAN connections
4	WAN	RJ-11 ADSL port

### VI. Hardware Installation

- 1. Connect one end of the ADSL cable into the WAN port of the ADSL modem, and the other end into the ADSL wall outlet.
- Connect one end of the RJ-45 cable into one of the RJ-45 ports of the ADSL modem, and the other end into your PC or LAN.
- 3. Plug in the AC adapter into the AC power socket, and connect the DC jack into the PWR inlet of the modem.
- Use a 9-pin RS-232 cable to connect the Console cable to the RJ-45 cable then to a PC with data terminal emulation software (Hyper Terminal) installed, in order for local management.
- 5. Gently slide the Wireless Access Point (AP) into the WLAN slot.



### VII. Management

- Console Port use the RS-232 cable for connecting X7028r to a console terminal or a PC running a terminal emulation program, such as Hyper Terminal. (For further details, See Chapter 1: X Console Setup)
- Local Ethernet Port (Telnet) connect the Ethernet port to your local area network or directly to a PC, "Telnet" X7028r from any workstation in the LAN. The default local Ethernet IP address is "192.168.1.1".
- ✓ Local Ethernet Port (Web Browser) connect the Ethernet port to your local area network or directly to a PC. Launch your web browser and enter default local Ethernet IP address "192.168.1.1" into the address bar.
- ✓ ADSL Port from Remote Site while the ADSL connection is in service, you may remotely "Telnet" X7028r from a workstation connected to the CO equipment.

**Note**: As operating an ADSL device requires technical know-how and experience. It is recommended that only qualified technical staffs manage *X7028r*. Therefore, a password authentication is required when you enter the web interface. See the *Default Values* section to obtain the password.

## VIII. Default Values

**X7028***r* is pre-configured with the following parameters; you may also re-load the default parameters by selecting System – Update in the web interface. (For further details, see *Chapter 2: 4.3 Update*)

Default Mode: Bridge	Username/Password: admin
Bridge Mode Setting	WAN and ADSL
Ethernet (local) IP: 192.168.1.1	Local Line Code: AUTO
Subnet Mask: 255.255.255.0	Trellis Mode: Enable
Full Duplex: Disable	FDM Mode: Fdm
Protocol: RFC1483, Bridge Mode	Coding Gain: Auto
VPI/VCI: 8/35	Transmit Power Atten: 0dB
Class (QoS): UBR	
Spanning Tree: Disable	
Packet Filter: Any	

## IX. Software Upgrade

You may easily upgrade *X7028r* embedded software by obtaining the compressed upgrade kit from the service provider then following the steps:

- ✓ Extract the ZIP file for updated firmware
- ✓ Connect X7028r via the local Ethernet port or remote ADSL link, make sure that the X7028r Ethernet IP address and your terminal are properly configured so that you can successfully "ping" X7028r. The default local IP address is 192.168.1.1.
- ✓ Under the DOS prompt, execute the command "xupgrade <*IP* address of X7028r>", for instance "xupgrade 192.168.1.1".
- $\checkmark$  This upgrading process may last as long as 60 seconds.
- ✓ Then reboot **X7028***r* with new software.

**Note 1**: The **X7028r** software may also be upgraded through the web interface. See Chapter 2: 4.3 Update

**Note 2**: Strictly maintain stable power to the *X7028r* while upgrading its software. If the power fails during the upgrading process, contents in the memory could be destroyed, and the system may hang. In such as case, you must call the dealer or system integrator for repairs.

## X. Console Setup

Connect the RS-232 console port to an ASCII data terminal or a PC with Widows serial Terminal mode of VT-100 (Hyper Terminal). To Start the Hyper-terminal, follow the steps below.

#### 1. Start "Hyper-terminal" program --

On Windows 98 or Windows NT:

Click on the Start button  $\rightarrow$  Programs  $\rightarrow$  Accessories  $\rightarrow$ Hyper Terminal Group  $\rightarrow$  Double Click "Hypertrm.exe"  $\rightarrow$ Enter Connection Name  $\rightarrow$  Select Icon  $\rightarrow$  Click OK

#### 2. Select COM port to communicate with the modem

Choose direct to COM1 or COM2 and click OK

#### 3. Set Port Properties --

#### • Port Setting:

- Bit per second: 9600
- Data bits: 8
- Stop bits: 1
- Parity bits: None
- Flow Control: None
- Settings:
  - Function, arrow, and ctrl keys act as: Windows keys
  - Emulation: Auto-detect
  - Back-scroll buffer lines: 500

#### ASCII Setup:

- Echo typed characters locally
- Line delay: 0 milliseconds
- Character line feeds incoming line ends: enable

## Chapter 2

## Web Management Interface

#### I. Overview

The Web management is provided in order to manage the ADSL device as easily as possible. It provides a very user-friendly configuration and graphical interface through a web platform. You may configure a bridge or a router function to accommodate your device need. In the section below, each configuration item will be described in detail.

#### **II.** Preparation

- 1. Please refer the hardware installation procedure in Chapter 1 to install **X7028r**.
- 2. You should configure the PC to the same IP subnet as *X7028r*. **Example:** The *X7028r*: 192.168.1.1

Your PC: 192.168.1.x

- 3. Connect your PC to the **X7028***r* and make sure that the PING function is working properly. The default IP address of this device is 192.168.1.1
- 4. Launch the Web browser (IE or Netscape), and enter the default IP address 192.168.1.1 into the address bar to access the web management page.
- 5. The Enter Network Password dialog box will popup first.

## 1. Login

The window Enter Network password will pop up while starting the configuration. With the window active, type admin for both the User Name and the Password. You can also edit the Username and Password or add a new profile. (See section 4.1 Users for further details)

Ado	ddress 🛃 http://192.168.1.1/							
0	Status	Enter Nets	vork Passwo	rd	? ×			
0	Statistics		Plazas tupo u	our user name and password.				
$\triangleright$	System	- <b>*</b>		·				
$\triangleright$	Configuration		Site:	192.168.1.1				
			Realm	WebAdmin				
			User Name	admin				
			Password	хихих				
			🔲 Save this	password in your password list	ŀ			
				OK Cancel				

## 2. Status

- Status
- Statistics
- ⊳ System
- Configuration
- The Status page displays the current configuration of the X7028r. You can click on the shortcuts from the Status page for quickly editing most frequent configurations:
- Click WAN Settings... to edit/add WAN connections refer to section 5.3 WAN Connections for further details.
- Click LAN Settings... to edit the default LAN IP address refer to section 5.2 LAN Connections for further details.
- Click Login Settings... to edit the login type refer to section 5.5 DHCP Server for details.
- Click IP Address Settings... to edit/add WAN connections refer to section 5.3 WAN Connections for further details)
- Click DHCP Server... to edit DHCP Server status refer to section 5.5 DHCP Server for details.

## Status

This page shows the status of your connection

#### Status

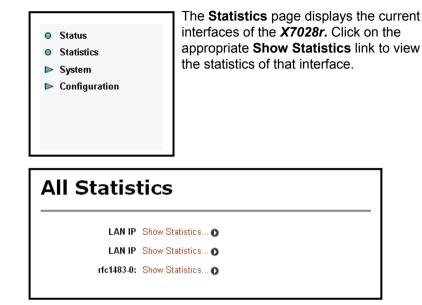
WAN IP Address: WAN Settings... ()

Local IP Address: 192.168.0.3 LAN Settings... ()

# Advanced Diagnostics

Connection Authentication: No	ne	Logir	i Settings 🕥
Port Connection Status			
Switch Hub Ty	rpe	Link	ed
Port#1 sw	vitch	x	
Port#2 sw	/itch	$\checkmark$	
Port#3 sw	/itch	x	
Port#4 sw	/itch	x	
Wireless etł	hernet	x	
WAN Status			
IP Address Type:	Static		IP Address Settings <b>()</b>
WAN Subnet Mask:	None		
Default Gateway:	None		
Primary DNS:	None		
LAN Status			
LAN Subnet Mask:	255.255.255.0		
Act as Local DHCP Server:	Yes		DHCP Server Settings 0
MAC Address:	00:20:2B:26:0	4:11	
Hardware Status			
Up-Time:	00:49:34s		
Version:	5.06XAF0.AW	R	
Vendor:	Xentrix		
ADSL Status			
Op State	handshake		
Firmware Version	T7961		

## 3. Statistics



Three examples are listed below, two for the LAN IP's and one for Rfc1483-c-0.

#### Example 1: LAN IP Show Statistics (Wireless)

- This page displays the current statistics of the wireless LAN (wlan) port. This includes port name, connection status, speed, and transfer/receive packets.
- You may edit the default LAN port by clicking on the Configure LAN Connections button. (For instructions on how to configure LAN connection, See 5B Configuration – LAN connection)

ysical port:			
Port name	wireless1	Active	TRUE
Connected	false	Link speed (x 100bps)	
Rx packets	0	Tx packets	8197
Rx bad packets	0	Tx bad packets	8165
Rx CRC errors	0	Tx Collisions	0
Rx over-long packets	0	Tx excessive collisions	0
Rx short packets	0		

#### Example 2: LAN IP Show Statistics (Ethernet)

- This page displays the current statistics of the Ethernet port. This includes port name, connection status, speed, and transfer/receive packets.
- You may edit the default LAN port by clicking on the Configure LAN Connections button. (For instructions on how to configure LAN connection, refer to section 5.2 LAN connections)

Status: eth0 - <i>eth0</i>					
Bridged interface					
hysical port:					
Port name	ethernet	Active	TRUE		
Connected false Link speed (x 100bps) 100000					
Rx packets	8669	Tx packets	783		
Rx bad packets	19	Tx bad packets	0		
Rx CRC errors	0	Tx Collisions	0		
Rx over-long packets	0	Tx excessive collisions	0		
Rx short packets	0				

#### Example 3: RFC1483-0 Show Statistics

- This page displays the current statistics of the default bridge RFC 1483. This includes port name, VPI/VCI values, transfer/receive packets and encapsulation type.
- You may edit/add WAN connections by clicking on the Configure WAN Connection button. (For instructions on how to configure LAN connection, refer to section 5.3 WAN connections)

Status: rfc1483-0 - <i>rfc1483-0</i>					
lged interface					
M connection:					
<sup>o</sup> ort name	adsl	Active	TRUE	[	
X VPI	8	Tx VPI	8		
Rx VCI	35	Tx VCI	35		
X packets	0	Tx packets	16533		
₹x bad packets	0	Tx bad packets	0		
Encapsulation LicBridged					
lefresh					
Configure WAN connections					

## 4. System



The **System** section includes **Users**, **Error Log**, **Update**, **Backup/restore** and **Restart** links. Each link is described in detail below.

## 4.1 Users

 Click on the Users link on the navigation bar to view the list of users. By default, only the admin user exists.

Au	Authentication						
Curr	Currently Defined Users						
User	May Config?	Comment					
admin	true	Default admin user	Edit user 🕥				
Create a	new user O	•	Υ <u></u>	1			

Click on the Edit User... link to change the settings of the admin user. On this page you may change the password and comment of the admin user. Click on the Apply button when completed.

Details for user 'admin' Username: admin Password: Admin May Config? true Comment: Default admin user Apply Reset Delete this user	Authentication: edit user 'admin'		
Password: Apply Reset	Details for user 'admin'		
May Config? True  Comment: Default admin user Apply Reset	Usemame: admin		
Comment: Default admin user Apply Reset	Password:		
Apply Reset	May Config? true 💌		
	Comment: Default admin user		
Delete this user	Apply Reset		
Delete this user			
	Delete this user		

Click on the Create a new user... link to add a new user. On this page you need to enter a username, password, select true or false, if you would like this user to have configuration rights, and add a comment. Click on the Create button when completed.

Authentication: create user			
Details for new user	i.		
Username: john			
Password:			
May Config? false			
Comment: user john			
Create Reset			
Cancel and return to Authentication Setup Page O			

• You will then notice that the user has been added to the table.

Currently Defined Users				
Config?	Comment			
	user john	Edit user 🕥		
	Default admin user	Edit user 🕥		
	Config?	Config? Comment	Config? Comment Edit user •	

### 4.2 Error Log

Click on the **Error Log** link in the navigation bar to view the history of errors. Click on the **Clear Logs** button to clear the log table.

Error log	
Error log (most recent errors first; times are in seconds since last reboot): Clear Logs	
When Process Error	

## 4.3 Update

Click on the **Upgrade** link on the navigation bar to view the firmware upgrade page, then follow the steps below:

- a) Click on the Browse button to select the upgrade file.
- b) Click on the Upgrade button when completed.

Firmware Upgrade From this page you may upgrade the system software on your network device					
Select Upgrade File Upgrades (where available) may be obtained from GlobespanVirata					
New Firmware Image Browse Upgrade					

## 4.4 Restart

To restart the modem, click on the **Restart** button. You may also check the box, if you would like to restart the modem with the factory settings. The default settings are displayed at the bottom of this page.

Restart Router From this page you may restart your router				
Restart				
	ait for several seconds to let the system come up. If you wou default settings, please check the following box:			
🗆 Reset to factory def	ault settings			
Restart				
Default Setting				
usern/a adminn/a				
Lan Ip	192.168.1.1			
netmask	255.255.255.0			
port	Ethernet			
Wan Setting:R1483 rout	te WAN uplink			
VPI	8			
VCI	32			
username				
password				
class	UBR			
port	adsl			

## 5. Configuration

Status	
--------	--

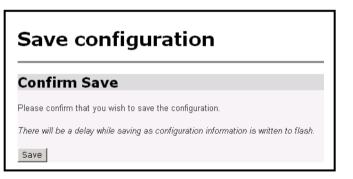
- Statistics
- 🕨 System

#### ▼ Configuration

Save config LAN connections WAN connections Routing Table DHCP server DNS relay Security IGMP Proxy The Configuration section includes Save Config, LAN connection, WAN connections, routing table, DHCP server, DNS relay, Security, and IGMP proxy links. Each link is described in detail below.

## 5.1 Save Config

Click on the **Save Config** link in the navigation bar to view the save confirmation page. If you would like to save the current configuration, click on the **Save** button.



#### 5.2 LAN Connections

This page displays a list of currently defined LAN interfaces. You may create a new LAN service or change the default LAN port IP address from this page. Both examples are listed below.

LAN connections
LAN services currently defined:
Name         Description         Creator           wireless         wireless         CLI
Create a new service
Change default LAN port IP address

#### 5.2.1 Create a New Service

In order to create a new LAN service, click on the **Create a new service** button. You can then select between Ethernet Routed and Ethernet bridged. After you make a selection, click on the **Configure** button. Both examples are listed below.

LAN connection: create service
Please select the type of service you wish to create:
Ethernet: ⓒ Ethernet routed C Ethernet bridged
Configure

#### Example 1: Ethernet Routed

- In order to create an Ethernet route the following fields need to be filled in:
  - a) Description: Enter a description for the route
  - b) Port: Select between Ethernet and wireless
  - c) Select to use DHCP or enter a LAN IP address
  - d) Click on the **Apply** button.

LAN co	onnection	Ethernet routed
Description: Port:	ethernet route	]
<ul> <li>Use DHCP</li> <li>LAN IP address</li> </ul>		]
Apply		

#### Example 2: Ethernet Bridged

- In order to create an Ethernet route the following fields need to be filled in:
  - Description: Enter a description for the route
  - Port: Select between Ethernet and wireless
  - Click on the **Apply** button.

LAN connection: Ethernet bridged
Description:
Port: ethernet 💌
Apply

#### 5.2.2 Change Default LAN IP

 Click on the LAN connections link in the navigation bar, and then click on the configure default LAN port IP address.

LAN connections
LAN services currently defined:
Name         Description         Creator           wireless         wireless         CLI
Create a new service
Change default LAN port IP address

 Define the primary IP address and subnet mask of your device here, and make the change by editing the IP address in the text box. Then click on the Apply button.

LAN connections This page allows you to change the IP address for the defaul <sup>.</sup> port
Default LAN Port
LAN IP Address           IP Address:         192         168         0         20           Subnet Mask:         255         255         0         0
Apply
Note: there may be a short pause between clicking Apply and receiving a response.

#### 5.3 WAN Connections

 The page lists WAN connection protocols that are available on this device. Please see the following instructions on creating each type of the WAN connection.

VAN services currently defined:	
Name Description Creator	
rfc1483-0 rfc1483-0 WebAdmin Edit O	Delete O

- You can create multiple WAN connection services from each of following protocols:
  - 5.3.1 RFC 1483 Routed
  - 5.3.2 RFC 1483 Bridged
  - 5.3.3 PPPoA Routed
  - 5.3.4 MER
  - 5.3.5 IPoA Routed
  - 5.3.6 PPPoE Routed

#### 5.3.1 RFC 1483 Routed

- Click Create a new service to display the type of service.
- Select RFC 1483 routed and then click on the Configure button.

WAN con	nection: create service
Please select the type of	service you wish to create:
ATM:    RFC 1483 route	ed C RFC 1483 bridged
C PPPoA routed	O MER
C IPoA routed	O PPPoE routed
Configure	

- Define the VPI, VCI, WAN IP to match the DSLAM setting. (Provided by the ISP)
- Select LLC/SNAP for Encapsulation.
- Choose between DHCP and WAN IP, and then click on the Apply button to confirm the configuration.

Description:	rfc 1483 r	
VPI:	0	
VCI:	35	
Encapsulation method:	LLC/SNAP	
Use DHCP		
C WAN IP address:		
Enable NAT on this inte	rface	

#### 5.3.2 RFC 1483 Bridged

- Click Create a new service to display the type of service.
- Select RFC 1483 Bridged and then click on the Configure button.

WAN connection: create service	
Please select the type of service you wish to create:	
ATM: O RFC 1483 routed O RFC 1483 bridged O PPPoA routed O MER O IPoA routed O PPPoE routed	
Configure	

- Define the VPI, VCI to match the DSLAM setting
- Select LLC/SNAP for Encapsulation, and then click on the Apply button to confirm the configuration.

Description:	rfc 1483 br	
VPI:	0	
VCI:	35	
Encapsulation me	thod: LLC/SNAP	

#### 5.3.3 PPPoA Routed

- Click Create a new service to display the type of service.
- Select **PPPoA routed** and then click on the **Configure** button.

WAN connection: create service		
Please select the type of service you wish to create: ATM: O RFC 1483 routed O RFC 1483 bridged PPPoA routed O MER		
C IPoA routed C PPPoE routed		

- Type PPPoA router for the description, then define the VPI, VCI to match the DSLAM setting
- Keep WAN IP default setting (0.0.0.0.)
- Leave LLC header Mode/HDLC header mode to off.
- Select PAP
- Type in the **Username** and **Password**.
- Click on the **Configure** button to confirm the configuration.

WAN connection: PPPoA routed		
	iection: FFF0A louted	
Description:		
VPI:	8	
VCI:	35	
WAN IP address:	0.0.0.0	
Enable NAT on this interpretention	rface	
LLC header mode:	off 💌	
HDLC header mode:	off 💌	
No authentication		
C PAP		
C CHAP		
User name:		
Password:		
	,	
Configure		

## 5.3.4 MER

- Click **Create a new service** to display the type of service. Select **MER** and then click on the **Configure** button. ۲

WAN conn	ection: create service
Please select the type of ser	vice you wish to create:
ATM: C RFC 1483 routed C PPPoA routed C IPoA routed	© MER
Configure	

- Type **MER router** for the description
- Define the VPI, VCI, WAN IP based on the DSLAM setting.
- Click on the **Apply** button to confirm the configuration.

WAN connection: MER			
Description:			
VPI:	8		
VCI:	35		
Encapsulation method	Encapsulation method: LLC/SNAP		
O Use DHCP			
C WAN IP address:			
Apply			

### 5.3.5 IPoA Routed

- Click **Create a new service** to display the type of service.
- Select IPoA routed and then click on the Configure button.

W	AN conr	nection: create service
Please	e select the type of se	rvice you wish to create:
ATM:	C PPPoA routed	
Cor	<ul> <li>IPoA routed</li> <li>figure</li> </ul>	C PPPoE routed

- Type **IPoA router** for the description
- Define the VPI, VCI, WAN IP based on the DSLAM setting.
- Click on the **Apply** button to confirm the configuration.

WAN connection: IPoA routed		
ipoa router		
0		
35		
,		
192.168.5.20		
Enable NAT on this interface		
Apply		
	ipoa router 0 35 192.168.5.20	

#### 5.3.6 PPPoE Routed

- Click Create a new service to display the type of service.
- Select **PPPoE routed** and then click on the **Configure** button.

W	WAN connection: create service		
Please	e select the type of se	rvice you wish to create:	
ATM:	C RFC 1483 routed	C RFC 1483 bridged	
	C PPPoA routed	O MER	
	O IPoA routed	PPPoE routed	
Con	figure		

- Type **PPPoE router** for the description.
- > Define the VPI, VCI value to match the DSLAM/ISP setting.
- Set **PPPoE Auto Connect** to **Enabled**.
- Use WAN IP default setting (0.0.0.)
- Leave Access concentrator and service name blank
- Leave LLC/HDLC header Mode to off.
- Select PAP and type the Username and Password and type idle time number.
- Click on the **Configure** button to confirm the configuration.

WAN connec	ction: PP	PoE routed
		-

Description:		
VPI:	8	
VCI:	35	
PPPoE Auto Connect:	disabled 💌	
WAN IP address:	0.0.0.0	
Enable NAT on this interface	e	
Access concentrator:		
Service name:		
LLC header mode:	off 💌	
HDLC header mode:	off 💌	
No authentication		
C PAP		
C CHAP		
User name:		
Password:		
User Idle Timeout (in minutes):	0	
	-	
Configure		

## 5.4 Routing Table

Click on the Routing Table link in the navigation bar. This page displays a table of the defined routes. Click on the Create new IP V4Route, to add an IP route to the table.

Edit Routes	
There are currently no Routes defined.	
Create new Ip V4Route O	

- In order to create an routing table entry the following fields need to be filled in:
  - a) Destination: Enter the destination of the router
  - b) Gateway: Enter the IP address of the gateway
  - c) *Netmask*: Enter the subnet mask
  - d) Cost: Enter the cost (number of hops)
  - e) Cost: Enter an interface name
  - f) *Advertise*: Select true/false from the drop down list if you would like the router to display itself.
  - g) Click on the **OK** button.

Create Ip V4Route		
Name	Value	
Destination	0.0.0.0	
Gateway		
Netmask	0.0.0.0	
Cost	1	
Interface		
Advertise	false 💌	
OK Reset		

## 5.5 DHCP Server

- This device can be setup to perform the service of the DHCP Server and enables the data connection between multiple PCs by configuring IP address ranges and lease times.
- Click on the DHCP Server link in navigation bar. You will then see the following screen.

DHCP server	
The DHCP server (or relay) is disabled.	
DHCP Server Mode	
C Disabled C DHCP server Configure	

Select DHCP Server and then click on the Configure button. You will then see the following screen.

DHCP: enable server	
DHCP Server Setup	
Please enter details for DHCP server configuration:	
Address Range Note that your LAN interface has IP address 192.168.0.3, with subr address range should lie within this subnet. Use Default Range (192.168.0.4 - 192.168.0.35)	net mask 255.255.255.0; the IP
Starting IP Address	192.168.1.10
Ending IP Address	192.168.1.200
Lease Times Use default setting(defaultleasetime:43200,maxleasetime:86400) Default Lease Time Maximum Lease Time	86400 seconds     86400 seconds
	86400 seconds
Domain Name Servers List here the primary and secondary domain name servers to be pro Use Router as DNS Server Primary DNS Server Address	vided to LAN clients.
Secondary DNS Server Address	192.168.10.6
Default Gateway	,
Use Router as Default Gateway Apply Reset	V

- Use Default Range: Place a check in this box if you would like to use the default IP address range. You can only use this if you network is on the 192.168.0.x subnet.
- Starting IP Address: Enter the first IP address that will be assigned by the DHCP Server.
- Ending IP Address: Enter the last IP address that will be assigned by the DHCP Server.
- Use Default Setting: Place a check in this box if you would like to use the default lease times. If not enter the default and maximum lease times in the text boxes provided.
- Use Router as DNS Server: Place a check in this box if you would like this device to be the DNS Server.
- Primary DNS Server Address: Enter the IP address of the primary DNS Server.
- Secondary DNS Server Address: Enter the IP address of the secondary DNS Server.
- Use Router as Default Gateway: Place a check in this box if you would like this device to be the default gateway.
- Click on the **Apply** button when completed.

# 5.6 DNS Relay

 Click on the DNS Relay link in the navigation bar. You may enable or disable DNS Relay. Then click on the Configure button.

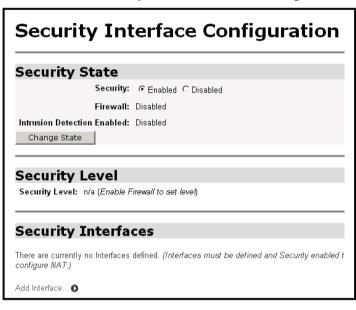
DNS relay	
The DNS relay is disabled.	
DNS relay mode	
C Disabled © Enabled	
Configure	

 Enter the primary and secondary DNS Server IP address into the text boxes provided.

DNS: enabl	e relay
The DNS relay is disabled.	
DNS Relay Setti	-
Primary DNS server IP address Secondary DNS server IP address	
Apply	

## 5.7 Security

- Click on the Security link on the navigation bar. In this section you will be able to configure the Security Interface. This includes the security state, security level, security interfaces, policies, triggers, and intrusion detection.
- Select Enabled Security, and then click the Change State button



Under the Security Interfaces menu, click on the Add Interface link to add a security interface. You will then see the following screen. Select an interface name (eth0) and interface type (internal), and then click on the Apply button. You will then see the added interface on the main page.

Security: Add Interface	
New Interface Setup Name: eth0 • Interface Type: internal •	
Apply Return to Interface List	

- Once again, click on the **Add Interface** button, to add an external interface.
- Select an interface name (ppp-0) and interface type (external), and then click on the **Apply** button.

Security: Add Interface	
New Interface Setup	
Interface Type: external  Apply Return to Interface List	

 You will then see the added interface on the main page. Click on the Enable NAT to internal interfaces button to enable Network Address Translation (NAT).

Name	Туре	NAT	
eth0	internal	May be configured on external or DMZ interfaces	Delete Interface
ррр-О	external	Enable NAT to internal interfaces  Advanced NAT Configuration (Enable NAT for Advanced Configuration)	Delete Interface

 Scroll back up to the Security State section; select Enabled for both Firewall and Intrusion Detection. Then click on the Change State button.

Security State	
Security:	Enabled
Firewall:	• Enabled C Disabled
Intrusion Detection Enabled:	
Change State	

Scroll down and click on the Firewall Policy Configuration link under the Policies, Triggers and Intrusion Detection section. You will then see the following screen. Currently, there are no policies set. Click on New Policy to add a firewall policy.

Firewall Policy Configuration	
Current Firewall Policies	
No Policies Defined	
New Policy O	

On this page you will be able to select your firewall interface between internal, external, and dmz. Based on those validations, you may choose to allow or block traffic. Selecting **allow** will block traffic from all hosts except those hosts, which have validators. Click on the **Apply** button when completed.

Firewall Add Policy
Between interfaces of types: external 💌 internal 💌
Validators will block 💌 traffic.
Selecting "allow" will block traffic from all hosts except those hosts which have validators.
Apply

• The policy has been added to the table. You may now edit the port filters or host validators on this interface.

Interface Type 1	Interface Type 2	Validators		Policy Configuration
external	internal	Only listed hosts blocked	Port Filters O	Host Validators <b>()</b>

## Port Filters: The following port filters may be added:

Field Name	Description
TCP Filter	Requires port range (start/end IP) and direction (inbound/outbound)
UDP Filter	Requires port range (start/end IP) and direction (inbound/outbound)
Raw IP Filter	Requires protocol type (TCP/UDP) and direction (inbound/outbound)

Host Validators: The following host validators may be added:

Field Name	Description
Host IP address	IP address of the host, for example 1.1.1.1
Host Subnet mask	Subnet mask of the above host, for example 255.255.255.255
Direction	Select Inbound, Outbound, or Both

Return to the Interface List and click on the Firewall Trigger Configuration link. A trigger is the term used to describe what happens when a secondary port is opened dynamically to allow protocols such as FTP and NetMeeting to pass data through the Firewall. Click on New Trigger to add a new firewall trigger.

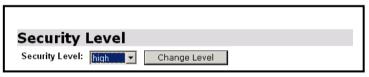
**Firewall Add Trigger**: The following fields are required for adding a firewall trigger.

Field Name	Description
Transport type	Choose between TCP or UDP
Port number start	Enter the starting port number, for example 21 for FTP
Port number end	Enter the ending port number, for example 21 for FTP
Allow multiple hosts	Choose between allow or block
Max Activity Interval	Enter the activity interval per second.
Enable Session Chaining	Choose between allow or block
Enable UDP Session Chaining	Choose between allow or block
Binary Address Replacement	Choose between allow or block
Address Translation Type	Choose between TCP, UDP, both, or none.

- Click on Configure Intrusion Detection link under the Policies, Triggers and Intrusion Detection section. On this page you will be able to select whether you would like to use a black list and victim protection. You can also set values for Dos attack block duration, scan attack block duration, Victim protection block duration, maximum TCP open handshaking count, maximum ping count, and maximum ICMP count.
- Click on the Apply button once you have set/changed these values.

Firewall Configure Intrusion Detection		
Use Blacklist <sub>false</sub> 🗸		
Use Victim Protection false		
Dos Attack Block Duration 1800		
Scan Attack Block Duration 86400		
Victim Protection Block Duration		
Maximum TCP Open Handshaking Count 100		
Maximum Ping Count 15		
Maximum ICMP Count 100		
Apply		

To automatically set up Policies, Triggers and Intrusion Detection settings. Select a security level (none, high, medium, or low) and then click on the Change Level button. This will automatically set up values for firewall policy, firewall trigger and intrusion detection.



# 5.8 IGMP Proxy

Click on the **IGMP Proxy** link on the navigation bar. On this page you will be able to select an Upstream interface for the IGMP proxy. Select and interface from the drop down list, and then click on the **Apply** button.

IGMP Proxy Configuration	
Upstream Interface : eth0	
upstreamlf: eth0 💌	
Apply	

# 6. Interfaces

- Statistics
- ▶ System
- ▼ Configuration

Save config LAN connections WAN connections Routing Table DHCP server DNS relay Security IGMP Proxy ♥ Interfaces Wireless Switch Hub Adsl The **Interfaces** section includes **Wireless**, **Switch Hub** and **ADSL** links. Each link is described in detail below.

# 6.1 Wireless

 Click on the Wireless link on the navigation bar. This page displays the wireless port configurations. You may change the MAC address on this page, then click on the Apply button when completed.

Ethernet	Port Configuration
View advanced attributes.	0
Basic Port At	tributes
Name	Value
MAC	00:20:2b:03:33:00
Rx Ok	107022
Rx Broadcast Packets	38366
Rx Error Packets	59
Tx Ok	3012
Tx Collisions	0
Tx Error Packets	0
Connected	false
Full Duplex	true
Link Speed	100000
Apply Reset	

- Click on the View advanced attributes link to view a detailed page of the Wireless Interface configuration. This page displays the advanced wireless port attributes. You may change the MAC address, and WEP Encryption options. In order to configure WEP encryption, fill in the following fields:
  - a) *WEP Encryption*: Select between 64-bit, 128-bit, or disable if you do not want to use web encryption.
  - b) Default Tx Key: Enter an option 0~3 depending on the previous WEP encryption selection. For example, if you selected 64-bit as the WEP encryption, and entered 3 into this text box, then you would need to edit the Mode64Key3 text box.
  - c) You may edit the rest of the text boxes, depending on the type configuration you are trying to set up.
- The image below only depicts the area described above. Click on the **Apply** button when completed.

MAC	00:20:2b:03:33:08
Default Max Queue	32
Card Type	Unknown
Nic Comp ID	0000
Ap Firmware Version	
Primary Firmware Version	
ESSID	default
Default Channel	1
Wep Encryption	disabled 💌
Default Tx Key	0
Mode64Key0	00-00-00-00
Mode64Key1	00-00-00-00
Mode64Key2	00-00-00-00
Mode64Key3	00-00-00-00
Mode128Key0	00-00-00-00-00-00-00
Mode128Key1	00-00-00-00-00-00-00
Mode128Key2	00-00-00-00-00-00-00
Mode128Key3	00-00-00-00-00-00-00
Rts Threshold	2432
Fragmentation Threshold	2346

# 6.2 Switch Hub

- Click on the Switch Hub link on the navigation bar. This page displays a table of the port configurations. Included are the port numbers, configuration type, link, and speed/duplex.
- You may select a speed/duplex rate from the drop down list. Click on the **Apply** button when completed.

Etl	Ethernet Configura		
Port	Configuration	Linked	Speed/Duplex
#1	AutoNego	×	Autonego 💌
#2	AutoNego	×	Autonego 💌
#3	AutoNego	$\checkmark$	Autonego 💌
#4	AutoNego	×	Autonego 💌
Apply	/		

# 6.3 ADSL

Click on the **ADSL** link on the navigation bar. This page displays a table of the default ADSL settings. This includes standard, trellis coding, coding gain, EC/FDM mode, and Tx power attenuation. You may change the default settings in order to accommodate your needs, click on the **Startup** button when completed.

ADSL Co	onfigur	ation
---------	---------	-------

# **Command Parameter**

Name	Parameter
standard	C t1.413 C g.lite C g.dmt
Trellis encoding	C disable 🔎 enable
Coding gain	COdB C1dB C2dB C3dB C4dB C5dB C6dB C7dB €auto
EC/FDM mode	⊖ec ⊙fdm
Tx Power Attenuation	OdB 💌

# Appendix A – Specifications

### A1. Hardware Specifications

#### Local Interface

- Four 10/100BaseT Ethernet ports, IEEE 802.3, RJ-45 connector
- Integrated 802.11b WLAN Access Point

#### WAN ADSL Line Interface

- Compliant with ADSL ITU G.992.1 (G.dmt) Annex A and ITU G.992.2 (G.lite) and ANSI T1. 413 issue 2
- Compliant with ADSL ITU G.992.1 (G.dmt) Annex B, ADSL ETSI ITS 101388 and Deutsche Telekom U-R2
- Automatic-rate adaptation or programmable in step of 32Kbps
- Line Impedance: 100  $\Omega$
- Connector: RJ-11

### OAM&P

- Remote: Telnet or Web browser
- Local: UART port

#### Memory capacity

- SDRAM: 128Mbytes
- Flash Rom: 16MBytes

#### Environment

- Operation Temperature: 0°C ~ 45°C
- Operation Humidity: 5% ~ 95%
- Storage Temperature: -20 ~ 85°C
- Storage Humidity: 5%~95%

#### Power

- AC Adapter :Input 120 VAC/60Hz or 230VAC/50Hz; Output 18VAC 600mA
- Power Consumption: Less than 10 Watts

#### Physical Dimensions

• (W x D x H) 239mm x 158mm x 42mm

## Certificates

• CE, CB, FCC Part 15 Class B, UL

## A2. Software Specifications

#### ATM

- ATM Cell over ADSL, AAL5
- Support UBR, CBR, & VBR-nrt
- VPI Range (0-4095) and VCI range (1-65535)
- Supports up to 8 PVCs in Bridge mode and 5 PVCs in Router mode
- Supports OAM F4/F5 loopback
- Payload Encapsulation
  - RFC2684 (RFC1483), multi-protocol over ATM
  - RFC2225 (RFC1577), IPoA
  - RFC2364, PPP over ATM (CHAP and PAP supported)
  - RFC2516, PPPoE (PPP over Ethernet) over ATM

### Bridging

- Transparent Bridging (IEEE 802.1D)
- RFC2684 (RFC1483) Bridged
- Spanning Tree Protocol (IEEE 802.1D)
- Supporting IP, IGMP, and PPPoE packets filter function

### Routing

- TCP/IP with RIP1, RIP2 routing, or static IP routing
- NAT/PAT RFC1631
- RFC2684 (RFC1483) Routed
- DNS relay

#### Configuration and Network Management

- DHCP server for IP management
- Telnet for local or remote management
- TFTP for firmware upgrade
- WEB configuration

## Firewall

- C NAT
- Port filter
- IP filter
- IDS

# Appendix B – Warranties

## **B1.** Product Warranty

XAVi Technologies warrants that the ADSL unit will be free from defects in material and workmanship for a period of twelve (12) months from the date of shipment.

XAVi Technologies shall incur no liability under this warranty if

 The allegedly defective goods are not returned prepaid to XAVi Technologies within thirty (30) days of the discovery of the alleged defect and in accordance with XAVi Technologies' repair procedures; or

 XAVi Technologies' tests disclose that the alleged defect is not due to defects in material or workmanship.

XAVi Technologies' liability shall be limited to either repair or replacement of the defective goods, at XAVi Technologies' option.

XAVi Technologies MARKS NO EXPRESS OR IMPLIED WARRANTIES REGARDING THE QUALITY. MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE BEYOND THOSE THAT APPEAR IN THE APPLICABLE USER'S DOCUMETATION. XAVI SHALL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGE. INCLUDING. BUT NOT LIMITED TO. LOSS OF PROFITS OR DAMAGES TO BUSINESS OR BUSINESS RELATIONS. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES.

## B2. Warranty Repair

- During the first three (3) months of ownership, XAVi Technologies will repair or replace a defective product covered under warranty within twenty-four (24) hours of receipt of the product. During the fourth (4th) through twelfth (12th) months of ownership, XAVi Technologies will repair or replace a defective product covered under warranty within ten (10) days of receipt of the product. The warranty period for the replaced products shall be ninety (90) days or the remainder of the warranty period of the original unit, whichever is greater. XAVi Technologies will ship surface freight. Expedited freight is at customer's expense.
- The customer must return the defective product to XAVi Technologies within fourteen (14) days after the request for replacement. If the defective product is not returned within this time period, XAVi Technologies will bill the customer for the product at list price.

## B3. Out-of-Warranty Repair

XAVi Technologies will either repair or, at its option, replace a defective product not covered under warranty within ten (10) working days of its receipt. Repair charges are available from the Repair Facility upon request. The warranty on a serviced product is thirty (30) days measured from date of service. Out-of-warranty repair charges are based upon the prices in effect at the time of return.

# Appendix C – Regulations

## C1. FCC Part 15 Notice

**Warning**: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 to the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, used, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is unlikely to cause harmful interference. But if it does, the user will be required to correct the interference at his or her own expense. The authority to operate this equipment is conditioned by the requirement that no modifications will be made to the equipment unless XAVi expressly approves the changes or modifications.

## C2. IC CS-03 Notice

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements as prescribed in appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee that the equipment will operate to the user's satisfaction.

Before installing this equipment, users should make sure that it is permissible to be connected to the facilities of the local telecommunications company. An acceptable method of connection must be used to install the equipment. The customer should be aware that compliance with the above conditions might not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**Warning:** Users should not attempt to make such connections themselves, but should contact appropriate electric inspection authority, or electrician, as appropriate.

# **Contact Information**

You can help us serve you better by sending us your comments and feedback. Listed below are the addresses, telephone and fax numbers of our offices. You can also visit us on the World Wide Web at <u>www.xavi.com.tw</u> for more information. We look forward to hearing from you!

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