etic TELECOM

XSLAN+

SHDSL Switch

USER GUIDE

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The XSLAN+ SHDSL switch is designed and manufactured by

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Annex 1: SHDSL data rate versus distance
Annex 2 : Surge protector wiring
Annex 3 : SNMP MIB
Annex 4 : XSLAN and XSLAN+ switches compatibility

1 Declaration of conformity

The manufacturer, ETIC Telecom – 13 chemin du vieux chêne – 38240 Meylan – France, Hereby declares that the listed products conforms to

- the R&TTE Directive 1999/5/EC on radio and telecommunication terminal equipment,
- the Directive 2002/95/CE on the restriction of the use of certain hazardous substances (RoHS).

Type of device : SHDSL switch
Reference : XSLAN+

The harmonized standards to which the equipment complies are :

Standard	Title
EN61000-6-2 Ed. 2001	Immunity : EN60100-4-2 Electrostatic Discharge EN60100-4-3 RF Radiated Immunity EN60100-4-4 EFT/Burst Immunity EN60100-4-5 Surge Immunity EN60100-4-6 RF Conducted Immunity
EN61000-6-4 Ed 2001	Emission : EN55022 radiated and conducted emission
EN60950	Security

Date : 5th december 2011

Gilles Benas
Quality manager

2 Products identification

The present user guide describes the setup of the XSLAN+ switches family (it also applies to the switches family previously named XSRING+). It is applicable for products with firmware version 2.0.0 or higher.
The main features are summarized hereafter :

Switch SHDSL XSLAN+								
	1400	12xx	2400	22xx	BP2400	BP22xx	4400	42xx
SHDSL port	1	1	2	2	2	2	4	4
Max. data rate (Mb/s)	15.2	15.2	30.4	30.4	30.4	30.4	60.8	60.8
Ethernet port 10-100 Mb/s	4	2	4	2	4	2	4	2
RS232/RS485 *	N	Y	N	Y	N	Y	N	Y
By-pass	N	N	N	Y	Y	Y	N	Y
RSTP	Y	Y	Y	Y	Y	Y	Y	Y
Failsafe ring	N	N	Y	Y	Y	Y	Y	Y
VLAN,	Y	Y	Y	Y	Y	Y	Y	Y
SNMP	Y	Y	Y	Y	Y	Y	Y	Y
Quality of service DiffServ	Y	Y	Y	Y	Y	Y	Y	Y
HTML configuration server	Y	Y	Y	Y	Y	Y	Y	Y
Serial gateway raw, telnet, modbus, unitelway	N	Y	N	Y	N	Y	N	Y

*Models with serial interface code :

xx	RS232	RS485	RS422 isolated	RS485 isolated
20	1	1	0	0
30	2	0	0	0
60	0	0	1	0
61	0	0	0	1

3 DATA SHEET

Dimensions	136 x 48 x 138 mm (h, l, p)
EMC	ESD : EN61000-4-2 : Discharge 6 KV RF : EN61000-4-3 : 10V/m < 2 GHz Burst : EN61000-4-4 Surge : EN61000-4-5 : 4KV line / earth
Electrical safety	EN 60950
Hazardous materials	2002/95/CE (RoHS)
Power supply	2 power supply input Reverse polarity protection 10 à 60 VDC
Consumption	XSLAN+1400 or +12xx : 5W XSLAN+2400 or +22xx : 6W XSLAN+4400 or +42xx : 9W
Operation T°	-20°/ + 70°C
SHDSL	ITU-T G.991.2, 802.3ah : 2BaseTL (EFM) Data rate: 192 kb/s to 15,2 Mb/s on 1 pair Isolation 1500 V
Connection	45 s typical
Latency	Frame transmission delay from one Ethernet port of an XSLAN+ to the Ethernet port of another XSLAN+ through an SHDSL link : 4 ms at 5.6 Mb/s
Ethernet	10/100 Mb/s Half/Full duplex Auto MDI/MDIX
Switch	Store and forward - 1024 addresses MAC
Redundancy	RSTP - IEEE 802.1D / 802.1Q Fail safe ring Loop VPN
VLAN	IEEE 802.1Q
IP router	Multicast and broadcast filtering Static routes RIP V2 - OSPF
QOS	RFC 2474, 2475, 2597, 2598 « Differentiated services » Traffic prioritization and bandwidth reservation
SNMP	Supported MIBS : RFC1213-MIB (MIB-2) HDSL2-SHDSL-LINE-MIB HOST-RESOURCES-MIB / IF-MIB IP-MIB BRIDGE-MIB RSTP-MIB
RS232-RS485 *	Asynchronous - 1200 à 115200 kb/s with or without parity Gateway : Raw TCP client and server / UDP multipoint / Multicast / Telnet Modbus / Unitelway
Date and time	NTP client and server
Log	Log with timestamp of the last 300 events Syslog
Configuration	With HTML browser

* depending on models

4 Product overview

The XSLAN+ switches family includes :

The products which can be connected to only one twisted pair.
They only provide one SHDSL interface.
The references of that products are XSLAN+1400 or XSLAN+12xx if they provide a serial port.
They are named XSLAN+1XXX hereafter.

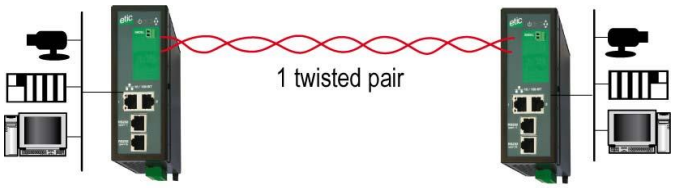
The products which can be connected to two twisted pair.
They provide two SHDSL interfaces.
The references of that products are XSLAN+2400 or XSLAN+22xx if they provide a serial port.
They are named XSLAN+2XXX hereafter.

The products which can be connected to four twisted pair.
They provide four SHDSL interfaces.
The references of that products are XSLAN+4400 or XSLAN+42xx if they provide a serial port.
They are named XSLAN+4XXX hereafter.

4.1 XSLAN+1XXX

Point to point link on a single twisted pair

Two XSLAN+1XXX switches extend Ethernet over on twisted pair.
The data rate is up to 5,7 Mb/s on 3,7 Km and 15 Mb/s on 0,7 Km (see table in Annex 1).



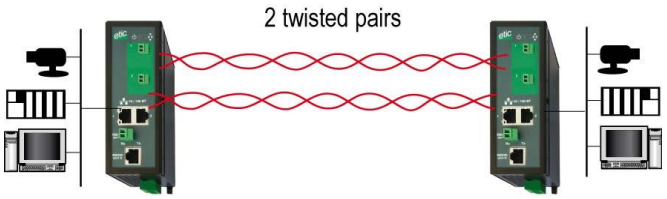
4.2 XSLAN+2XXX

Additional features compared to XSLAN+1XXX:

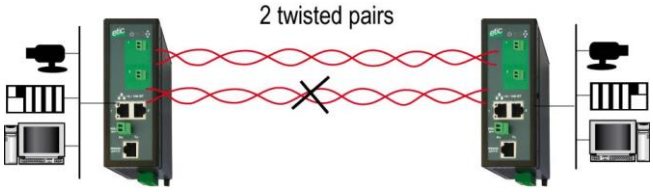
Point to point link on two twisted pairs

Two XSLAN+2XXX switches extend Ethernet over two aggregated twisted pair.

The data rate is twice the data rate on a single pair: up to 11,4 Mb/s on 3,7 Km and 30 Mb/s on 0,7 Km (see table in Annex 1).

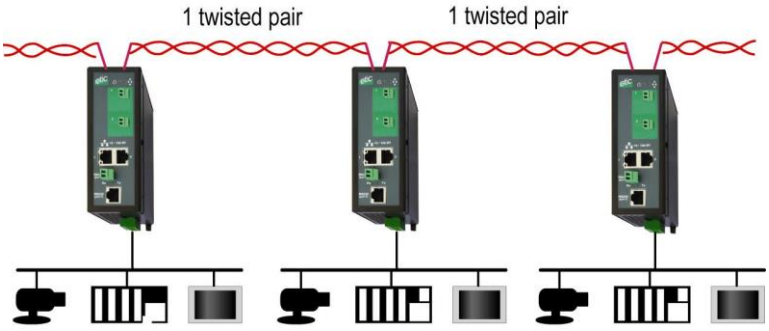


In case of a failure of a pair the data transmission is maintained on the other pair (backup).



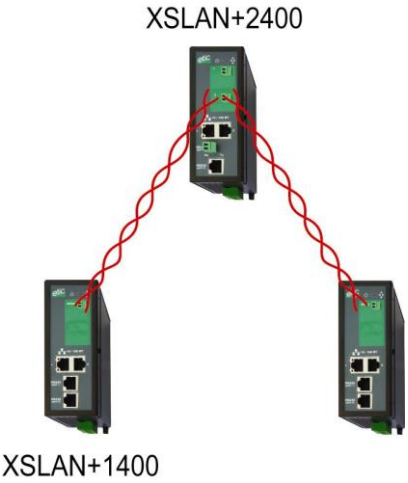
Daisy chain link

The XSLAN+2XXXswitch is used to interconnect a series of Ethernet networks using a single twisted pair. The number of switches is not limited.



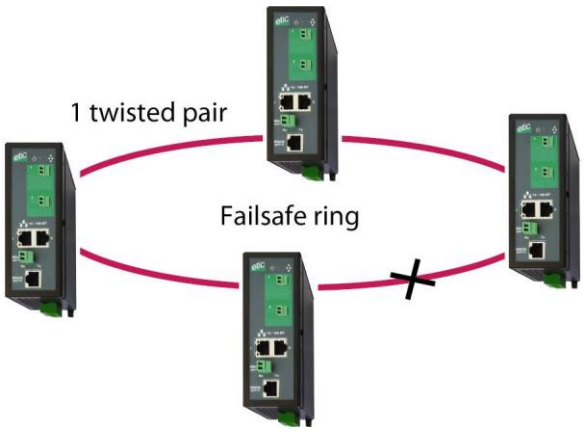
Point to multipoint link

The XSLAN+2XXX switch is used to interconnect a central site with two remote sites.

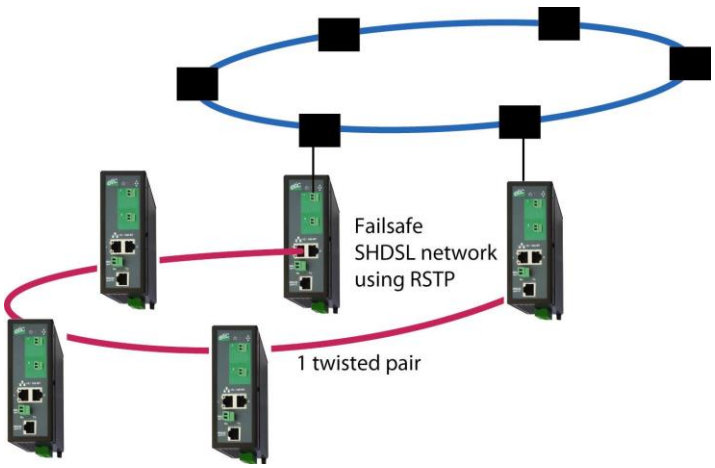


RSTP redundant link of fail safe ring

Redundant network ring using the proprietary protocol (or RSTP)



Complex network topology and "multi-manufacturer" using the RSTP standard protocol.



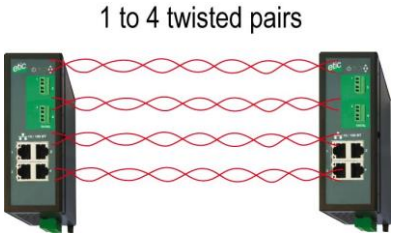
4.3 XSLAN+4XXX

Additional features compared to XSLAN+2XXX:

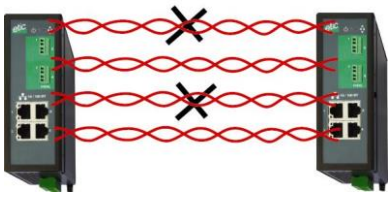
Point to point link on four twisted pairs

Two XSLAN+4XXX switches extend Ethernet over two, three or four aggregated twisted pair.

The data rate is the sum of the data rate on each pair: up to 22,8 Mb/s on 3,7 Km and 60 Mb/s on 0,7 Km (see table in Annex 1).

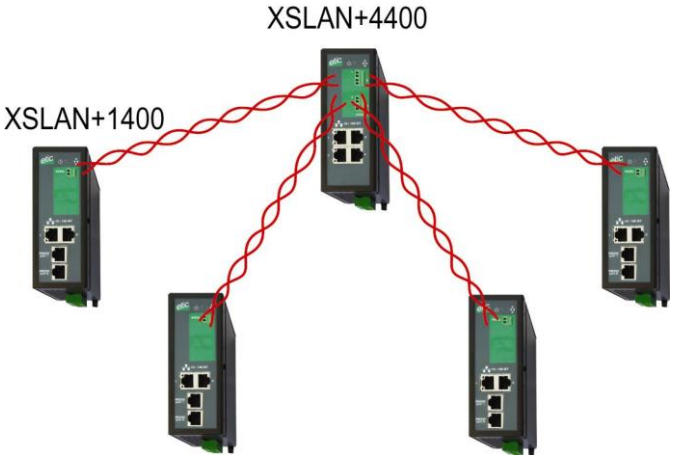


In case of a failure of one or more pairs, the data transmission is maintained on the remaining pairs (backup).



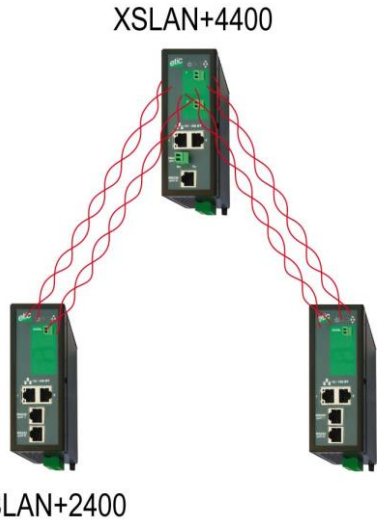
Point to multipoint link - Concentrator

The XSLAN+4XXX switch is used to interconnect a central site with four remote sites.



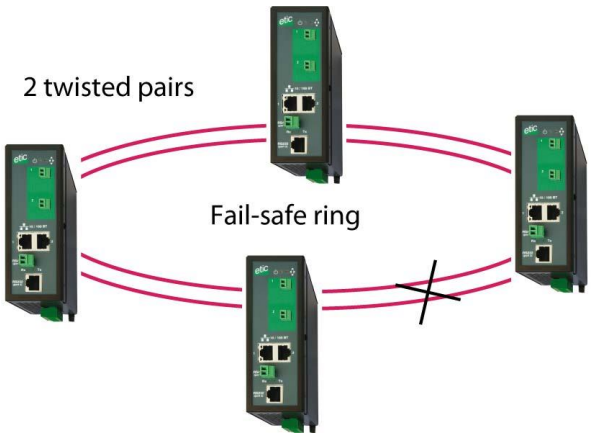
Point to multipoint link with doubled data rate

The XSLAN+4XXX switch is used to interconnect a central site with two remote sites.



Redundant ring with doubled data rate

Redundant ring with 2 pairs aggregated on each side.



4.4 Redundancy solutions: RSTP and proprietary failsafe ring

Industrial applications need reliable networks; one way to provide reliability is to provide backup paths which form loops in the Ethernet network.

However, loops are highly unwelcome in Ethernet networks, as they can cause broadcast storms, eating up all the available bandwidth and causing network outage.

The goal of redundancy protocols is to make Ethernet work of networks containing loops and to provide a path at each time, even, if possible, when one or several links are in failure.

The XSRING provides two solution to handle redundancy :

RSTP :
RSTP, standing for "Rapid Spanning Tree Protocol" is specified by the IEEE in the 802.1D-2004 document.

RSTP can handle complex structures ; RSTP can be used with devices from other manufacturers.

The failure detection delay and the recovery delay in an SHDSL network is around 10 seconds.

Proprietary failsafe ring algorithm:
Based on the STP algorithm, that solution makes possible to handle a ring structure up to 16 SHSDL switches.

The advantages of that solution is that the failure detection delay and the recovery delay is only a few seconds (One second if the ring counts 5 SHDSL switches); moreover, it is very simple to configure..

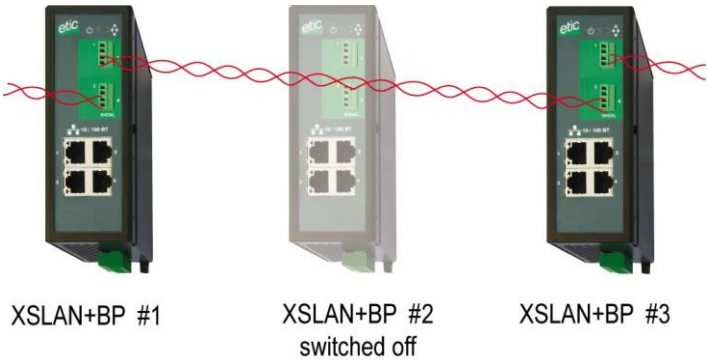
4.5 The by-pass function

When the network is a daisy chain – that case is very frequent in industrial applications - and when, however, it is not possible to build a failsafe structure like a ring, the XSLAN+BP offers a very useful function called the “By-pass function”.

The XSLAN+BP includes an electro-mechanical relay between both lines; that relay is automatically closed to connect the two lines when the XSLAN+BP is switched off.

For instance, if the XSLAN #2 cabinet is switched off for maintenance, the by-pass relay inside the XSLAN #2 will automatically connect the line coming from the XSLAN#1 to the line going to the XSLAN+ #3.

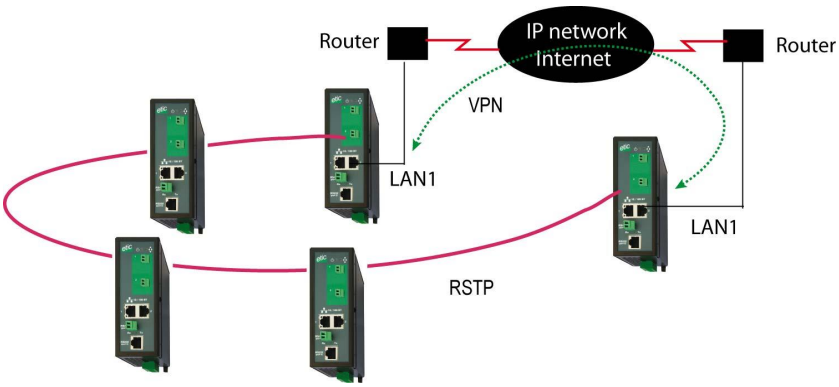
After a few seconds, the XSLAN+ #1 detects the connection default and establishes immediately the connection with the XSLAN #3.
In that way, the connection is recovered after a short delay between the XSLAN #1 and the XSRING #3



4.6 The loop VPN function

When the SHDSL network forms a daisy chain (ie a linear topology), and when it is not possible to form a secure ring, the "loop VPN" function allows for network redundancy if a public WAN connection (Internet) or private (MPLS) is available at each end of the SHDSL network.

The 2 XSLAN+ switches at the end of the network establish a VPN over the WAN. The VPN provides connectivity at the Ethernet level. Thus by activating the RSTP protocol redundancy may be provided thanks to that VPN.



4.7 Other functions of the XSLAN+ family

Data rate versus distance
The table in appendix 1 gives the data rate which can be expected over a line versus the length of the line. Each interface features an adaptive data rate from 192 Kb/s up to 15,2 Mb/s.

When using several aggregated pairs, the total data rate that can be obtained is equal to the sum of the data rates on each pairs.

Ethernet and serial interface
Depending on the model, the products have either 4 RJ45 Ethernet interfaces, or 2 Ethernet and 1 or 2 serial interfaces associated with a gateway function that allows the easy integration of equipment with RS232 or RS485 or RS422 serial interface to the Ethernet network.

IP routing and filtering
The XSLAN+ switch can remove the broadcast frames on the SHDSL link by routing the IP frames, and thus limiting the unwanted traffic on the SHDSL link.

VLAN
The XSLAN+ features VLAN :
Each Ethernet port can be assigned to a particular VLAN. A device connected to an Ethernet port belonging to a particular VLAN can communicate only with devices connected to Ethernet ports belonging to the same one.

Quality of service DiffServ
The XSLAN+ can manage different IP traffics with different priorities.

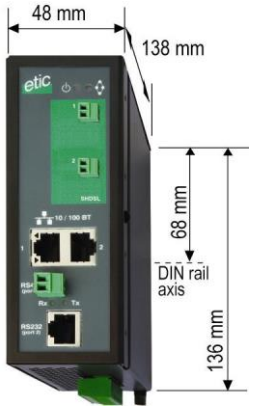
SNMP
The XSLAN+ switch can be monitored by an SNMP manager and supports the main MIB of an Ethernet switch and the SHDSL MIB.

Configuration
The products are configured with an html browser.

1 Description

1.1 Dimensions

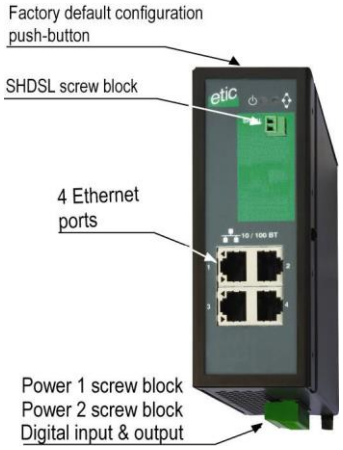
All models XSLAN+1XXX or XSLAN+2XXX or XSLAN+4XXX



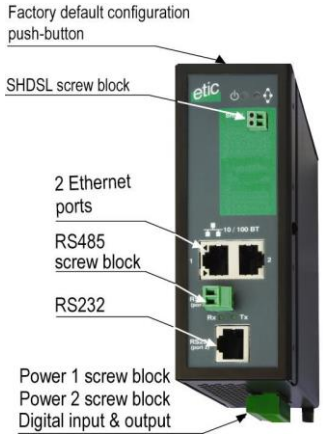
The height indicated ignores the bulk of the power connector on the bottom side.

1.1 Connectors and Led indicators

XSLAN+1400

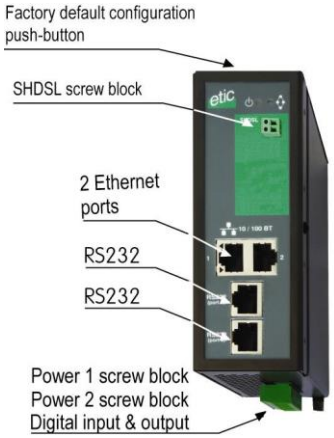


XSLAN+1220

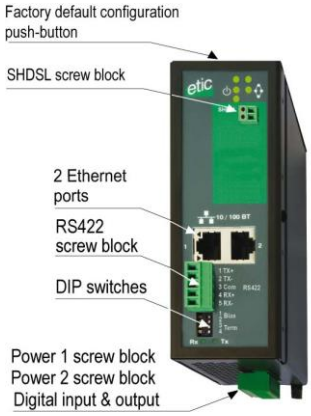


INSTALLATION

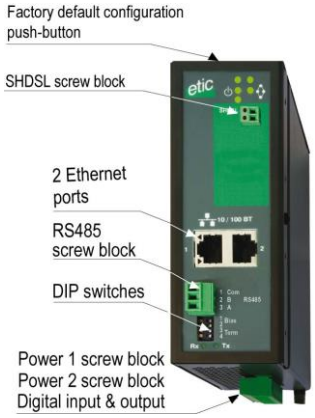
XSLAN+1230



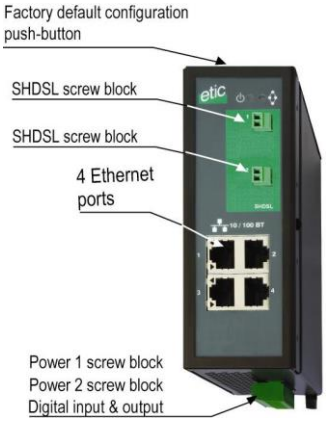
XSLAN+1260



XSLAN+1261

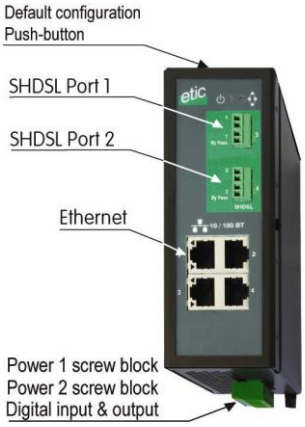


XSLAN+2400



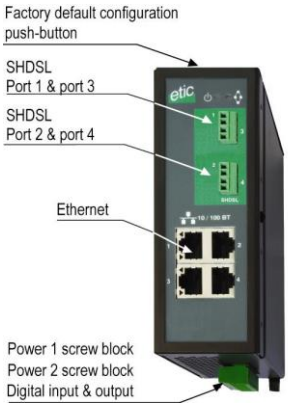
For XSLAN+22XX :
See XSLAN+12XX

XSLAN+BP2400



For XSLAN+BP22XX :
See XSLAN+12XX

XSLAN+4400



For XSLAN+42XX :
See XSLAN+12XX

Function	Led	Function
Power 1		Steady green : The supply voltage 1 is present
Power 2		Steady green : The supply voltage 1 is present
Run		Steady green : The unit is ready Steady red : Startup (15 s) – Otherwise : product failure Slow blinking green : Startup (continued) Fast blinking red : Firmware download in progress
Ring		Steady green : The fail safe ring is established Steady red : Fail safe ring failure Off : Fail safe ring disabled
SHDSL 1 **SHDSL 2** **SHDSL 3** **SHDSL 4**	**1 to 4**	**Green light** : Slow blinking : Connection in progress Steady : Connection established Flashing : Traffic on the link
RS232 *	**Rx**	Bytes received from the RS232
	Tx	Bytes transmitted to the RS232
RS485 *	**Rx**	Bytes transmitted to the RS485
	Tx	Bytes transmitted to the RS485
RS422 *	**Rx**	Bytes transmitted to the RS422
	Tx	Bytes transmitted to the RS422

* Depending on models

2 positions screw terminal: Supply voltage 1 Protected against reverse polarity		
Position	**Signal**	**Function**
1	Power 1 +	+V : 10 – 60 V DC
2	Power 1 -	0V isolated from the enclosure

2 positions screw terminal: Supply voltage 2 Protected against reverse polarity		
Position	**Signal**	**Function**
1	Power 1 +	+V : 10 – 60 V DC
2	Power 1 -	0V isolated from the enclosure

4 positions screw terminal: Digital input and output		
Position	**Signal**	**Function**
1	3V3	3 V DC provided by the XS+
2	In	Digital input
3	F +	Digital output + (max 48Vdc - 0,5A)
4	F -	Digital output +

XSLAN+1XXX or XSLAN+2XXX or XSLAN+4XXX 2 positions screw terminal : SHDSL1 & SHDSL2 & SHDSL3 & SHDSL4		
Position	**Signal**	**Function**
1	Line	SHDSL line conductor
2	Line	SHDSL line conductor

XSLAN+BP2XXX 2 positions screw terminal : SHDSL1 & SHDSL2		
Position	**Signal**	**Function**
1	Line	SHDSL line conductor if the by-pass function is not used
2	Line	SHDSL line conductor if the by-pass function is not used

XSLAN+BP2XXX 2 positions screw terminal : SHDSL1 by_pass & SHDSL2 by-pass		
Position	**Signal**	**Function**
1	Line	SHDSL line conductor if the by-pass function is used
2	Line	SHDSL line conductor if the by-pass function is used

RJ45 connector : Ethernet		
Position	**Signal**	**Function**
1	Tx +	Emission polarity +
2	Tx -	Emission polarity -
3	Rx +	Reception polarity +
4	N.C	-
5	N.C	-
6	Rx -	Reception polarity -
7	N.C.	-
8	N.C.	-

2 positions screw terminal : RS485		
Position	**Signal**	**Function**
1	A	RS485 polarity A
2	B	RS485 polarity B

3 positions screw terminal : RS485 isolated		
Position	**Signal**	**Function**
1	Com	Common isolated
2	B (+)	RS485 polarity B
3	A (-)	RS485 polarity A

5 positions screw terminal : RS422 isolated		
Position	**Signal**	**Function**
1	Tx+	Emission polarity +
2	Tx-	Emission polarity -
3	Com	Common isolated
4	Rx+	Reception polarity +
5	Rx-	Reception polarity -

RJ45 connector : RS232 (To connect a DCE to the RS232 port)			
Position	**Circuit**	**Direction**	**Function**
1	DTR - 108	OUT	Data terminal ready
2	TD - 103	OUT	Data Emission
3	RD - 104	IN	Data Reception
4	DSR - 107	IN	Data set ready
5	SG - 102	-	Ground
6	Not used	OUT	-
7	CTS - 106	IN	Clear to send
8	RTS - 105	OUT	Request to send

RJ45 connector : RS232 (To connect a DTE to the RS232 port)			
Position	**Circuit**	**Direction**	**Function**
1	CD - 109	OUT	Carrier detect
2	RD - 104	OUT	Data Reception
3	TD - 103	IN	Data Emission
4	DTR - 108	IN	Data terminal ready
5	SG - 102	-	Ground
6	DSR - 107	OUT	Data set ready
7	RTS - 105	IN	Request to send
8	CTS - 106	OUT	Clear to send

OUT = Signal supplied by the XSLAN switch
IN = Signal supplied by the external device.

1.2 Push button

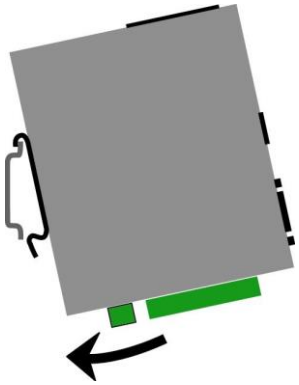
The push button is located on the top side of the product and is used for the following operations :

Temporary restoration of the factory configuration
If the pushbutton is pressed during operation, the Factory configuration of the product is temporarily restored; in particular, the IP address of the management server is 192.168.0.128.
However, the current configuration is not lost: The settings for the current configuration are still displayed in the web pages; the current configuration can be modified and saved again.

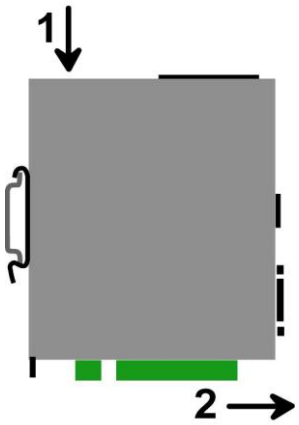
Erasing the current configuration and return to the factory configuration
If the pushbutton is pressed at power up, the current configuration is erased and the factory configuration is restored.

2 DIN rail mounting

Mounting the unit on the 35 mm horizontal DIN rail,



Removing the unit from the DIN rail,



3 Cooling

The product is designed to be mounted on a 35mm DIN rail.
To avoid obstructing the airflow around the unit, the spacing must be at least 25 mm above and below, and 10 mm left and right.

4 Power supply

The XSLAN switch has 2 power inputs.
The supply voltage must be regulated and strictly between 10 and 60 Volt DC.
The power consumption is 5W for XSLAN+1XXX, 6W for XSLAN+2XXX+ and XSLAN+BP2XXX and 9W for XSLAN+4XXX.

5 Isolation and grounding

The enclosure of the XSLAN+ is metallic ; the lug located on the underside of the product must be connected to an efficient protective ground.

The minus polarity of the supply voltage is common with the minus voltage of the electronic board (usually called 0V) and is isolated from the enclosure.

Ethernet and SHDSL signals are isolated through transformers. Consequently,

XSLAN+X400, XSLAN+BP2400, XSLAN+X260 et XSLAN+X261 products are electrically isolated from the outside up to a common mode voltage of 1500 V;

XSLAN+X220 et XSLAN+BP2220 products are electrically isolated with the same conditions except for the RS232 and RS485 interfaces;

XSLAN+X230 et XSLAN+BP2230 products are electrically isolated with the same conditions except for the RS232 interfaces;

6 RS232 serial connection (XSLAN+X230 ou XSLAN+BP2230)

Cables can be provided to connect the product to DTE and DCE as follows :

RS232 cables		
Reference	**Connector**	**Function**
CAB592	SubD 9 male	To connect a DCE to the product
CAB593	SubD 9 female	To connect a DTE to the product
CAB609	Wires	To connect a device providing a specific connector

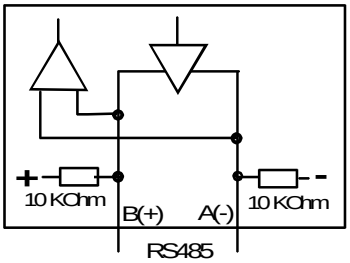
The RS232 cable must be shorter than 10 meters.

7 RS485 serial connection (XSLAN+X220 ou XSLAN+BP2220)

The RS485 interface is not isolated.

Two 10 KOhm bus polarization resistors are included inside the product.

if the RS485 line is longer than10 meters or if the data rate is greater than 19200 b/s, it is necessary to connect one 120 Ohm matching resistor at each end of the line and two 390 Ohm polarization resistors at one of the two extremities of the line.



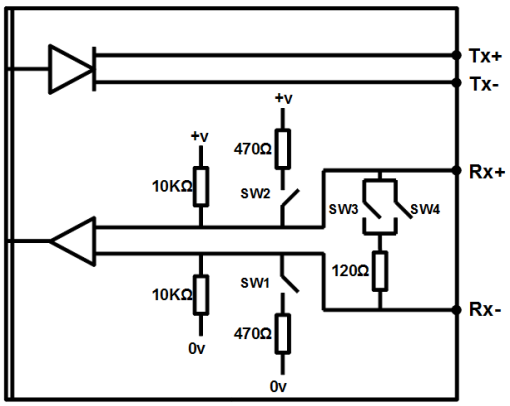
8 RS422 isolated serial connection (XSLAN+X260 ou XSLAN+BP2260)

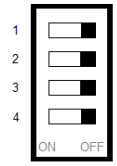
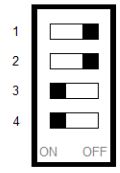
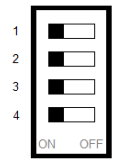
The polarization and termination resistors can be selected with DIP switches.
The termination resistor must be enabled when the product is located at the extremity of the RS422 bus.
The polarization resistors must be enabled by one device of the bus.

Up to 16 devices can be connected to the bus.

We recommend to use a shielded cable and twisted pairs.

When two devices or more are connected to the RS422 bus, the XSLAN+ switch must be the only device to transmit data on the TX+/TX- line towards all the other devices.
It means that the TX+/TX- line of the IXSLAN+ switch must be connected to the RX+/RX- of all the other devices of the bus.



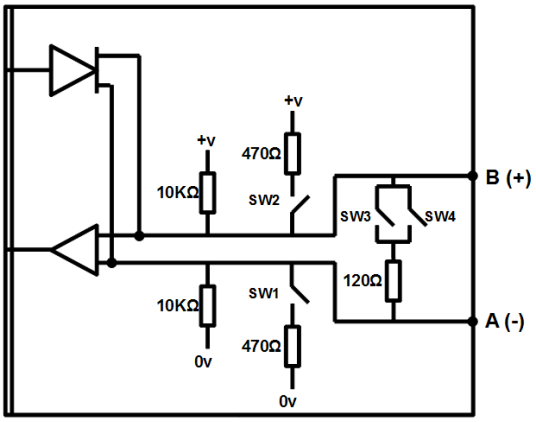
Micro-switches	
	No polarization No termination resistor
	470 Ohm polarization resistors No termination resistor
	No polarization 120 Ohm termination resistor
	470 Ohms polarization resistors 120 Ohm termination resistor
	All other combinations are prohibited

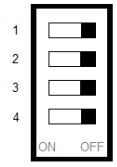
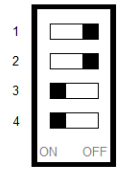
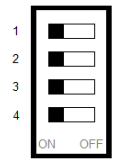
9 RS485 isolated serial connection (XSLAN+X261 ou XSLAN+BP2261)

The polarization and termination resistors can be selected with DIP switches.
The termination resistor must be enabled when the product is located at the extremity of the RS485 bus.
The polarization resistors must be enabled by one device of the bus.

Up to 16 devices can be connected to the bus.

We recommend to use a shielded cable and twisted pairs.



Micro-switches	
	No polarization No termination resistor
	470 Ohm polarization resistors No termination resistor
	No polarization 120 Ohm termination resistor
	470 Ohms polarization resistors 120 Ohm termination resistor
	All other combinations are prohibited

10 Preparing and checking the line

10.1 Type of cable

Twisted pair cable
The XSLAN+ SHDSL switch is designed to be connected to one or several telephone grade twisted pairs.
The conductor diameter must be included between 0.4 mm and 1 mm.

A cable may be composed of several twisted pairs.
Each pair can usually be used for a different SHDSL transmission if necessary. However, care must be taken to ensure that crosstalk between pairs is not excessive.

Shielded cable
It is better to use a shielded cable.
The shield must be connected to the earth at one of its ends.
The shield decreases the influence of the electromagnetic ambient noise on the SHDSL signal.
Moreover, the shield protects the XSLAN+ switch against lightning.

Electrical power cable
Two power conductors can be used instead of a twisted pair to set an SHDSL connection.
However, because the two wires are not twisted, the ambient electrical noise may disturb the transmission.
Compared to the transmission over a twisted pair, the maximum distance between two SHDSL switches is decreased.

10.2 Crosstalk interference

If the cable is made of several pairs, each pair can be used to transmit a particular SHDSL connection ; however the SHDSL signal transmitted in one pair may disturb the SHDSL signal transmitted in another one, and, in some cases, may decrease the effective data rate of both SHDSL connections.

10.3 Shield grounding

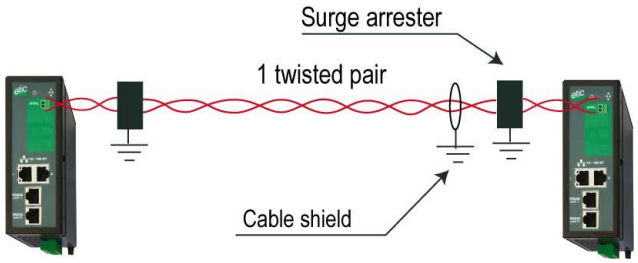
A shielded cable provides better noise immunity and surges protection during thunderstorms.

The best protection is provided when the shield is grounded at each end of the line.
However, there may be a large potential difference between the connection points to the ground, especially when the line is long.
Therefore, to avoid a large current flowing in the shield, it is recommended to connect the shield to the ground at only one end of the cable.

10.4 Protecting the SHDSL switch from lightning

The XSLAN+ switch is coupled to the line by a transformer which provides isolation between the circuit board and the line. Moreover, the switch XSLAN+ is equipped with internal protections against overvoltage.

However, if the line is vulnerable to thunderstorms, for example if it is an air line, or if it is several kilometers long, or if the installation is in a very exposed area, it is recommended to protect each XSLAN+ switch with a surge protector, as described below.



The surge protector is described in Annex 2

11 Connecting the shdsl switch to the line

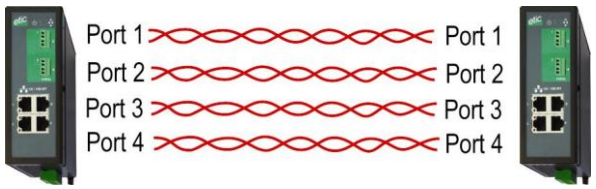
11.1 General precautions

The SHDSL signal is not polarized ; it is why the two conductors of one line can be inverted.
Check that the shield, if any, is properly connected to the ground.

11.2 Point to point connection using two, three or four twisted pairs

An aggregated link is a link between two XSLAN switches that uses two or three or four twisted pairs to multiply the total throughput (depending on model).

When performing a point to point link to doubled (XSLAN+2XXX) or tripled or quadrupled (XSLAN+4XXX) the data rate, it is recommended to wire pairs in an orderly way, as shown below, to make the configuration and the diagnostic easier.



XSLAN+4XXX XSLAN+4XXX

11.3 Daisy chain or ring connection

If the SHDSL switches are connected to shape a daisy chain network or a ring network, we recommend to connect the lines as shown below .

In that way, the configuration of each SHDSL switch will be similar.

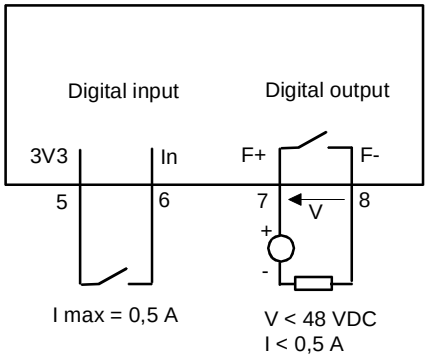
11.4 By-pass function

To enable the by-pass function, connect the line1 to the “1 by-pass” screw block and the line 2 to the “2 by-pass” screw block as shown below.

12 Digital input and output

Digital output :
Isolated 500 V
Max. voltage : 48 VDC
Max. current : 500 mA

Digital input :
Not isolated
Maximum voltage : 20 VDC



1 Setup steps

To configure the product, we advise to proceed as follows :

- Connect a PC to the XSLAN+ switch
- Set up the LAN interface
- Set up the SHDSL connections
- Set up the RSTP or failsafe ring redundancy protocol
- Set up VLAN
- Set up SNMP
- Set up QoS
- Set up the routing functions
- Set up the serial gateways

2 Connecting a PC for configuration

2.1 Overview

The XSLAN+ switch is configured using a PC with an HTML browser. No additional software is required.

Online help :
For most pages of the administration server an help page is available by clicking the ? located at the top right of the page.

Administration server address :
When the product is delivered, the IP address of the administration web server is 192.168.0.128.

First setup :
For the first configuration, we advise to connect the PC directly to the LAN interface of the SHDSL switch.. Subsequent changes can be made remotely.
.
Restoring the factory IP address:
The factory IP address 192.168.0.128 can be restored by pressing the pushbutton on the top of the product.

Restricted access to the administration server :
If you do not have access to the administration server, it is probably that access has been restricted for security reasons or for other reasons.

Network IP address :
Later in the text, we often speak of "network IP address". We mean the lowest value of the addresses of the network.

For instance, if the netmask of a network is 255.255.255.0, the network IP address of that network is terminated by a zero (X.Y.Z.0.).

Characters allowed
Accented characters are not supported.

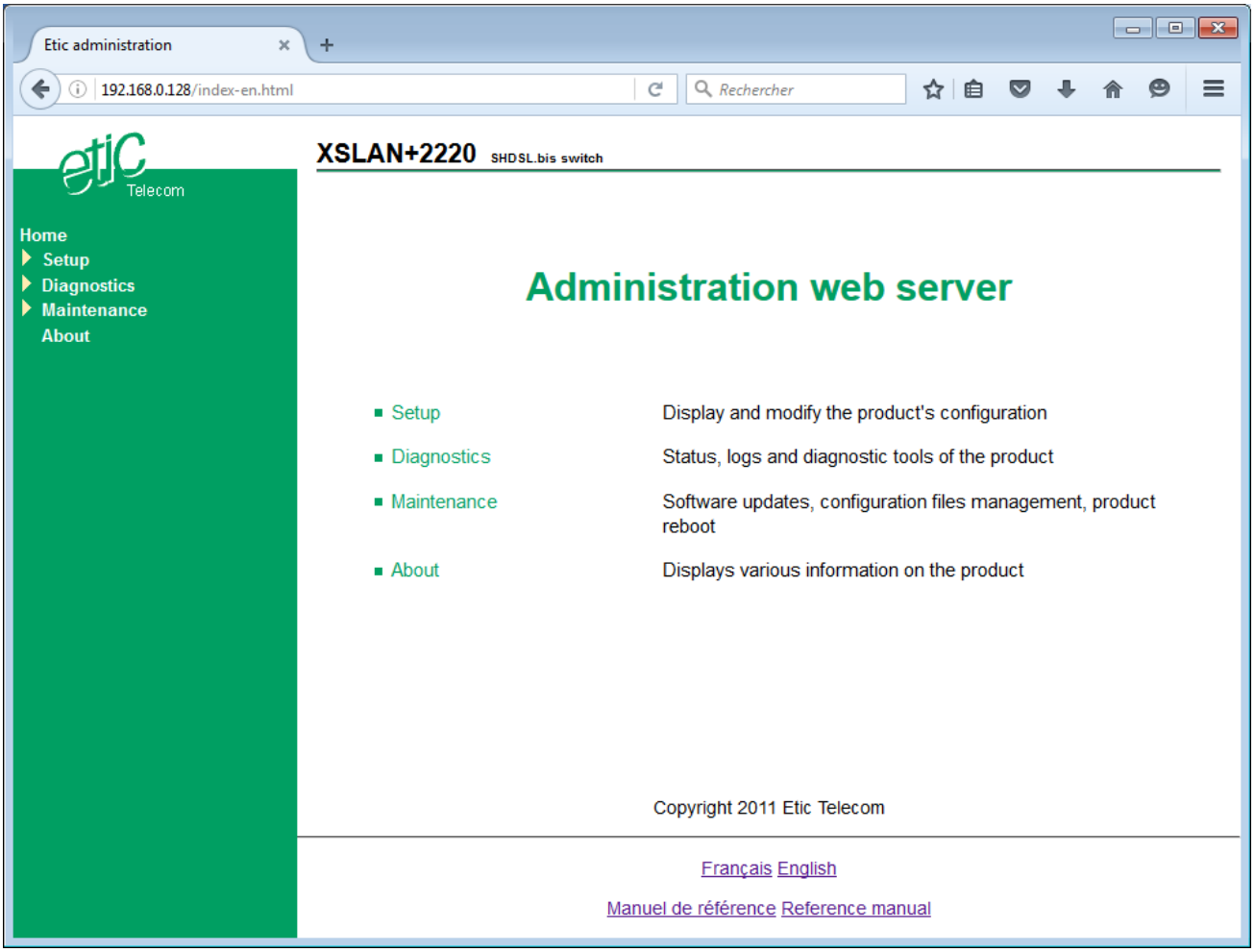
2.2 First configuration

Step 1 : Create or modify the PC TCP/IP connection
Assign to the PC a different IP address different but consistent with the factory IP address of the XSLAN+ switch.
For the first configuration, assign for instance 192.168.0.1 to the PC.

Step 2 : Connect the PC to the XSLAN+
Connect the PC directly to the XSLAN+ with any Ethernet cable (straight or cross-wired);

Step 3 : Launch the web browser
Launch the web browser and then enter the IP address of the XSLAN+ switch : 192.168.0.128

The Home page of the administration server is displayed.



Note : In the first configuration, access to the administration server is not protected.

2.3 Changing the configuration later

Thereafter, the XSLAN+ switch administration server is accessible from the Ethernet interface or remotely through the SHDSL line at the IP address assigned to the product.

- Open the html browser and enter the IP address of the administration server of the XSLAN+ switch
- Enter, if any, the user name and password that protect the access to the administration server.

3 Temporary return to the factory settings

If the IP address of the XSLAN+ switch could not be founded, or if it is impossible to access the administration server, for example, following a bad VLAN configuration, it is possible to restore the factory settings without losing the current configuration.

- Keep the push-button pressed for about 3 seconds;
- The LED ⏻ blinks red rapidly.
- The administration server becomes accessible at the factory IP address (192.168.0.128) ; The factory configuration is temporarily running.
  However, the current configuration is not lost and it is the one that is still displayed in the pages of the Administration Server.
- After reading the IP address or changing some parameters, press again the push button or reboot the product.
  The product can be reached at the registered IP address.

Note :
If the IP address of the XSLAN+ switch is unknown, the software tool EticFinder can be used.
This software detects all ETIC branded products on a local network. After starting the software, click on the "Search" button, and when the product list is displayed, double-click on the product address to access the html server.

4 Restoring the factory settings

To restore the factory settings using the push button,

- Power off the XSLAN+ switch,
- Keep the push-button pressed,
- Power on the product,

The LED ⏻ turns red ; the XSLAN+ switch boots and the factory configuration is restored.

Note : The factory configuration can also be restored via the menu « Maintenance > Configurations management » of the administration server.

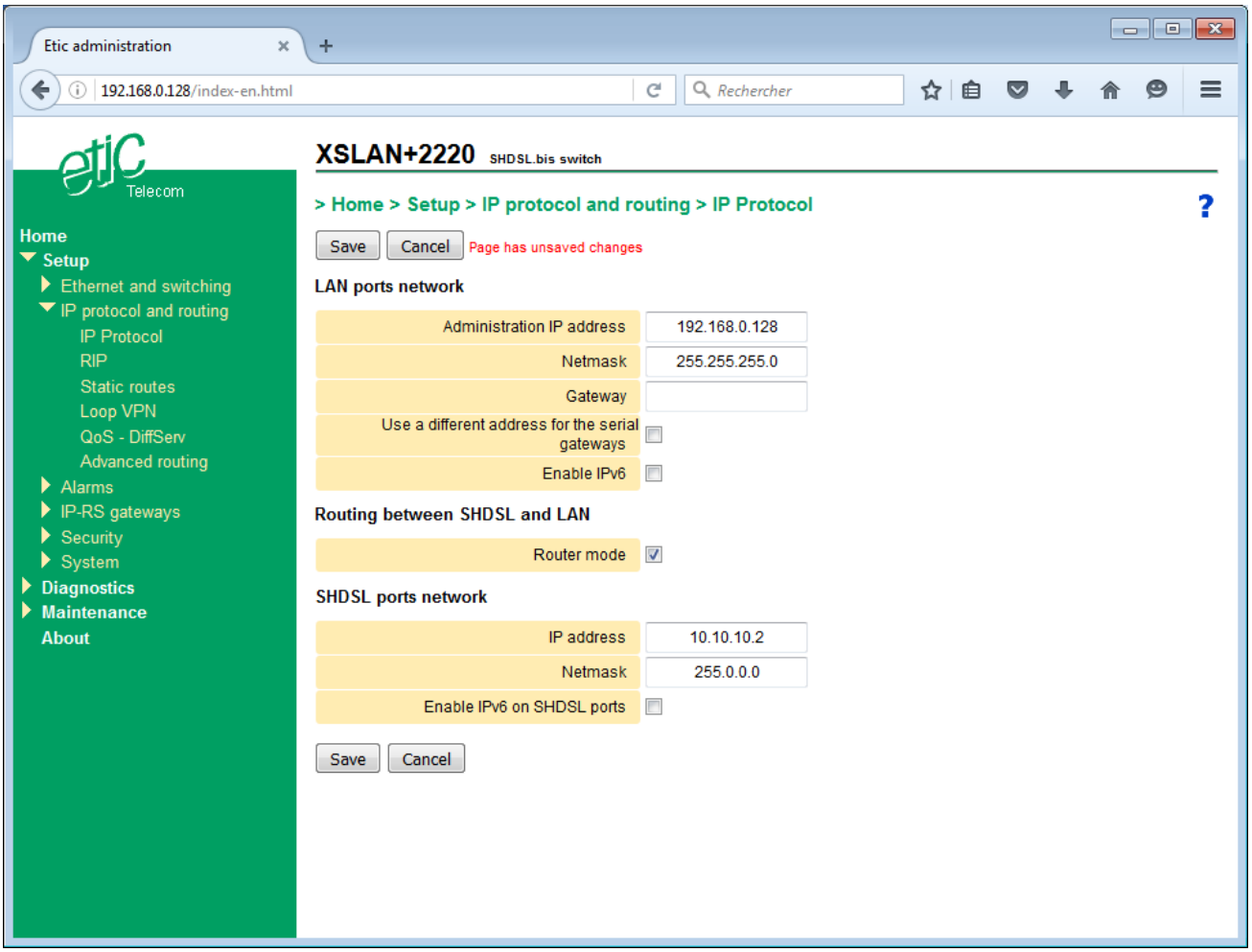
5 Protecting the access to the administration server

- Select the menu « Setup > Security > Administration rights ».
- Enter a user name and password to protect the administration server.
- Tick the checkbox « Password protect the web site access »

If the username and password to access the administration server are lost, you have to temporarily return to the factory settings; access to the administration server is then free.

6 IP addresses setting

- Select the menu « Setup > IP protocol and routing > IP Protocol ».



- Configure parameters « LAN ports network » :

Parameter « Administration IP address » :
This is the IP address assigned to the Ethernet interface of the XSLAN+ switch on the local network.
This is the IP address of the administration server and the serial gateways.
Factory value : 192.168.0.128

Parameter « Netmask » :
The netmask defines the local network size and which IP address belongs to that network.
Factory value : 255.255.255.0

Parameter « Default gateway » :
This is the IP address of the default router on the local network .

Checkbox « Use a different address for the serial gateways » :
By default, the IP address of the serial gateways is the IP address of the administration server of the XSLAN+ switch.
It may be necessary to set a different IP address for the serial gateways especially when VLAN is enabled; in this case, this box must be checked and an IP address and a subnet mask must be entered.

Checkbox « Enable IPV6 » :
The IP addresses assigned to the XSLAN+ switch must be entered in IPV4 format.
However, the switch also supports IPv6 addressing. If this is checked, IP addresses must also be entered in IPv6 format.

- Configure parameters « Routing between SHDSL and LAN »

Checkbox « Router mode » :
The XSLAN+ switch acts as a managed switch..
However, if this box is checked, the XSLAN+ switch provides basic IP router features between two interfaces:
LAN Ethernet 10/100BT ports,
and SHDSL ports.

The Ethernet ports are considered a single interface; SHDSL ports (1 to 4 depending on model) are also considered as a single interface. The XSLAN+ switch must have two IP addresses. The one previously defined only applies to LAN Ethernet ports and a new one must be defined for SHDSL ports.
The main purpose is to prevent the broadcast frames or other frames to congest the SHDSL lines.

Default value : Unchecked

The following parameters are displayed only when the IP router mode is selected.

Parameter « IP address » :
This is the unique IP address assigned to the SHDSL interfaces of the XSLAN+ switch..
Default value : none

Parameter « Netmask » :
Subnet mask for the network on the SHDSL port side.
Default value : 255.255.255.0

Checkbox « Enable IPV6 on SHDSL ports » :
See above.
Default value : Unchecked

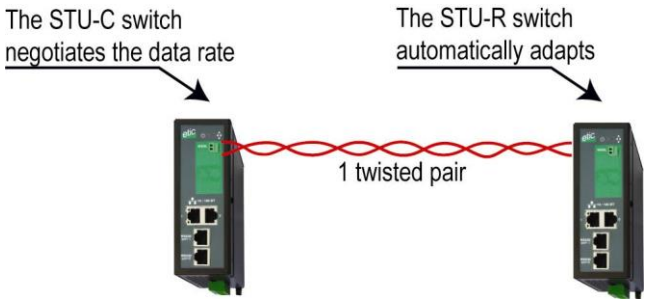
7 SHDSL connection set up overview

7.1 Principle of operation

When two XSLAN+ switches are connected by a twisted pair, one switch initiates the connection while the other responds and adapts automatically its data rate.

The switch that initiates the connection is called STU-C.
The switch that responds and adapts is called STU-R.

Thus a line is always connected on one side to a switch acting as the STU-C and on the other side to a switch acting as the STU-R.



One switch is normally configured as a STU-C and the other as a STU-R. However, to make the configuration simpler, the switch configured as a STU-C is able to automatically change to STU-R mode if it detects the presence of a STU-C on the remote side. Thus, two XSLAN+ switches configured both in STU-C will find a way to connect. One of the two will switch to STU-R.

The STU-C initiates the connection and measure the received signal level and the noise level and calculates the signal to noise ratio.

The longer the distance and the higher the noise level over the line, the smaller the SNR ratio.

A minimum SNR is required to connect two SHDSL switches through a line at a given data rate.

The difference between the SNR ratio as it is measured and the minimum required is the SNR margin.
The greater the SNR margin, the more reliable the connection at a given data rate.
One can select the SNR margin; in that way, one selects the reliability of the connection.

7.2 Connection profiles

A connection profile includes all the technical parameters of an SHDSL connection.

To make the connection process as simple as possible, five profiles are available.

To set an SHDSL connection, one of these profiles has to be assigned to each SHDSL port.

Profile « STU-R, Auto » :

This profile has to be assigned to an SHDSL port when it has to wait for the connection (see the drawing above).

Profile « STU-C, Standard » :

The SHDSL port configured with this profile initiates the connection but is able to switch to STU-R mode if it detects the presence of an STU-C at the other end.

The connection is established at a data rate compliant to the EFM standard up to 5.6 Mb/s.

The SNR ratio margin is medium; the date rate is medium and the risk of disconnection is reasonable in case of any disturbance.

The duration to establish the connection is typically 45 seconds and may take up to 1 minute 30.

This profile is suitable for most situations, i.e. with no or moderate noise and using usual twisted pair transmission cables.

Profile « STU-C, Endurance » :

The SHDSL port configured with this profile initiates the connection but is able to switch to STU-R mode if it detects the presence of an STU-C at the other end.

The connection is established at a data rate compliant to the EFM standard up to 5.6 Mb/s.

The SNR ratio margin is high; the date rate is low and the risk of disconnection is low in case of any disturbance.

The duration to establish the connection is longer, typically 3 minutes and may take up to 5 minutes.

This profile is suitable for medium to very noisy lines or on cables not dedicated to the transmission such as cables with a large diameter or electrical cables.

Profile « STU-C, Performance » :

The SHDSL port configured with this profile initiates the connection but is able to switch to STU-R mode if it detects the presence of an STU-C at the other end.

The connection is established at a data rate compliant to the EFM standard up to 15,2 Mb/s.

The SNR ratio margin is low; the date rate is high and the risk of disconnection is high in case of any disturbance.

The duration to establish the connection is longer, typically 3 minutes and may take up to 5 minutes.

This profile is suitable for slightly noisy lines. The highest data rates are obtained on short distances.

Profile « STU-C, Fixed datarate » :

The SHDSL port configured with this profile initiates the connection.

This profile is not usable directly; It must be edited to select the desired data rate ("Copy and change").
See Advanced setting up of an SHDSL link

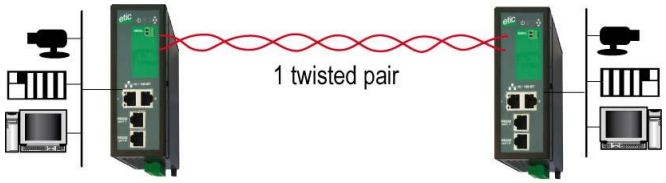
The duration to establish the connection is the fastest, typically 30 seconds.

However, it requires the user to perform tests by changing the data rate until getting a connection with the expected SNR ratio margin.

8 Setting up a link using one twisted pair

This section describes the implementation of a point to point link on a twisted pair.

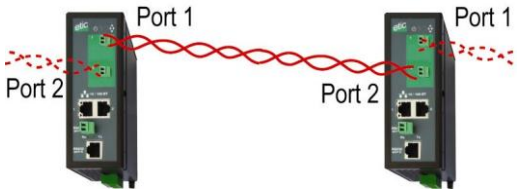
Either between two XSLAN+ as in the diagram below.



XSLAN+1XXX or
XSLAN+2XXX or
XSLAN+4XXX

XSLAN+1XXX or
XSLAN+2XXX or
XSLAN+4XXX

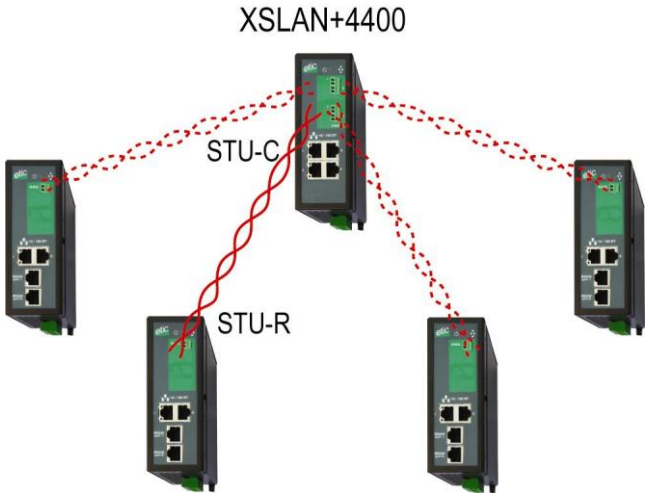
Or between two XSLAN+2XXX in case of a daisy chain or a ring network, as in the diagram below.



XSLAN+2XXX or
XSLAN+4XXX

XSLAN+2XXX or
XSLAN+4XXX

Or between an XSLAN+4400 used as a concentrator and several XSLAN+1XXX as in the diagram below.



8.1 Set up steps

Step 1 : SHDSL connection set up

Assign the STU-R profile to the SHDSL port of the first XSLAN+ switch

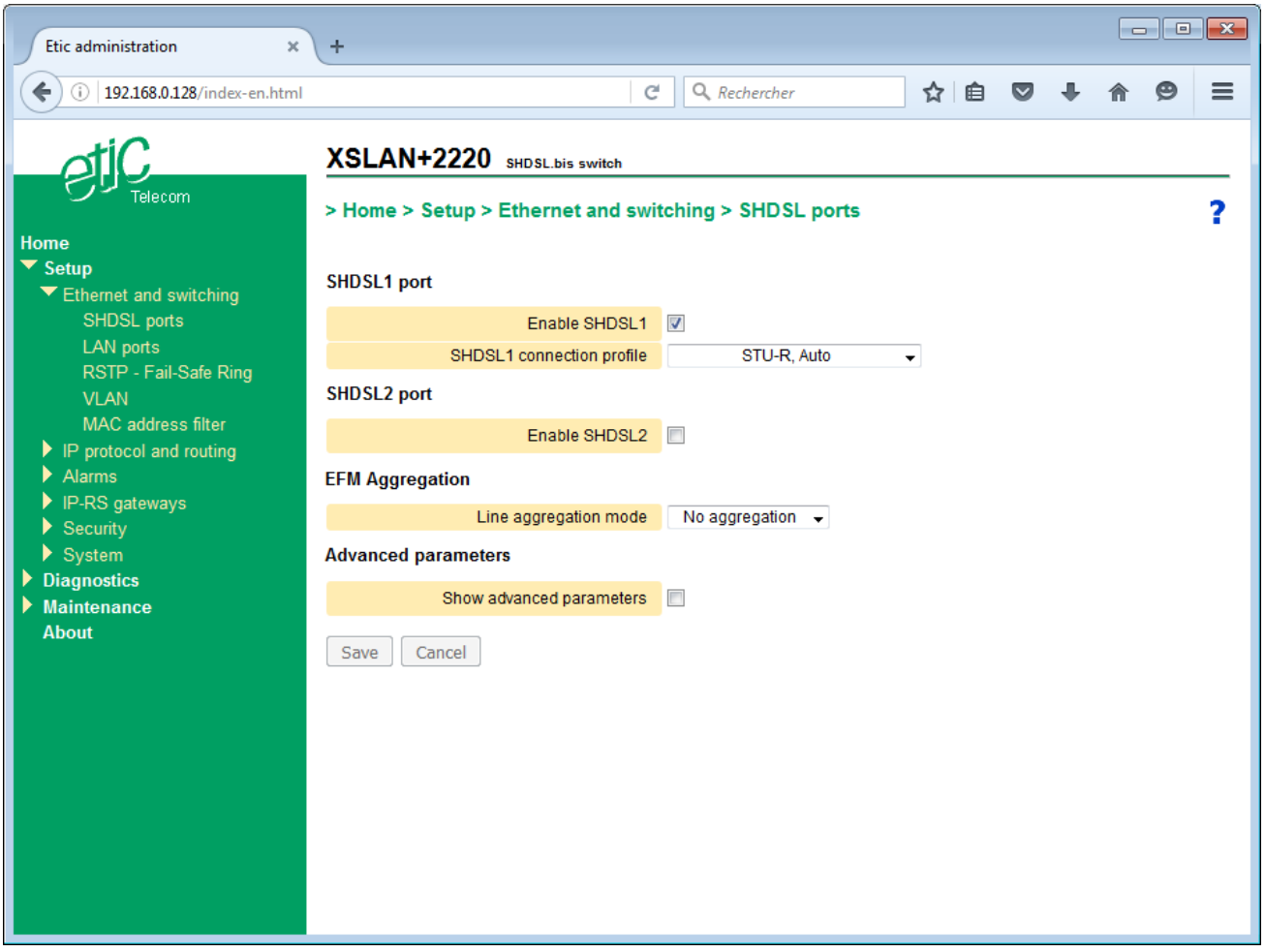
Assign a connection profile to the other switch (« STU-C Standard » or « STU-C Endurance » or « STU-C Performance ».

Step 2 : SHDSL test and set up adjustment

8.2 Step 1 : SHDSL connection setup

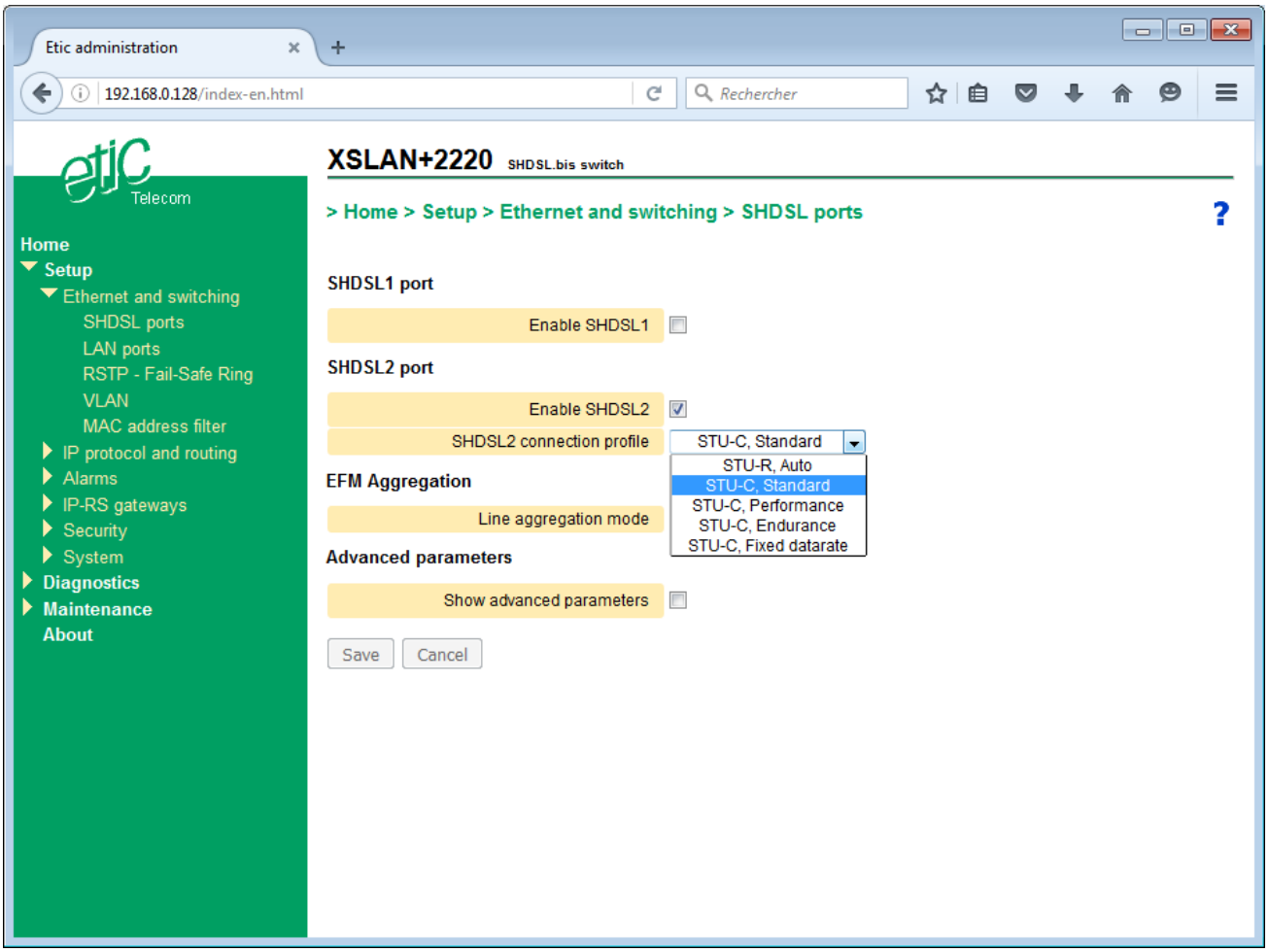
Setting up the XSLAN+ 1 :

- Select the menu « Setup > Ethernet & commutation > SHDSL ports ».
- Tick the checkbox « Enable SHDSL1 » (or 2 or 3 or 4 depending on the case).
- Assign the « STU-R, Auto » profile.
- Click « Save ».



Setting up the XSLAN+ 2 :

- Select the menu « Setup > Ethernet & commutation > SHDSL ports ».
- Tick the checkbox « Enable SHDSL1 » (or 2 or 3 or 4 depending on the case).
- Assign the « STU-C, Standard » or « STU-C Performance » or « STU-C Endurance » profile.
- Click « Save ».

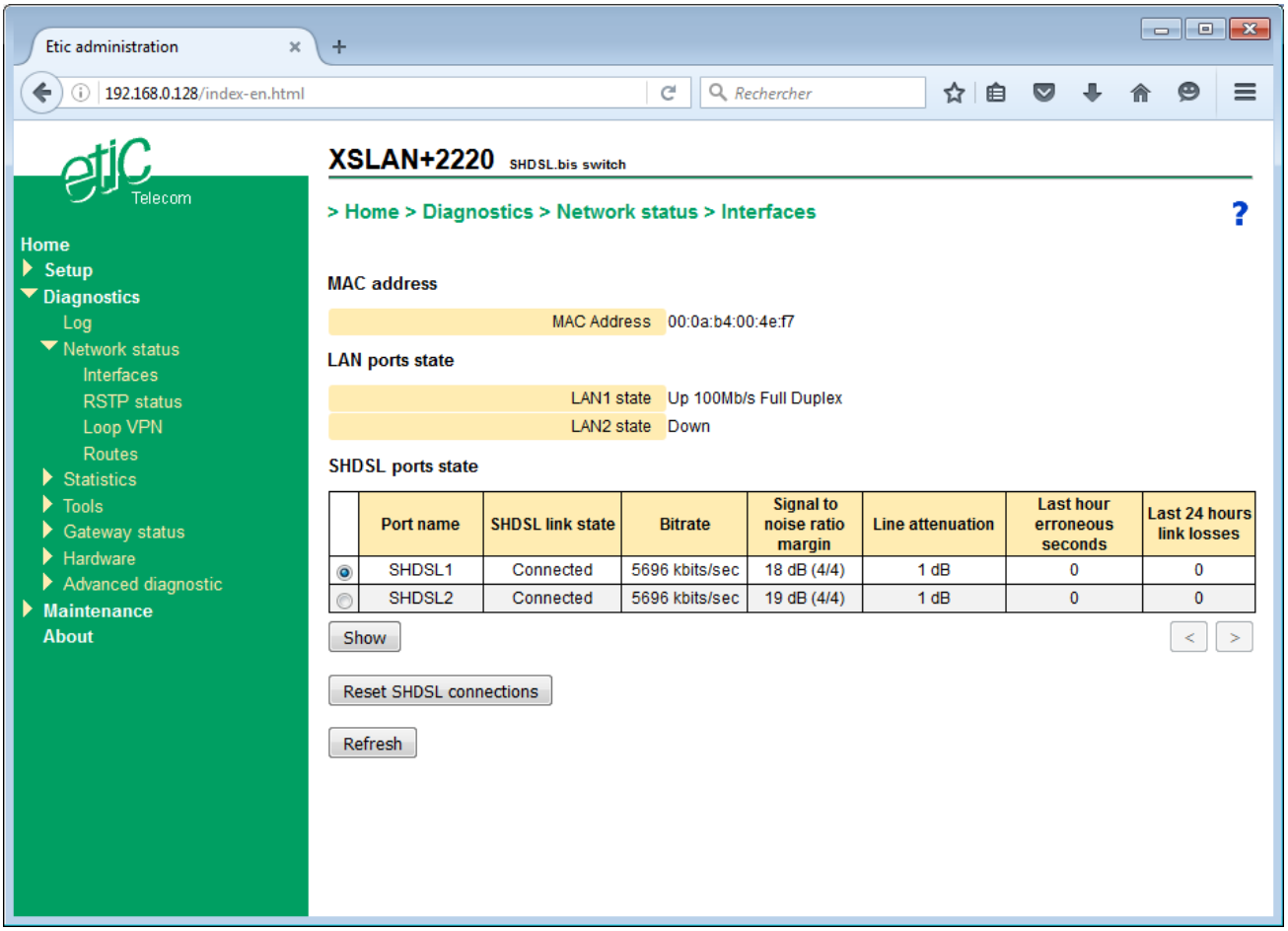


8.3 Step 2 : SHDSL test and set up adjustment

- Connect the XSLAN+ switches to the twisted pairs. The wires of the same twisted pair can be reversed.
- Power on the switches.
- The connection takes about 45 s to establish with the « standard » profile and may takes a longer time with other profiles.
- The SHDSLx led attached to each port displays the state of the connection as described in the table below.

Connection state	STU-C	STU-R
The other XSLAN+ has not been detected (for instance when the line is not connected)	Blinking 0,1 s ON / 2 s OFF	Blinking 1 s ON / 1 s OFF
The other XSRING+ has been detected	Blinking 1s ON / 1s OFF	Blinking 1s ON / 1s OFF
Data rate negotiation	Blinking 0,3s ON / 0,3s OFF	Blinking 0,3s ON / 0,3s OFF
Connected	Steady ON	Steady ON
Connected & data transmission	Flashing briefly	Flashing briefly

- Once connected, select the menu « Diagnostics > Network status > Interfaces » to check the SHDSL link quality.



- Check the quality of each SHDSL port.
  The SNR ratio margin must be at least 2/4.
  The number of erroneous seconds during the last hour must be next to 0.
  The number of link losses during the last 24 hours must be 0 or a few ones.

- If the SNR ratio margin is only 1/4d e 1/4, with the « STU-C standard » profile, assign the « STU-C Endurance » profile and check again the connection.

- Once all the SHDSL connection run correctly, send periodically a PING from a PC to a remote XSLAN+ or device to check that no error occurs.

Remark : one can use the PING tool included in the XSLAN+ (menu Diagnostics > Tools > PING).

- If, despite these changes, the quality is insufficient, or if disconnections occur, or if the connection is not established, check the line :

  Check that each conductor of the line is correctly connected.
  Disconnect and by-pass the surge protectors to check if they are not the cause of the dysfunction;
  Check that the cable shield if any, is correctly connected to the ground.

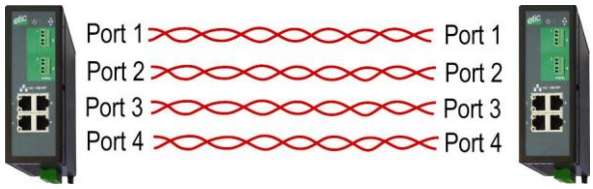
9 Setting up a link using 2, 3 or 4 twisted pairs

This chapter describes how to set up a multiplexed point to point connection.

A multiplexed connection is a link between two XSLAN+ switches that uses two or three or four twisted pairs to multiply the total throughput. The overall data rate is approximately the sum of the rates obtained on each twisted pair.

The XSLAN+2XXX switch can establish a multiplexed link with two pairs; the data rate is approximately doubled, up to 11 Mb/s or even 20 Mb/s up to 1 Km.

The XSLAN+4XXX switch can establish a multiplexed link with up to four pairs; the data rate is approximately quadrupled, up to 22 Mb/s or even 40 Mb/s up to 1 Km.

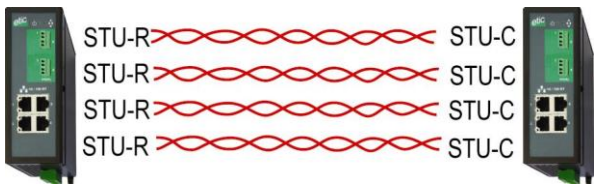


XSLAN+4XXX XSLAN+4XXX

Setting up :

The parameters are set in the same way as for Setting up a link using one twisted pair :

- Assign the « STU-R » profile to all SHDSL port of the first XSLAN+ switch.
- Assign a connection profile to all SHDSL port of the other switch (« STU-C Standard » or « STU-C Endurance » or « STU-C Performance ».
- Aggregate the lines.



XSLAN+4XXX
or XSLAN+2XXX

XSLAN+4XXX
or XSLAN+2XXX

Parameter « Line aggregation mode » :

Possible values : No aggregation
1 group of 2 lines (XSLAN+2XXX)
2 groups of 4 lines (1-3) and (2-4) (XSLAN+4XXX)
1 group of 4 lines (XSLAN+2XXX)

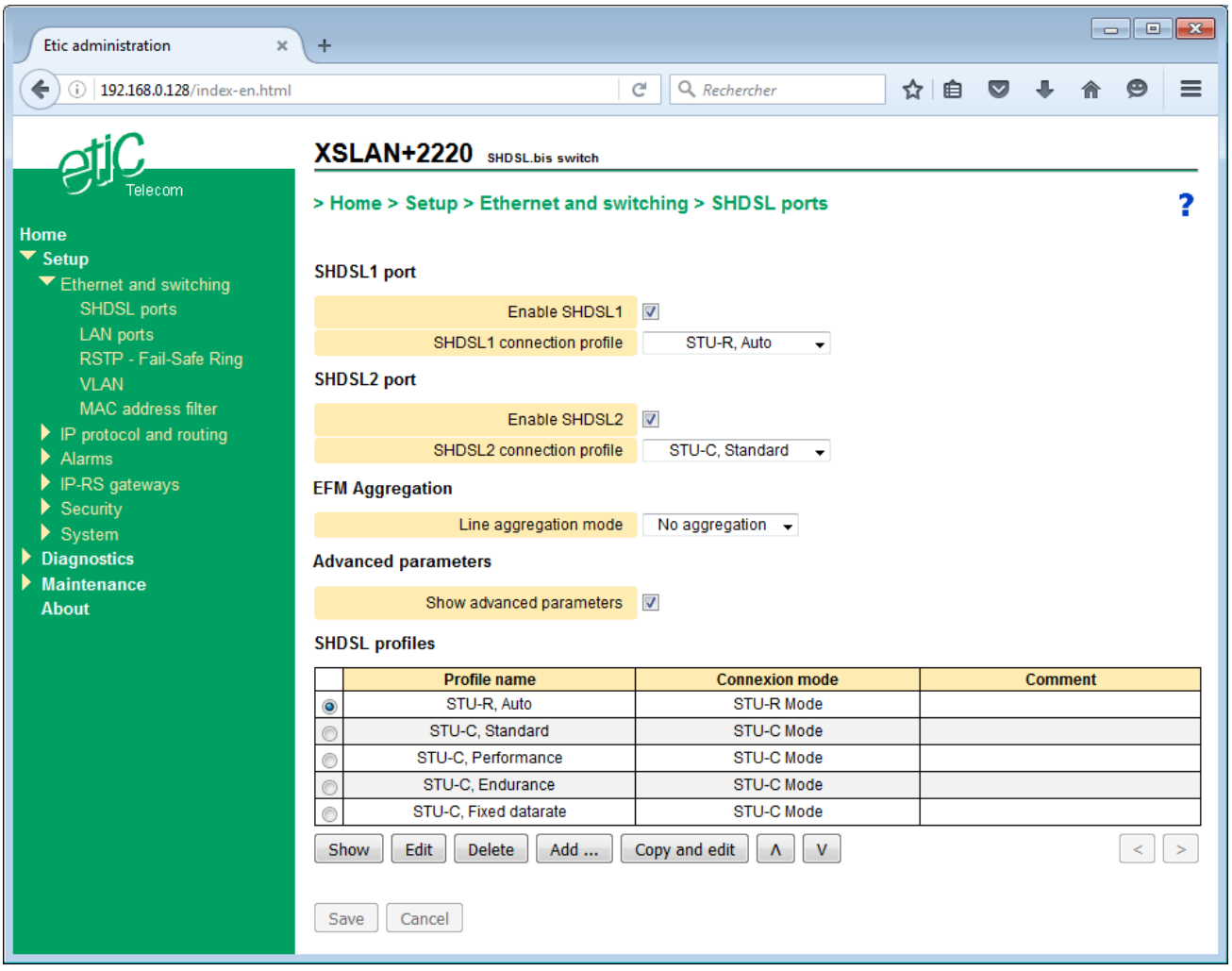
10 Advanced setting up of an SHDSL link

In special cases, it may be useful to change any of the existing connection profiles, for example, to change the SNR ratio margin or to force the modulation.

The modified profile is added to the 5 profiles.

To add a new connection profile,

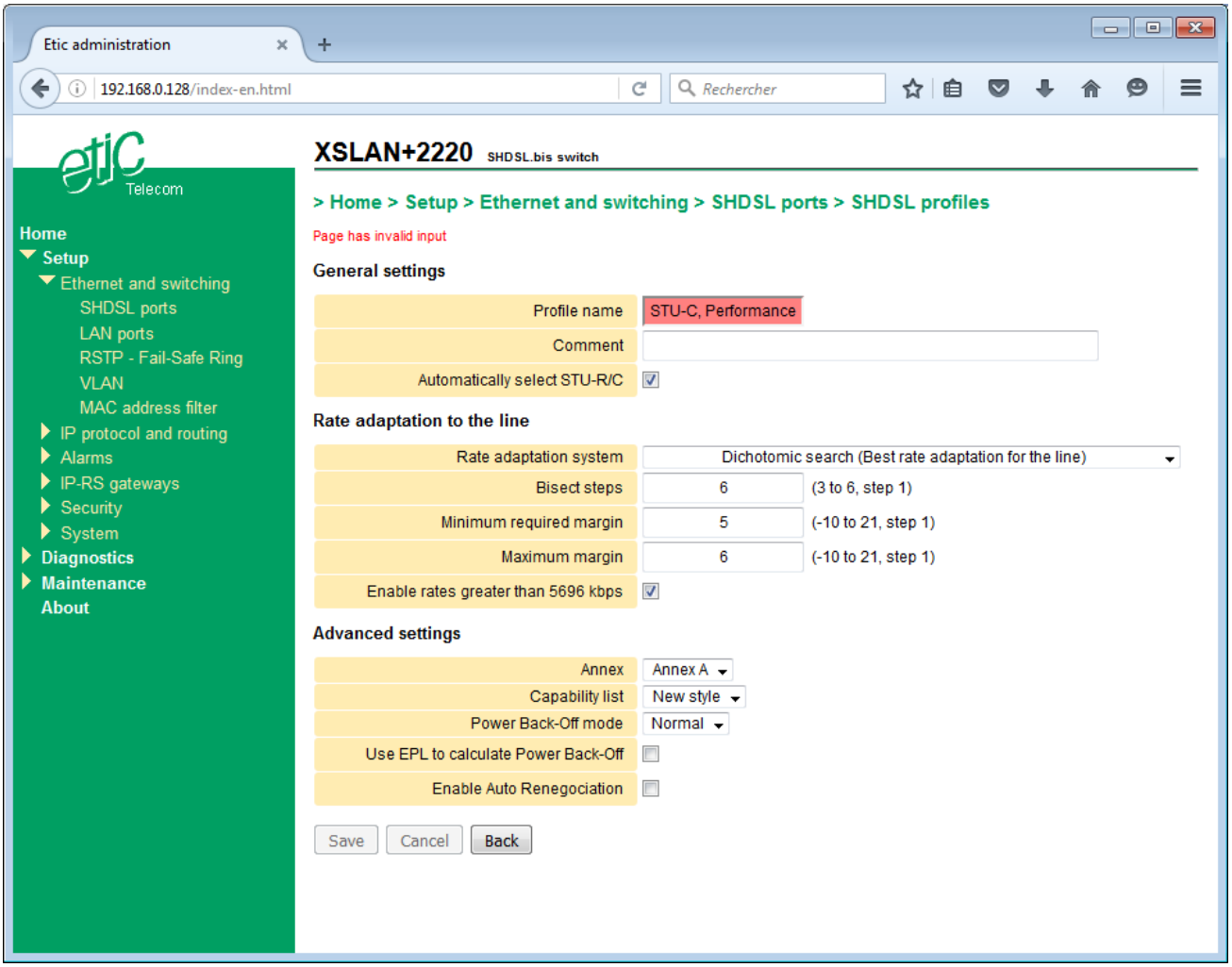
- Select the menu « Setup > Ethernet & commutation > SHDSL ports ».
- Tick the checkbox « Show advanced parameters »,



- Select one of the existing profiles,
- Click « Copy and edit »

The corresponding window is displayed ; it allows to tune the below parameters.

- Click « Save » ; the new profile is added in the profile list and it can be selected.



Checkbox « Automatically select STU-R/C » :

If this checkbox is checked, the XSLAN+ switch alternately tries to connect in STU-C and STU-R mode. Thus the connection can be established regardless the mode selected on the remote switch.

Parameter « Connection mode » :

Possible values : STU-C : The switch initiates the connection and negotiates the conditions.
STU-R : The switch wait for a connection.

Parameter « Rate adaptation system » :

Possible values : Line probing (Quick, adaptation is approximate)
Dichotomic search (Best adaptation for the line, but longer connection time)
Fixed data rate (Fastest connection time, but no adaptation performed)

Parameter « Minimum bit rate » :

Minimum value negotiated
Possible values : 192 to 5696 kb/s step 64 Kb/s
Default value : 192

Parameter « Maximum bit rate» :

Maximum value negotiated
Possible values : 192 to5696 kb/s step 64 Kb/s
Default value : 5696

Parameter « Annex » :
Possible values : Annex A or Annex B
Default value : Annex A

Parameter « PAM constellation » :
The PAM constellation defines the modulation used.
Possible values : Auto, PAM16, PAM32
Default value : Auto

Parameter « Capacity list » :
The capacity list exchanged between the switches can be performed in an old way to interoperate with legacy switches generation (XSLAN-).
Possible values : Auto, Old style, new style
Default value : Auto

Parameter « Used margins » :
The SNR ratio margin may be determined either according to current conditions (CC) or according to predefined conditions considered the worst (WC)
Possible values : CC margins, WC margins, CC and WC margins, No margin
Default value : CC margins

Parameter « SNR ratio margin » :
This is the desired margin above the minimum operating threshold.
When the switch establishes the connection, it measures the signal to noise ratio and subtracts the SNR ratio margin.
If the result is greater than the minimum required, the connection is established
Possible values : -10 à 21

Parameter « Alternative CC SNR margin » :
Visible when the "rate adaptation System" is set to "Line probing".
If the connection cannot be established with the specified SNR ratio margin, then the switch attempts to connect with this alternative margin. The value must be higher than the previous, which will result in a connection at a lower data rate.
Possible values : -10 à 21

Parameter « Power-back off mode » :
Reduces the transmitting power when the lines are short to least disturb the surrounding lines (crosstalk).
Possible values : Normal, Forced
Default value : Normal

Checkbox « Use EPL to calculate Power back-off » :
XX
Possible values :
Default value :

Checkbox « Enable extended rates » :
Check this checkbox to activate the extended data rate for transmitting up to 15 Mb/s when the line is less than 1 Km.

Parameter « Extended constellation » :

The PAM constellation defines the modulation used.

Possible values : Auto, PAM 4, PAM8, PAM16, PAM32, PAM64, PAM128

Default value : Auto

Checkbox « Enable Auto Renegociation » :

The SHDSL connection is established based on the line conditions at the connection time. For example, a noise can exist on the cable at this time and disappear thereafter. By default, the switch does not renegotiate its connection again, the SNR ratio margin will be higher than expected. If checked the switch renegotiate its link which can be established at a higher data rate.

Parameter « Minimum SNR margin for renegociation (dB) » :

Renegotiation causes a disconnection and therefore a loss of service, during the time of recovery. This is why the renegotiation should be attempted only if the margin increased very significantly, enabling a significant increase in throughput.

Parameter « Minimum duration before renegociation (hours) » :

Renegotiation causes a disconnection and therefore a loss of service, during the time of recovery. This is why the renegotiation should be attempted only if the margin increased very sustainable way.

11 RSTP

11.1 Overview

RSTP, standing for "Rapid Spanning Tree Protocol" is specified by the IEEE in the 802.1D-2004 document.

Loops in Ethernet networks are highly unwelcome, as they can cause broadcast storms, eating up all the available bandwidth and causing network outage. But sometimes they are necessary, in order to have backup paths in case a device or a link fails.

The goal of RSTP is to eliminate loops dynamically by calculating a spanning tree of the network. This spanning tree becomes the topology of the network and is created by disabling some ports.

The algorithm work by exchanging periodically small Ethernet frames : BPDUs (Bridge Protocol Data Unit). These frames contain information that allow the network to choose a root bridge, which is the root of the spanning tree. BPDUs originating from the root bridge are forwarded from bridge to bridge, to ensure propagation of the information in the network.

When a bridge receives BPDUs from root from 2 of its ports, meaning there is a loop in the network, it will only forward the best one, and block the port where the others were received.
When a link fails, BPDU are not received anymore by the bridge, and it will enable previously blocked ports in response.

RSTP supersedes the old STP for loop and redundancy management.
RSTP is retro-compatible with STP, but has extensions for faster recovery times :

- Ports can be put in "Edge" mode, meaning they will never be blocked.
- Ports can be put in "Peer to Peer" mode, meaning they transition quickly from "Blocked" to "Forwarding" when necessary.

This protocol can be used with devices from other manufacturers because it is interoperable.

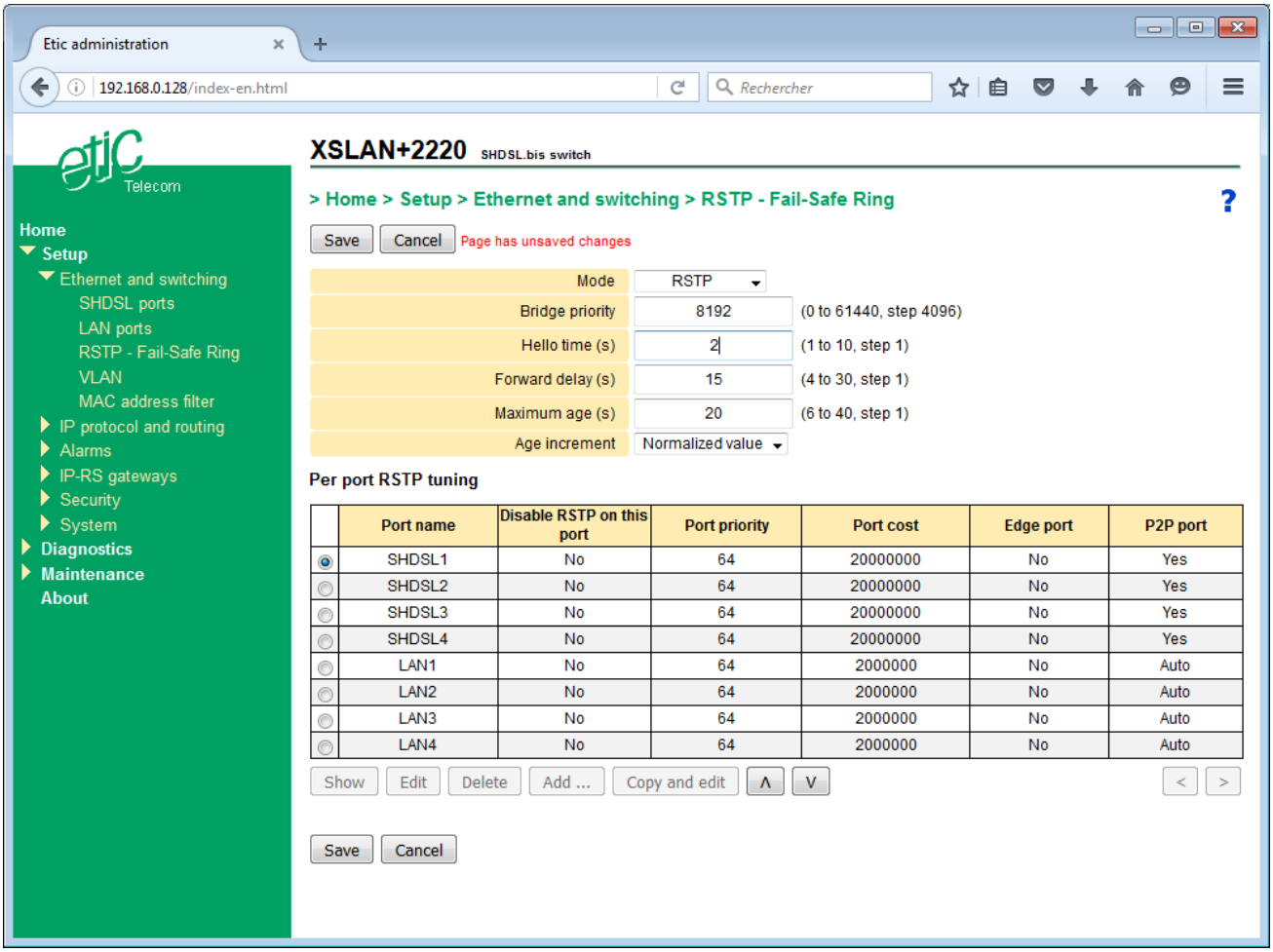
On the SHDSL side of the product, convergence is achieved in around 10 seconds.

Ports classification **:**

An Edge port is a port on the network edge; it connects an RSTP switch to equipments not acting as a bridge; for example, an Ethernet port that connects the XSLAN+ switch to a PC or a PLC is an Edge Port

11.2 Set up

- Select the menu « Setup > Ethernet & switching > RSTP – Fail safe ring ».
- Select the mode « RTSP ».



The page is divided in two parts :

The general parameters.

The Ethernet & SHDSL ports parameters.

General parameters :

Parameter « Bridge priority » :
This value is prepended to the MAC address of the bridge to form the bridge ID.
This is used by the network to choose which bridge will become the root of the spanning tree. The root is the bridge with the lowest bridge ID

Parameter « Hello time » :
The "Hello time" is the delay between 2 consecutive BPDU sent by a bridge
It must be the same for all bridges in the network.

Parameter « Forward delay »:
When a port changes state following a topology change, it goes through 3 states :

• Blocked : All ingress traffic is discarded but BPDU frames (necessary for STP function)

• Listening/Learning : The port listens to the traffic but does not forward data. This is used to detect transient loops that can be created during the convergence.

• Forwarding : The port forwards data.

The forward delay is the duration of the Listening/Learning state.

Remark : Ports configured as Edge ports or P2P ports ignore this setting and skip the listening step altogether because it becomes unnecessary and increases the convergence time.

Parameter « Maximum age » :
When the STP root transmits a BPDU, the information contained in it is forwarded from bridge to bridge. At each retransmission, a bridge adds 1 to a counter in the data. When this counter exceeds the "Max Age" value, the BPDU is not forwarded.

Note 1 : This acts like the TTL in IP packets.

Note 2 : This value must be large enough for the network. Each device must be able to receive the BPDUs from the root, even if it is located a lot of devices away. For example, for a ring with 20 devices, you must have "Max Age" greater than 20. Otherwise strange problems like erratic behavior,
very long convergence time, or no convergence at all will occur.

Parameter « Age increment » :
Increment value of age counter when going through the bridge.

Per port RSTP tuning

- Select the port to configure in the table

Parameter «Port name » :
Select one of ports of the product (Ethernet 1 to 4 or SHDSL 1 or 2).

Checkbox « Disable RSTP on this port » :
Check this box when the port does not participate in RSTP.

Parameter « Port priority » :
When "Port cost" is identical for two paths to the root bridge, the port priority can be used to break a tie between two ports. The less the number, the higher the priority.

Parameter « Port cost » :
The port cost reflects the data rate of the link. It is used in the calculation of the active topology to prioritize a high data rate link versus a low data rate link. A high data rate link usually has a low cost.

Recommended values :

SHDSL port : 200 000 000
Ethernet 100 Mb/s port : 200 000

Checkbox « Edge port » :
An Edge port is a port located on the border of the network, with no bridge attached to it like, for instance, an industrial device or a PC.
BPDU are not transmitted to that kind of port; moreover, that kind of port cannot be blocked.

Listbox « P2P port » :
Select “YES” if the port is participating in a direct link between 2 RSTP enabled switches (no unmanaged switch must be inserted on that link).

This information enables the RSTP switch to converge faster by skipping the "Learning" step, and jumping directly from "Blocked" to "Forwarding".
Moreover, a link loss is guaranteed to be detected and acted upon very quickly by both ends.

SHDSL ports must be P2P ports.

12 Fail-safe ring

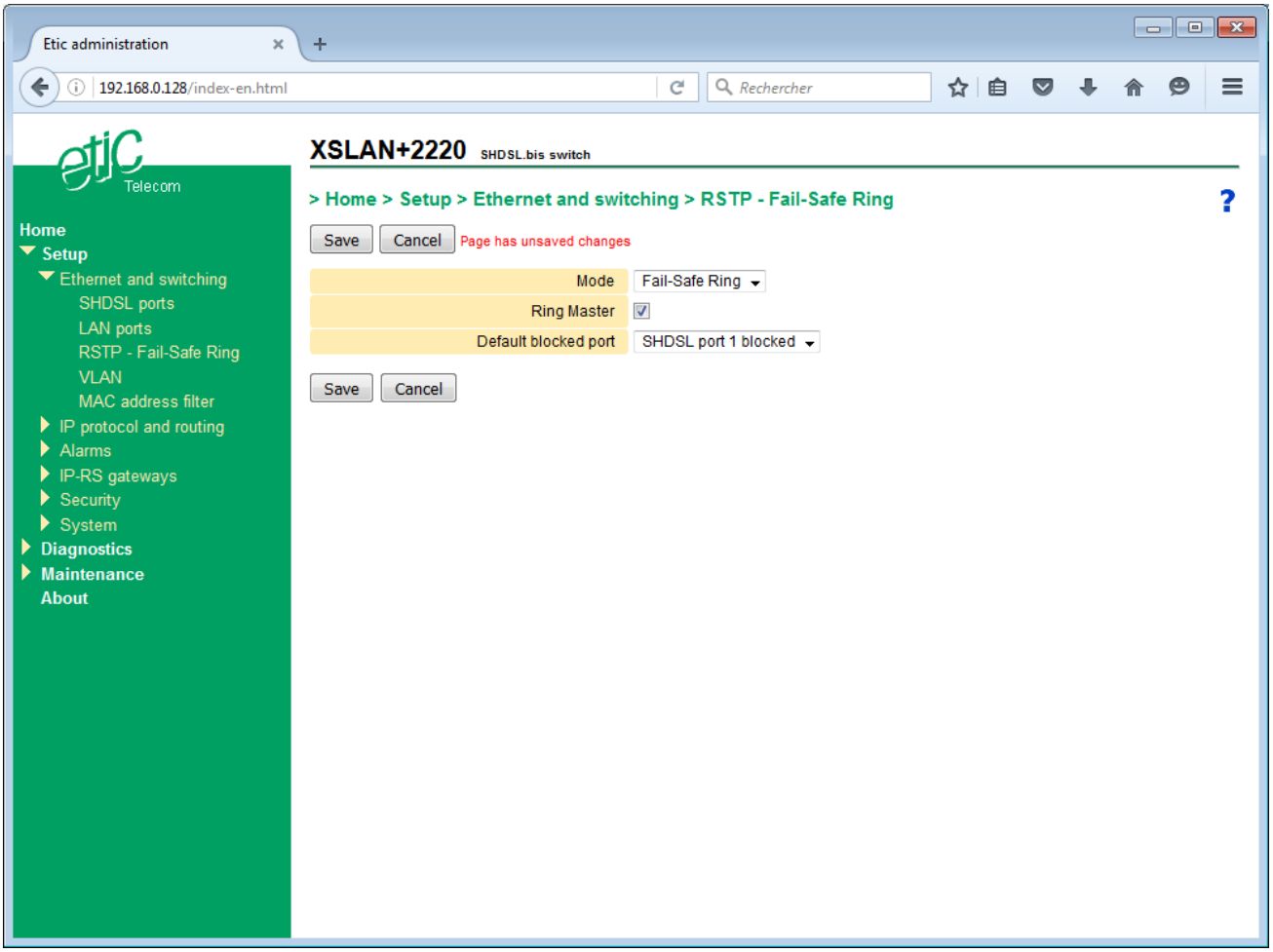
Based on the STP algorithm, that proprietary redundancy solution makes possible to handle a ring structure up to 16 SHSDL switches.
One of the switches has to be selected as the ring master ; it has a particular function : The Ring Master will block one of its ports, preventing the formation of an Ethernet loop, and leave the other in forwarding mode. When a device or a link fails in the SHDSL ring, the second port will be enabled, allowing to reach all the devices in the ring.

Remark : In this mode, LAN ports do not participate in the algorithm, only the SHDSL ports are used.

The advantages of that solution is that the failure detection delay and the recovery delay is only a few seconds (One second if the ring counts 5 SHDSL switches); moreover, it is very simple to configure.

Ring master configuration

- Select the menu « Setup > Ethernet & switching > RSTP – Fail-safe ring ».



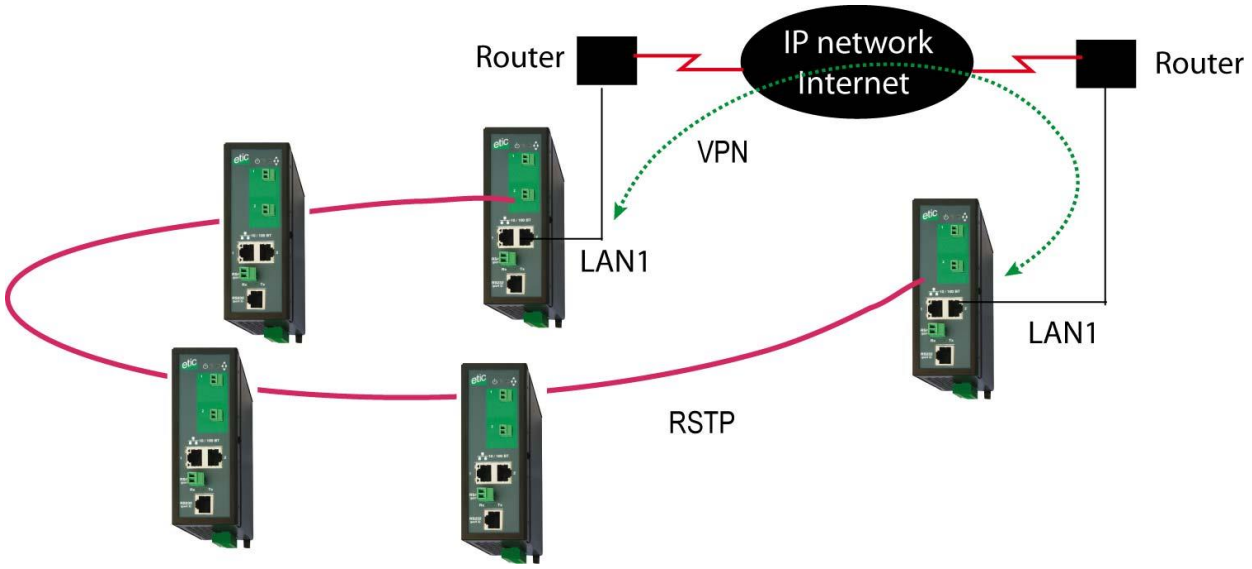
- Select the mode « Fail-safe ring ».
- Tick the checkbox « Ring master ».
- Select the default blocked port.
- Click « Save ».

Other switches configuration

- Select the menu « Setup > Ethernet & switching > RSTP – Fail-safe ring ».
- Select the mode « Fail-safe ring ».
- Leave the “Ring master” box unchecked
- Click « Save ».

13 Loop VPN

When the SHDSL network forms a daisy chain (i.e. a linear topology), and when it is not possible to form a secure ring, the "loop VPN" function allows for network redundancy if a public WAN connection (Internet) or private (MPLS) is available at each end of the SHDSL network.



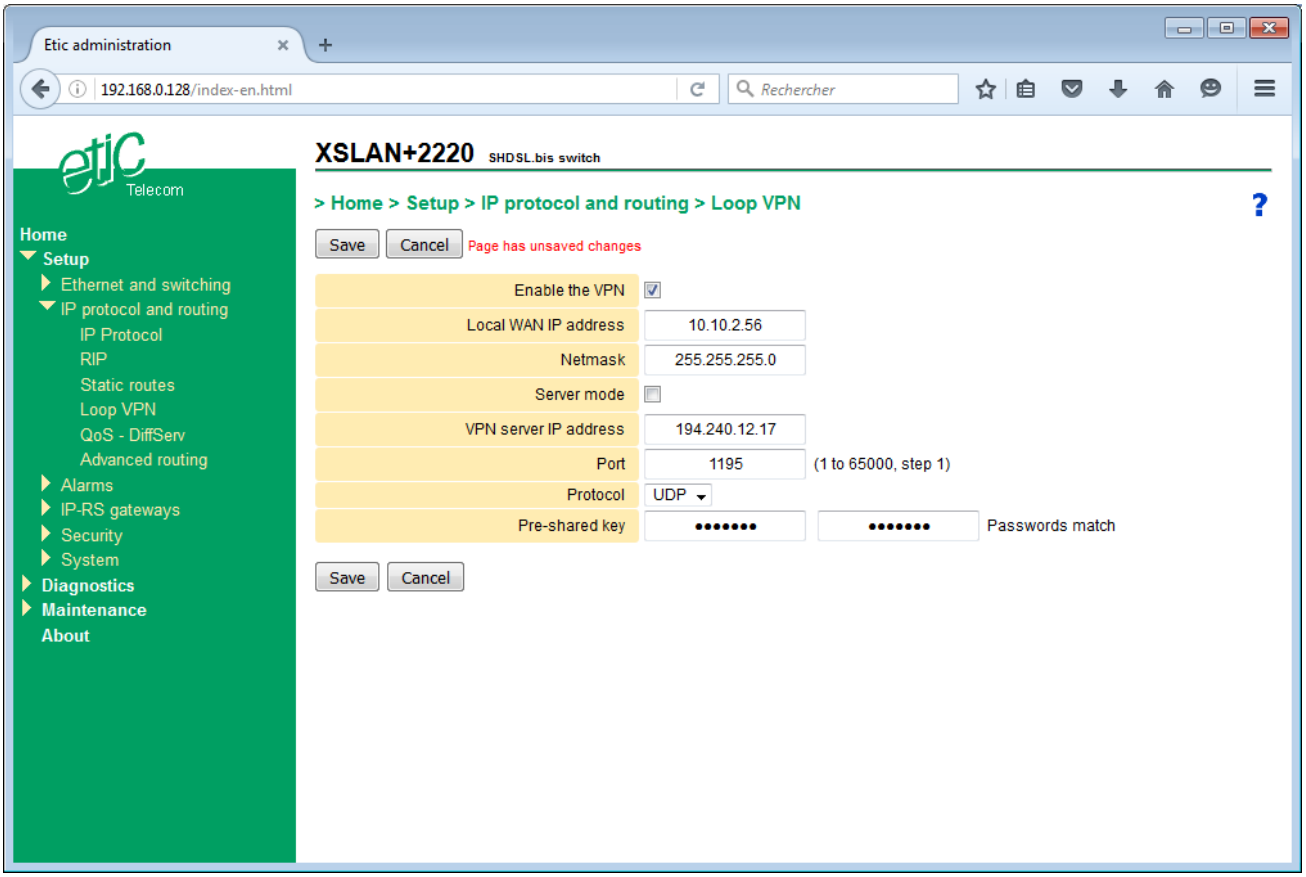
The 2 XSLAN+ switches at the end of the network establish a VPN over the WAN. The VPN provides connectivity at the Ethernet level. Thus by activating the RSTP protocol redundancy may be provided thanks to that VPN.

One XSLAN+ switch must be configured as a VPN server mode and must be accessible via a fixed IP address across the WAN. The other XSLAN+ switch must be configured as a VPN client.

The VPN is established on the Ethernet LAN1 port of the XSLAN+ switch and that port becomes a "WAN" port with its own IP address. This Ethernet port must be connected to the WAN access router and therefore cannot be used to connect other equipments which are reachable through the SHDSL link.

Setting up the VPN

- Select the menu « Setup > IP Protocol and routing > Loop VPN ».
- Tick the checkbox « Enable the VPN ».



Parameter « Local WAN IP address » :
This is the IP address assigned to the LAN1 port of the XSLAN+ switch in the IP subnet of the WAN access router. This subnet is different from the one on the other LAN ports.

Parameter « Netmask » :
Netmask of the WAN router subnet.

Checkbox « Server mode » :
Check this box on the switch used as a VPN server. Leave the box unchecked on the one used as a VPN client.

Parameter «VPN server IP address » :
When the XSLAN+ switch is the VPN client, the IP address to reach the VPN server switch must be defined. This IP address is not necessarily the one assigned to the VPN server switch in the "Local WAN IP Address" parameter if the VPN goes through routers with Network Address Translation (NAT).

Parameter « Port » :
TCP or UDP port number of the VPN.

Parameter « Protocol » :
TCP or UDP protocol of the VPN.

Parameter « Pre-shared key » :
The Pre-shared key is a secret character string that is used for encryption and VPN traffic authentication. It must be the same in the 2 XSLAN+ switches that perform the VPN.

14 VLAN

14.1 Overview

VLAN function
The VLAN technology conform to the IEEE 802.1Q norm makes possible to transmit up to 4096 Ethernet networks over the same physical Ethernet layer.

The devices belonging to the same Ethernet VLAN can exchange Ethernet frames with one another but cannot exchange frames with devices belonging to another VLAN except if a level 3 switch or an equivalent device makes possible to bridge that VLANs.

Ethernet ports
When we speak of an Ethernet port of an XSRING+, we speak not only of 10/100 BT Ethernet ports, but also of the SHDSL ports.
All SHDSL ports are supposed to be a unique SHDSL port.

Principles of operations
A particular field of each Ethernet frame stores the VLAN identity (VID) to which the frame belongs.
When that field stores the VLAN ID, one says the frame is tagged.

How are Ethernet frames tagged and untagged ?
An Ethernet frame can be tagged by the device which produces it.
Otherwise, the Ethernet frame is tagged by the switch to which the device is connected.

Reciprocally, the VLAN ID of an Ethernet frame can be removed by the Ethernet switch before being transmitted to the Ethernet device or can be transmitted tagged to the device.

The switch filters the Ethernet frames according to their VLAN ID
When they come into the switch on an Ethernet port, Ethernet frames are tagged with the VLAN ID assigned to that Ethernet port.

When it is received by the switch, a tagged Ethernet frame can only come out to an Ethernet port, if the VLAN ID assigned to that port is the same as the VLAN ID of the Ethernet frame.

Html administration server and the serial gateway
If the VLAN function is enabled, Ethernet frames produced by the html administration server and the serial gateway are tagged with a particular VLAN.

If the html administration server and the serial gateway do not belong to the same VLAN, a separate IP address must be assigned to the serial gateway

Setting up the VLAN function
The VLAN set up is divided in two parts : The Egress policy set up and the Ingress policy set up.

The Egress policy consists in registering the authorized VLAN IDs and defining which Ethernet ports belong to each VLAN.

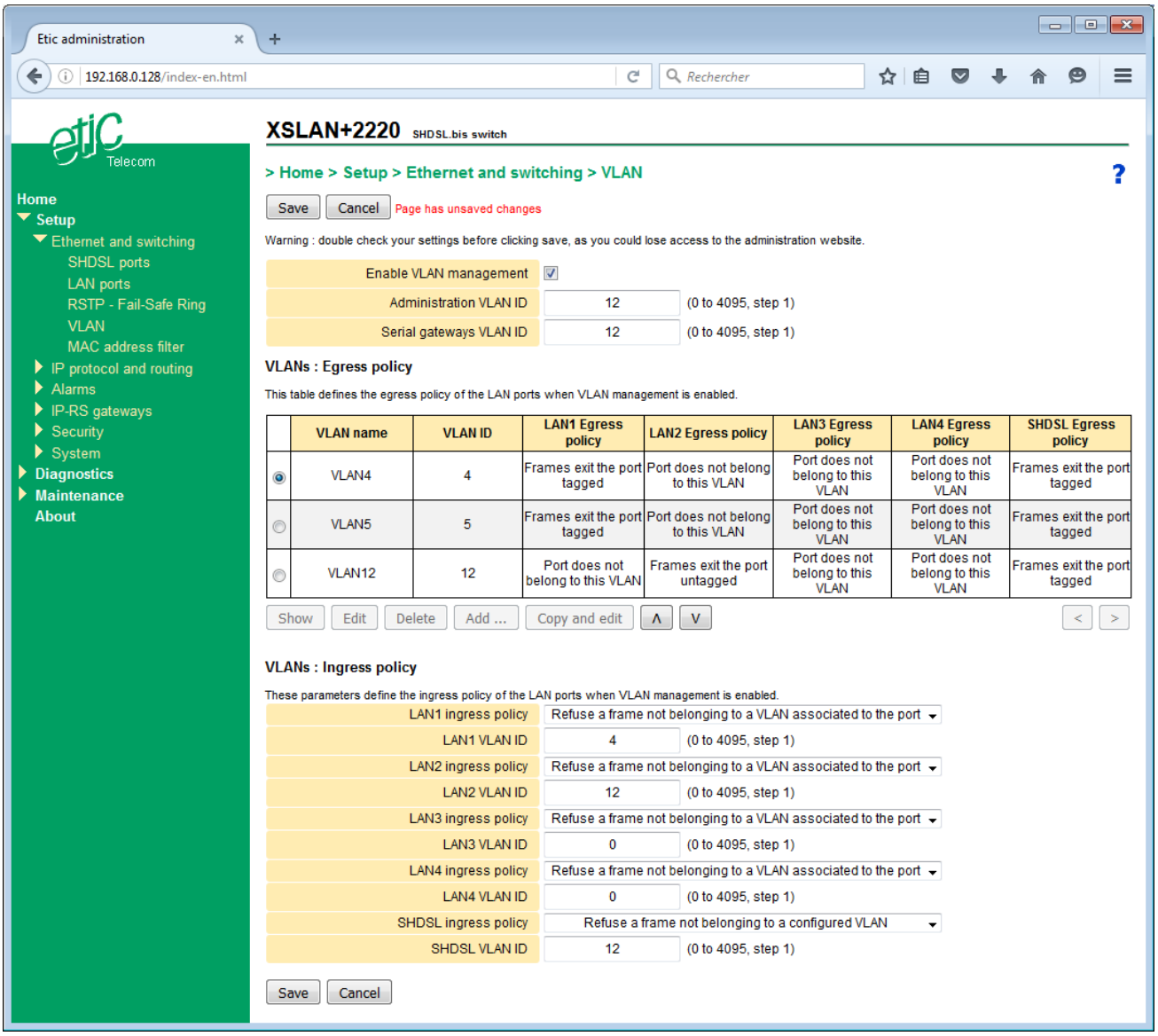
The Ingress policy consists in defining which process must be applied to each Ethernet frames going into the switch : Tagging the frame with a VLAN ID or leaving the frames untagged etc …

14.2 Set up

Attention :
Before saving the VLAN configuration, make sure you will be able to access to the administration html server through an Ethernet port or remotely through the line.
One Ethernet port at least belong to the same VLAN as the administration html server of the XSLAN+.

- Select the menu « Setup > Ethernet & Switching > VLAN ».

- Check the box « Enable VLAN management ».



The page allows you to set the output policy, the input policy and the VLAN ID of the administration server and the serial gateways.

14.2.1 Egress policy

That part of the page is made to register the VLAN IDs and to specify which process must be applied to exiting tagged frames with that VLAN ID.

The processes which can be applied to an outgoing frame are :

Frames exit that port untagged.
Frames exit that port tagged.
Frames exit that port unmodified
Port does not belong to that VLAN

Example

Three VLANs are defined : 4, 5, 12.

The LAN1 port is registered on VLAN 4 and 5. The frames that belongs to the VLAN exits the switch on the LAN1 port tagged.

The LAN2 port is registered on VLAN 12. The frames that belongs to the VLAN exits the switch on the LAN2 port untagged.

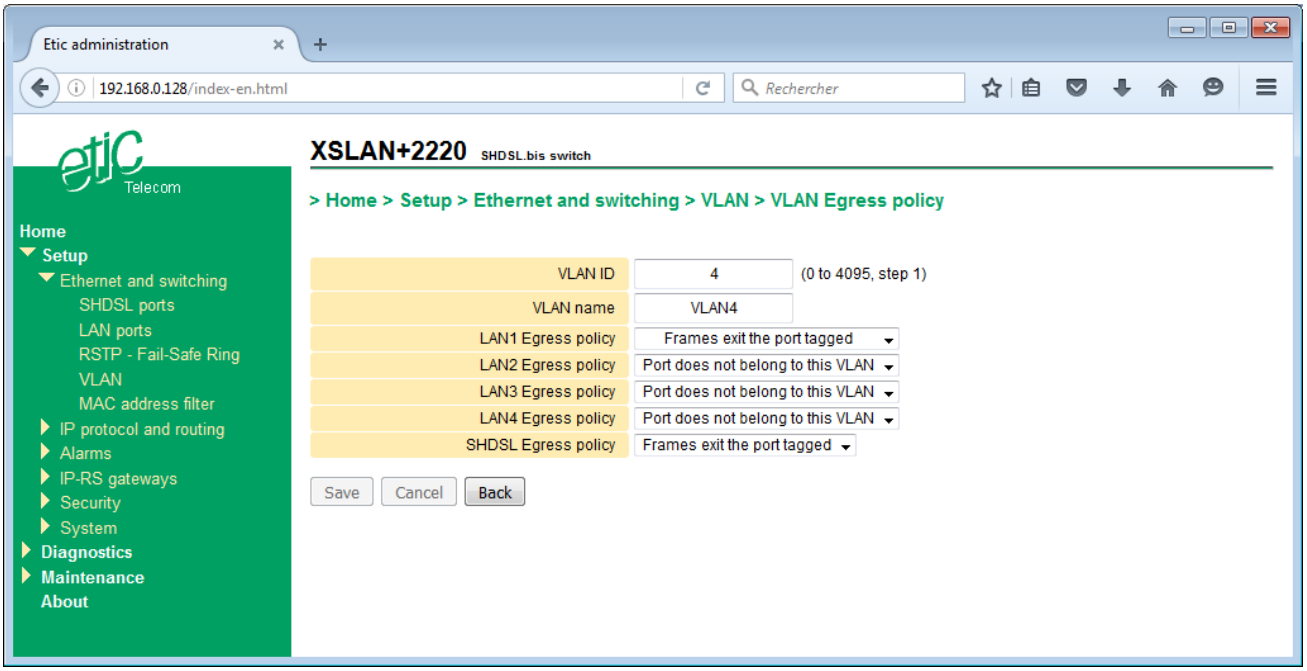
Lan3 and LAN4 ports don't belong to any VLAN (not used).

The SHSDL ports are registered to all VLANs. All frames are transmitted on the SHDSL network tagged.

Egress policy	LAN1	LAN2	LAN3	LAN4	SHDSL
VLAN 4	Yes – tagged	No	No	No	Yes – tagged
VLAN 5	Yes – tagged	No	No	No	Yes – tagged
VLAN 12	No	Yes –untagged	No	No	Yes – tagged

To set up the Egress policy,

- Select the menu « Setup > Ethernet & Switching > VLAN »
- Click « Add ».
- Enter a VLAN ID and assign a name to that network.
- For each Ethernet port, select if the port belongs to that VLAN and if the frame exits the port tagged or not.



Parameter « VLAN ID » :
Enter the VLAN ID.

Parameter « VLAN name » :
Enter a name for this VLAN.

Parameter « LAN1 Egress policy » (or 2, or 3, or 4) :

« Frames exit the port tagged» :
Ethernet frames belonging to this VLAN can exit on LAN1 port (or 2 or 3 or 4).
Frames exit the port tagged.

« Frames exit the port untagged» :
Ethernet frames belonging to this VLAN can exit on LAN1 port (or 2 or 3 or 4).
Frames exit the port untagged.

« Frames exit the port unmodified» :
Ethernet frames belonging to this VLAN can exit on LAN1 port (or 2 or 3 or 4).
Frames exit the port unmodified (tagged or untagged).

« Port does not belong to this VLAN » :
Ethernet frames belonging to this VLAN can not exit on LAN1 port (or 2 or 3 or 4).

Parameter « SHDSL Egress policy » :

« Frames exit the port tagged» :
Ethernet frames belonging to this VLAN can exit on SHDSL ports.
Frames exit the port tagged.

Note : SHDSL ports should belong to all VLAN so that Ethernet frames coming from all the devices locally connected to the XSLAN+ switch be transmitted to the SHDSL line.

14.2.2 Ingress policy

That part of the page is made to register which process must be applied to the Ethernet frames when they enter a given port of the switch or when they are received from the line.

One defines

which already tagged frames can enter the switch;

which VLAN ID will be assigned to untagged frames coming into the switch.

Example :
Let us go on with the example given at the previous paragraph; we have defined the Egress policy :

Egress policy	LAN1	LAN2	LAN3	LAN4	SHDSL
VLAN 4	Yes – tagged	No	No	No	Yes – tagged
VLAN 5	Yes – tagged	No	No	No	Yes – tagged
VLAN 12	No	Yes –untagged	No	No	Yes – tagged

The table hereafter, defines the ingress policy :

	LAN1	LAN2	LAN3	LAN4	SHDSL
VLAN ID	4	12	0	0	12
Accept all frames					
Refuse a frame not belonging to a configured VLAN					X
Refuse a frame not belonging to a VLAN associated to the port	X	X	X	X	

LAN1
Only frames tagged with ID 4 or 5 can enter through this port.
Untagged frames are assigned to VLAN 4 and can enter through this port.

LAN2
Only frames tagged with VLAN ID 12 can enter through this port.
Untagged frames are assigned to VLAN 12 and can enter through this port.

LAN3 et LAN4
Frames cannot enter through these ports.

SHDSL
Only frames tagged with ID 4 or 5 or 12 can enter through these ports.
Untagged frames are assigned to VLAN 12 and can enter through this port.

To set up the Ingress policy,

- Select the menu « Setup > Ethernet & Switching > VLAN »
- For each Ethernet port and for the SHDSL ports, select the Ingress policy and the VLAN ID which must be applied to the untagged frames.

Parameter « LAN1 ingress policy » (or 2 or 3 or 4 or SHDSL) :

Accept all frames:
All frames entering the Ethernet ports are accepted whatever they are tagged or not.
An untagged frame entering the Ethernet port will belong to the VLAN of this port.
A tagged frame entering the Ethernet port will keep is VLAN ID.

Refuse a frame not belonging to a configured VLAN :
An untagged frame entering the Ethernet port will belong to the VLAN of this port.
Tagged frames entering the Ethernet port are only accepted if their VLAN ID is one of the previously configured VLAN (see Egress policy).
Frames tagged with another VLAN ID are denied.

Refuse a frame not belonging to a VLAN associated to the port :
An untagged frame entering the Ethernet port will belong to the VLAN of this port.
Tagged frames entering the Ethernet port are only accepted if their VLAN ID is one of the registered VLAN or that port (see Egress policy).
Frames tagged with another VLAN ID are denied.

Parameter « LAN1 VLAN ID » (or 2 or 3 or 4 or SHDSL) :
This is the VLAN ID assigned to an untagged frame entering to this port.

14.2.3 Administration server and serial gateways

When VLAN management is enabled, the administration web server and the serial gateway must belong to a VLAN.

Parameter « Administration VLAN ID » :
Enter the VLAN ID to which the administration server belongs.

Parameter « Serial gateways VLAN ID » :
Enter the VLAN ID to which the serial gateways belong.

Remark :
If the serial gateway does not belong to the same VLAN as the html administration server, a particular IP address must be assigned to serial gateways.

- Select the menu « Setup > IP protocol and routing > IP protocol ».
- Tick the checkbox « Use a different address for the serial gateways ».
- Enter the IP and the netmask for the serial gateways

15 SNMP

15.1 Overview

The XSLAN+ switch supports the following MIBs :

- RFC1213-MIB (MIB-2)
- HDSL2-SHDSL-LINE-MIB
- HOST-RESOURCES-MIB
- IF-MIB
- IP-MIB
- BRIDGE-MIB
- RSTP-MIB

See Annex for a detailed description.

The SNMP manager can acquire, in particular, the following information :

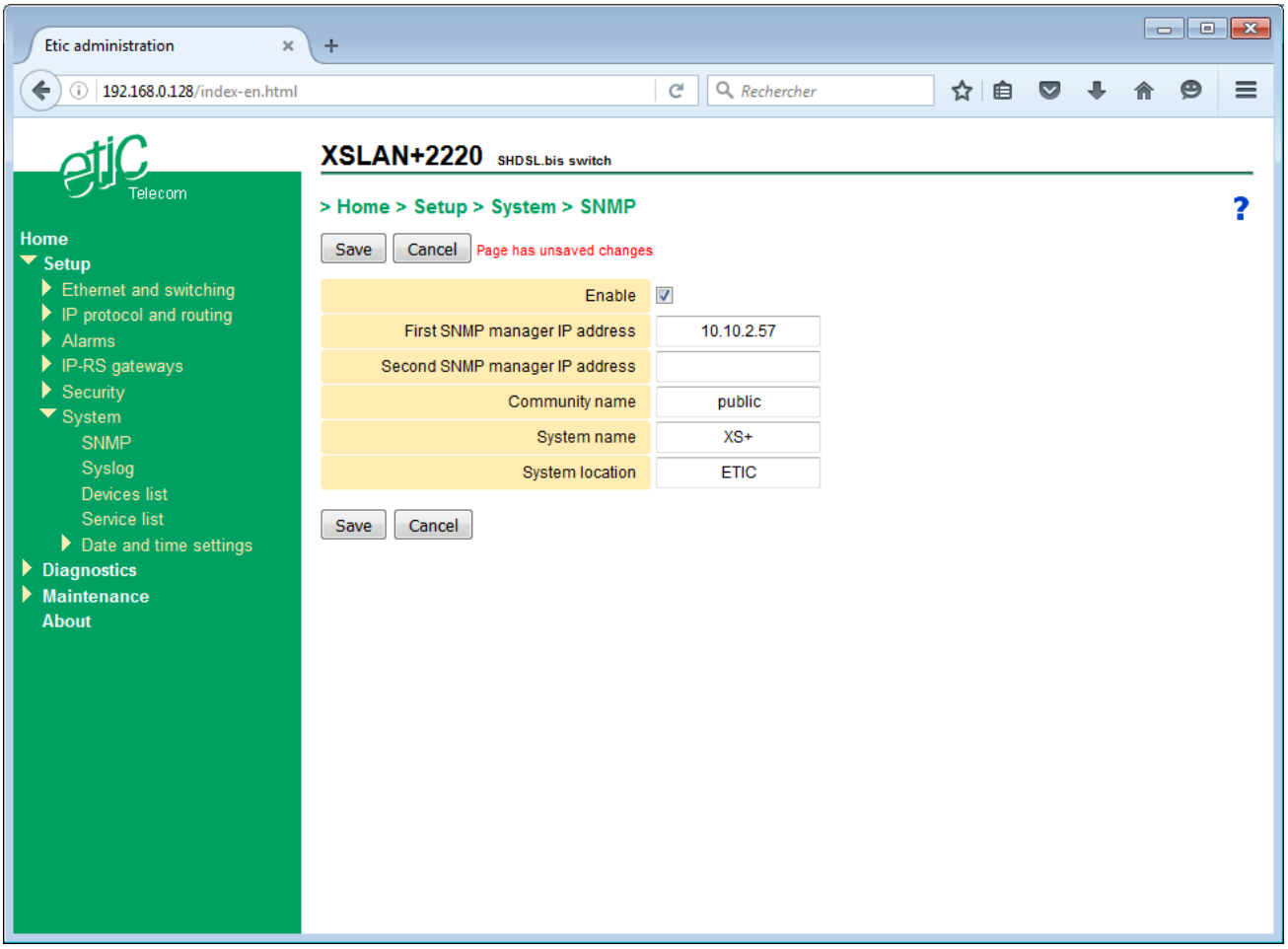
Ethernet 10/100 BT ports status : Up / down
SHDSL links status : connected or not
SHDSL links bit rate
SHDSL links SNR ratio margin
SHDSL links Number of erroneous seconds during the last quarter of hour
SHDSL links Number of erroneous seconds during the last 24 hours
RSTP ports status (blocked / learning / forwarding)
RSTP bridge parameters (bridge ID, priority, MAC, root)
MAC addresses data base

The XSRING+ is also able to send SNMP traps when the following events occur :

Ethernet 10/100 BT port connection
Ethernet 10/100 BT port disconnection
SHDSL connection established for each SHDSL port
SHDSL connection disconnected for each SHDSL port
Failsafe ring established
Failsafe ring failure
Product restart

15.2 Setting up the SNMP function

- Select the menu « Setup > System > SNMP ».
- Tick the checkbox « Enable ».



Parameter « First SNMP manager IP address » :
Enter the IP address of the first SNMP manager where to send SNMP traps.

Parameter « Second SNMP manager IP address » :
Enter the IP address of the second SNMP manager where to send SNMP traps.

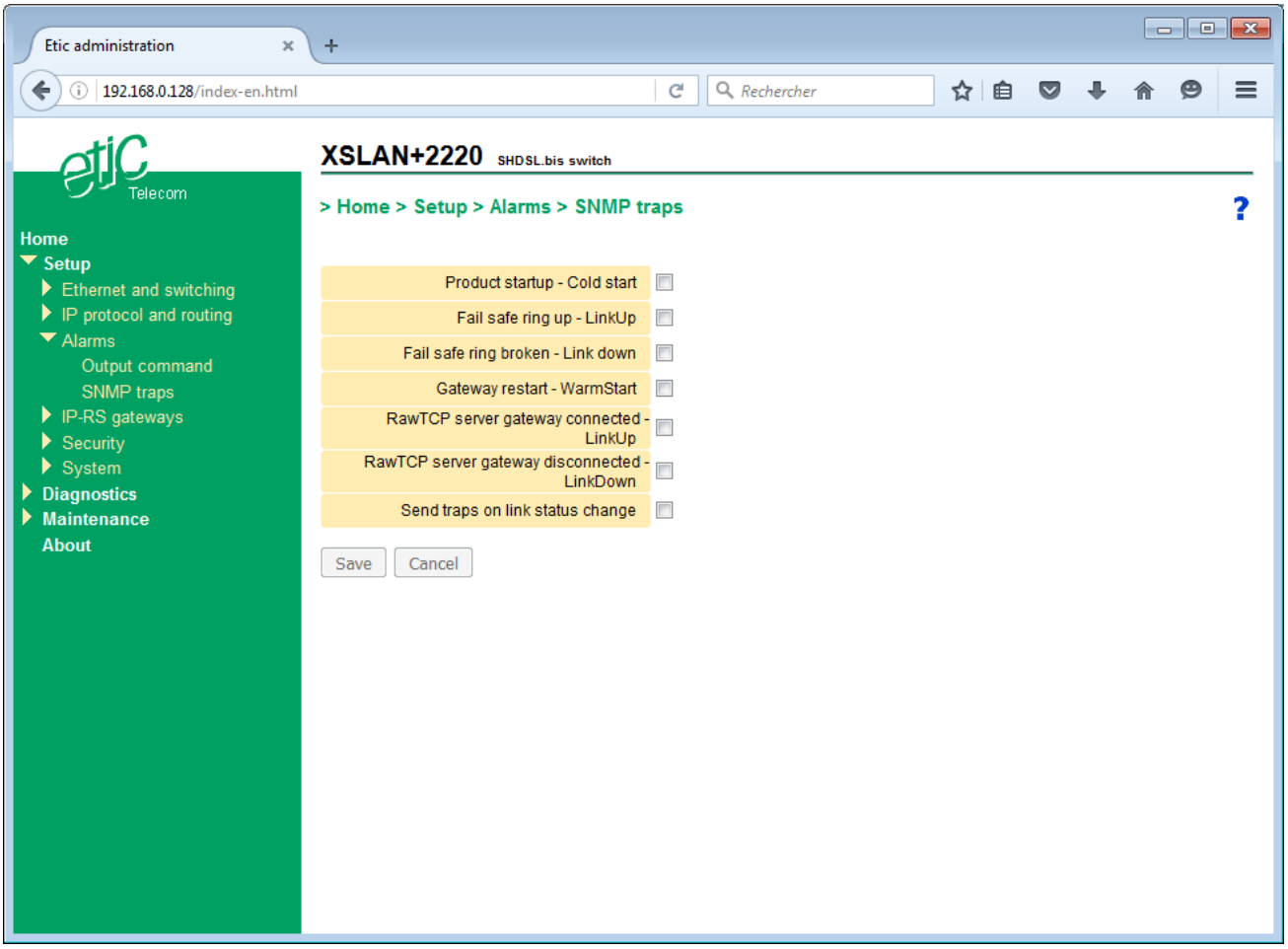
Parameter « Community name » :
Enter the name of the community to which the product belongs.

Parameter « System name » :
The system name is the name of the product. (XSLAN+2400 for example).

Parameter « System location » :
Enter a string which identifies the location where the product is installed.

15.3 Setting up the SNMP traps

- Select the menu « Setup > Alarms > SNMP traps ».
- Select the traps which must be transmitted by the product.



Product startup – Cold start
Fail safe ring up – LinkUp
Fail safe ring broken – LinkDown
Gateway restarted – WarmStart
RawTCP server gateway connected – LinkUp
RawTCP server gateway disconnected – LinkDown
Link status change

16 NTP

16.1 Overview

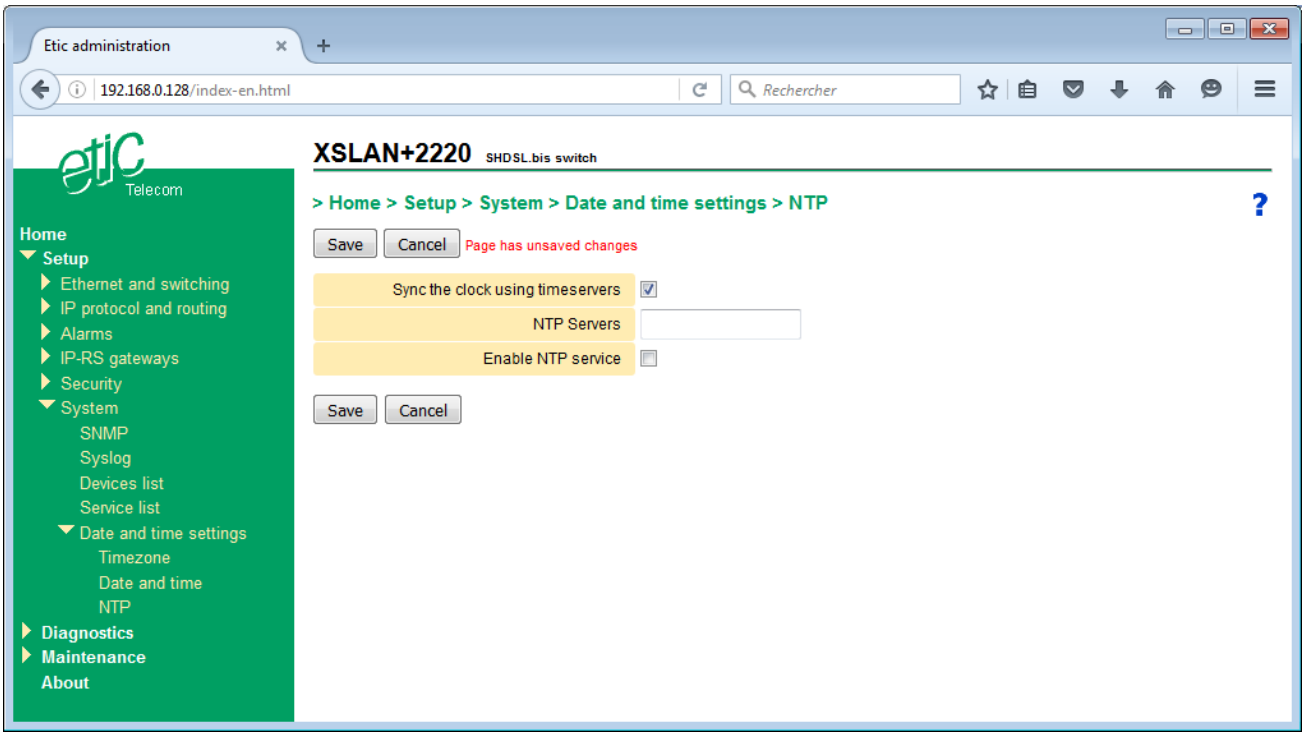
The FTP protocol is used to synchronize the time of a device on a reference server

The XSLAN+ switch supports this protocol and can get the time on one or more time servers.

The XSLAN switch can also act as a time server and deliver time for secondary equipments. This solution is interesting in the case of an SHDSL link at low throughput. Only the XSLAN+ switch queries a time server at the other end of the link. Equipments connected to the LAN ports of the XSLAN+ switch are synchronized locally. This allows not to overload the low data rate SHDSL link by many NTP requests.

16.2 Setting up the NTP client

- Select the menu « Setup > System > Date and time settings > NTP ».
- Tick the checkbox « Sync the clock using timeservers ».



Parameter « NTP Servers » :
Enter the IP address of the NTP time server. If there are several servers, enter the different IP address with a coma separator « , » .

16.3 Setting up the NTP server

- Select the menu « Setup > System > Date and time settings > NTP ».
- Tick the checkbox « Enable NTP service ».

17 Quality of service (Qos) - DiffServ

17.1 Overview

The IP protocol can multiplex different services on the same media (video, command and control, html ...). The advantages are well known; However, if a service transmits an excessive IP traffic, the network is congested and the latency becomes important.

By default, each SHDSL port has a transmit FIFO buffer of 10 packets (this value can be modified). When activating the "Quality of Service" (QoS), the FIFO is replaced by a SFQ buffer (Stochastic Fairness Queuing). SFQ automatically classifies incoming frames into streams according to their addresses and their source and destination ports. Each stream alternately send a frame. This method limits the latency and reserve a bandwidth for each traffic. This method is sufficient in most cases and requires no further setting.

If the result is not satisfactory, it is possible to manually classify and prioritize different traffics using the DiffServ algorithm that will mark each IP frame in the DSCP field.

Principle of operation :

A traffic is the couple formed by an IP address and a service (ftp, html, Modbus etc ...).
Moreover, the bandwidth available is shared into 5 parts called "classes"
Each traffic defined is assigned to one of the first 4 classes: Platinum, Gold, Silver, Bronze. .
The undefined traffic is assigned to the class « Default ».

The "Platinum" class has the highest priority; That traffic is routed first whatever the traffic in the other classes.
Classes "Gold, Silver, Bronze" share the available bandwidth:

Exemple	Minimum bandwidth	Maximum bandwidth
	% of the whole bandwidth	% of the whole bandwidth
Gold	50 %	80 %
Silver	30 %	80 %
Bronze	15 %	80 %
Default	5 %	Unlimited
Total	60 %	

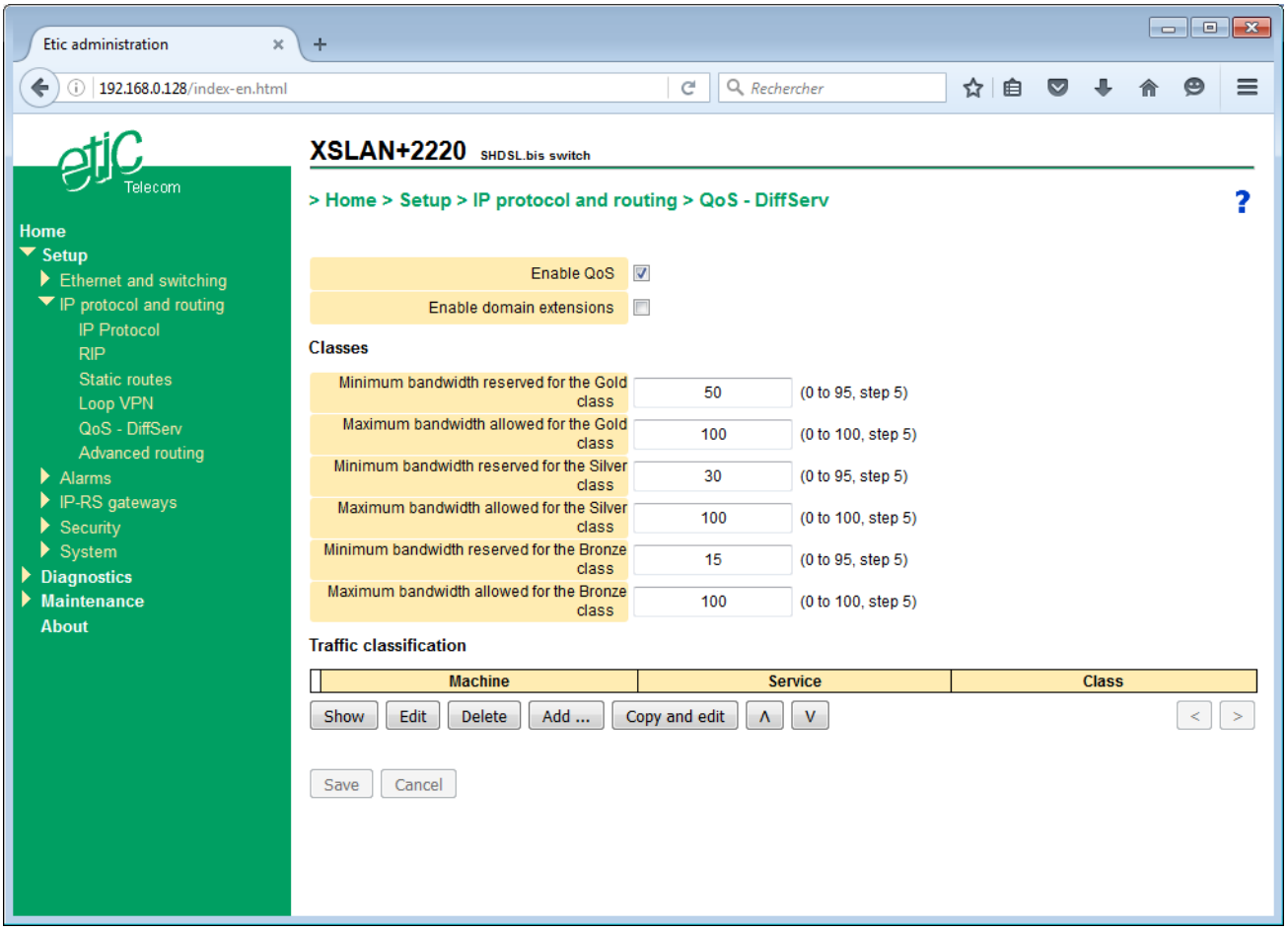
Once the traffic of one of these 4 classes fills the minimum band allocated, the additional traffic of this class can take more bandwidth provided that some unused band by other classes is available. The attribution rule of that unused band depends of the class priority: Additional traffic of the Gold class has the highest priority and the one of the Default class has the lowest priority.

Care should be taken not to affect too much traffic to the "Platinum" class. Indeed, the traffic of this class has the highest priority; if it is too large it prevents traffic from other classes to flow.
"Platinum" class should be reserved for example, to “Control and Command” traffic.

The DiffServ classification is effective in the area of SHDSL links. Within this domain IP frames keep their DSCP classification mark. By cons, IP frames that exit the Ethernet LAN port lose their classification (DSCP 0). Sometimes it is useful to extend the DiffServ domain to Ethernet LAN, for instance, to communicate with another XSLAN+ on the Ethernet LAN. In this case IP frames that exit the Ethernet LAN port keep their classification, the DSCP field is not set to 0.

17.2 Basic configuration

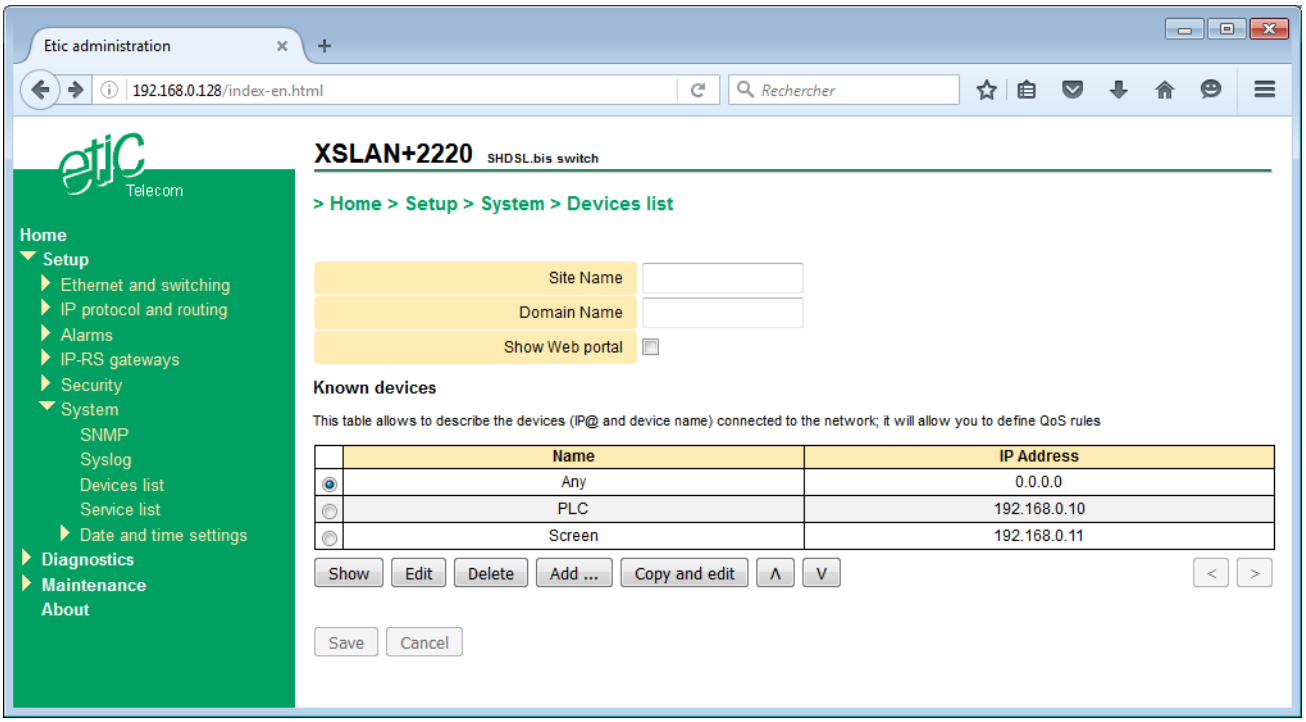
- Select the menu « Setup > IP protocol and routing > QoS – DiffServ ».
- Tick the checkbox « Enable QoS ».



17.3 Advanced configuration

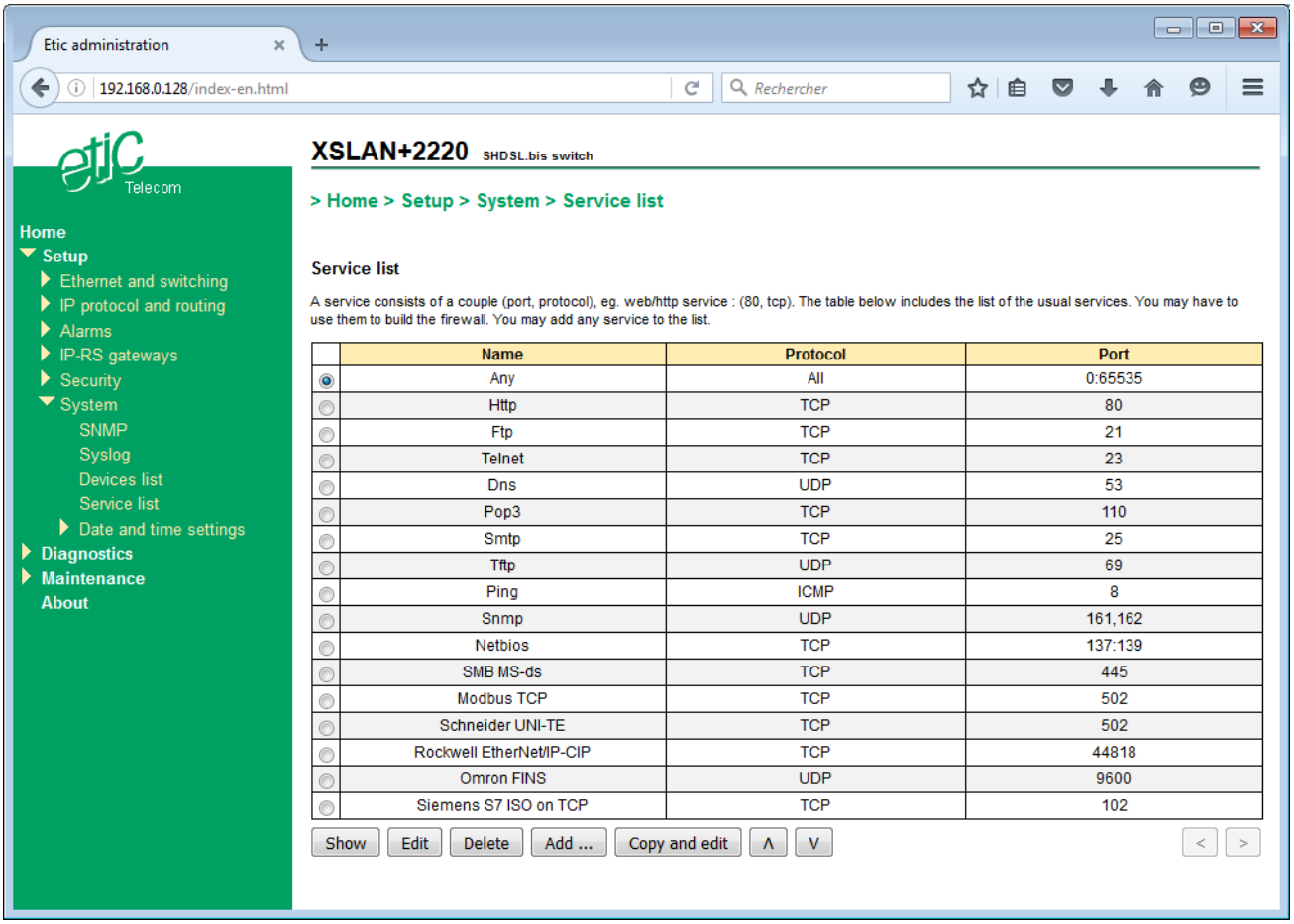
Step 1 : Define the devices addresses

- Select the menu « Setup > System > Device list ».
- Click « Add… ».
- Give a name for this device or this group of devices.
- Enter an IP address to specify a single host (for instance 192.168.10.12) or a range of IP addresses and a netmask (for instance 192.168.10.0/255.255.255.0).
- Click « Save ».



Step 2 : Optionally set other services

- Select the menu « Setup > System > Service list ».
- Click « Add… ».
- Give a name for this service.
- Define a protocol and a port number for that service.
- Click « Save ».

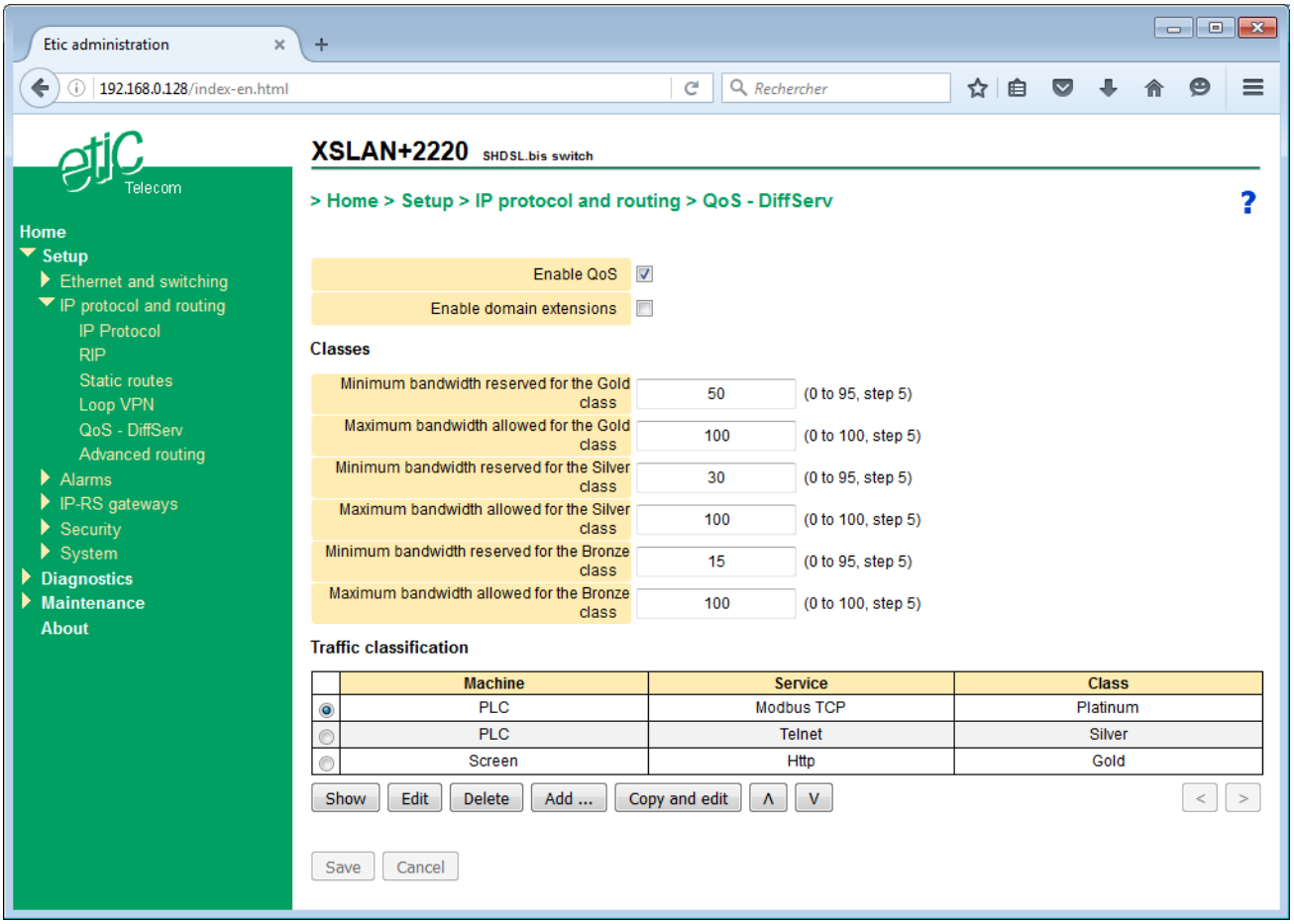


Step 3 : Configure the traffic classes

- Select the menu « Setup > IP protocol and routing > QoS – DiffServ ».
- Tick the checkbox « Enable QoS ».
- Assign a minimum and a maximum bandwidth to each class (Gold, Silver, Bronze).
- Click « Save ».

Step 4 : Classify the traffic

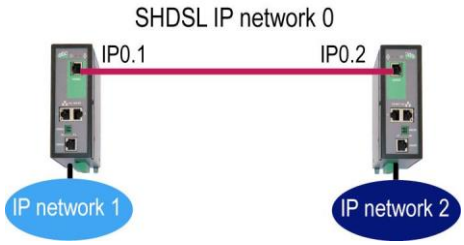
- Under the traffic classification table, click « Add ».
- Assign a device and a service to a class (Platinum, Gold, Silver, Bronze).
- Click « Save ».


Etic administration
192.168.0.128/index-en.html
Rechercher
Telecom
XSLAN+2220 SHDSL.bis switch
> Home > Setup > IP protocol and routing > QoS - DiffServ
?
Home
Setup
Ethernet and switching
IP protocol and routing
IP Protocol
RIP
Static routes
Loop VPN
QoS - DiffServ
Advanced routing
Alarms
IP-RS gateways
Security
System
Diagnostics
Maintenance
About
Enable QoS
Enable domain extensions
Classes
Minimum bandwidth reserved for the Gold class 50 (0 to 95, step 5)
Maximum bandwidth allowed for the Gold class 100 (0 to 100, step 5)
Minimum bandwidth reserved for the Silver class 30 (0 to 95, step 5)
Maximum bandwidth allowed for the Silver class 100 (0 to 100, step 5)
Minimum bandwidth reserved for the Bronze class 15 (0 to 95, step 5)
Maximum bandwidth allowed for the Bronze class 100 (0 to 100, step 5)
Traffic classification
Machine Service Class
PLC Modbus TCP Platinum
PLC Telnet Silver
Screen Http Gold
Show Edit Delete Add ... Copy and edit ∧ V
< >
Save Cancel

18 IP Routing

18.1 Overview

The XSLAN+ switch can perform basic IP routing functions between its local interface consisting of 2 to 4 Ethernet ports and the SHDSL interface, consisting of 1 to 4 SHDSL ports.



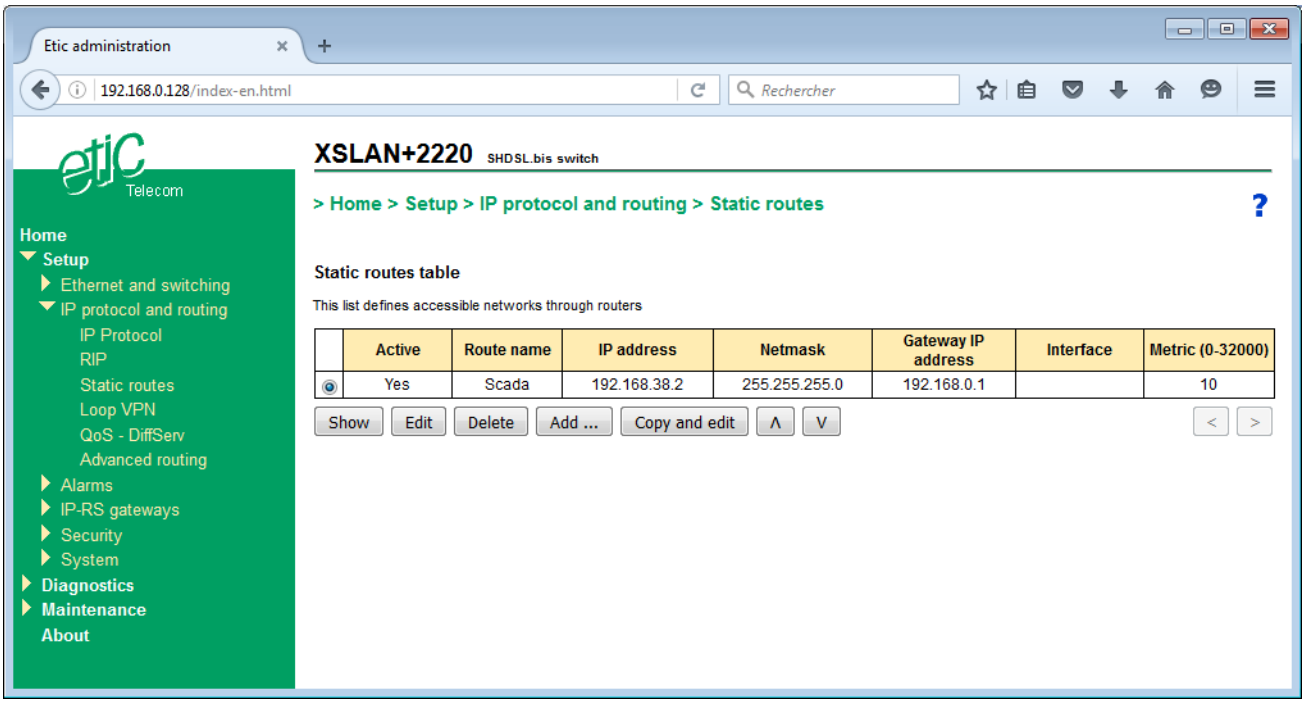
See chapter « IP addresses setting »

To access devices located in a different IP network, the XSLAN+ switch usually send the IP frames to its default gateway. However, for more complex situation, it is possible to create static routes or use a routing protocol.

18.2 Static routes

To create a static route,

- Select the menu « Setup > IP protocol and routing > Static routes ».
- Click « Add… ».
- Enter the destination IP address, the netmask, the gateway address used for this destination and the cost of the route.



18.3 RIP protocol

RIP (Routing Information Protocol) is an IP routing protocol that allows each router or a network equipment to know the route to another network.

Principle of operation :

Routing table broadcasting
Each router transmits to neighboring routers and neighboring RIP listeners, is routing table.

Routing table update
Each router updates its own table using the information received from the other.
RIP prevents to declare static routes in each router.

To enable RIP,

- Select the menu « Setup > IP protocol and routing > RIP ».
- Tick the checkbox « Enable RIP »

When enabled, RIP runs on all Ethernet ports, LAN or SHDSL, regardless whether the router mode is enabled or not.

18.4 OSPF protocol

The OSPF protocol performs the same function as RIP but is used on more complex network configuration.

The XSLAN+ switch supports OSPF but the configuration is done via SSH command line. This is an advanced operating mode which allows the XSLAN+ switch to behave as a very flexible and sophisticated router. For example, it is possible to bridge any Ethernet port with any SHDSL port and assign different IP addresses for each port.

To enable OSPF,

- Select the menu « Setup > IP protocol and routing > RIP > Advanced routing ».
- Tick the checkbox « Enable advanced routing mode (SSH CLI) ».
- In the table « Bridge configuration » Click « Add… ».
- Enter the list of interfaces that belong to that bridge.

For each bridges an IP address and a subnet mask will be assigned later.

The rest of the configuration is done via SSH on port 22.

For more information, refer to Quagga reference manual.

19 Alarms

19.1 SNMP Alarms

See SNMP chapter.

19.2 Digital output

The digital output can switch OFF in case of one of these events :

XSLAN+ / Event :	1XXX	2XXX	4XXX
Port SHDSL 1 disconnected	Y	Y	Y
Port SHDSL 2 disconnected	-	Y	Y
Port SHDSL 1or 2 disconnected	-	Y	Y
Fail safe ring broken		Y	Y

20 Serial to IP gateways

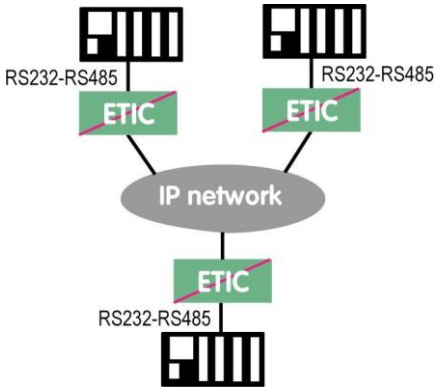
20.1 Overview

Depending on the model, the XSLAN+ switch provides 2 serial ports : 2 RS232, or 1 RS232 and 1 RS485, or 1 RS422 isolated or 1 RS485 isolated.

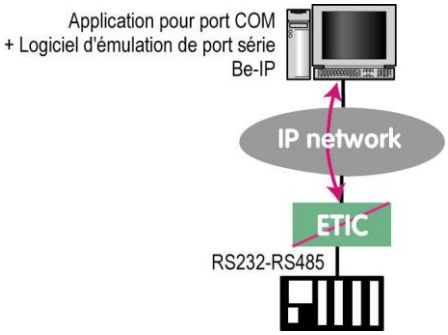
A gateway can be assigned to each serial port.

A serial gateway makes possible to use the IP network to transport serial data between two or several serial devices or directly with devices connected to the Ethernet network.

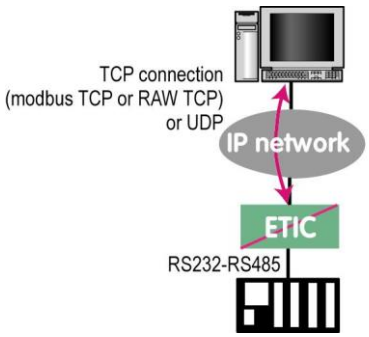
- Communication between serial devices



- Communication between a serial device and a PC via a COM port emulation software



- Communication between serial devices and a PC software application able to encapsulate the serial data into UDP or TCP (like a Modbus TCP software application for instance).



To perform the functions described above, several types of gateways are available.

20.2 Modbus gateway

The Modbus gateway allows to connect serial RS232-RS485 master or slaves devices to one or several Modbus TCP devices connected to the IP network

20.2.1 Glossary

A Modbus TCP client is a device connected to the Ethernet network and able to transmit Modbus requests to a Modbus TCP server device which will reply.

Several Modbus clients can send requests to the same Modbus TCP server.

A Modbus TCP server is a device connected to the Ethernet network and able to reply to Modbus requests to a coming from Modbus TCP client devices.

A TCP server can reply to several TCP clients.

A Modbus master device is a device connected to a serial asynchronous link and able to send requests to a Modbus slave device connected to the same serial network.

A Modbus slave device is a device connected to a serial asynchronous link and able to reply to Modbus requests connected to the same serial network.

Modbus address : An address between 0 and 254 assigned to each participant to a Modbus network.

Remark the Modbus address must not be confused with the IP address of a Modbus device
.

20.2.2 Selecting a Modbus client or a Modbus server gateway

Select the Modbus Server gateway to connect serial slave devices to the serial port of the product.

Select the Modbus Client gateway to connect a serial Master device to the serial port of the product.

20.2.3 Assigning a Modbus gateway to a serial port

The Modbus client gateway (respectively server) can be assigned to the serial port COM1 or COM2.

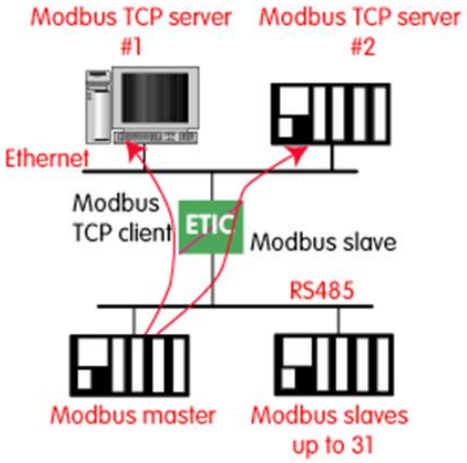
The Modbus client gateway can be assigned to a serial port (COM1 for ex.) while the Modbus server gateway is assigned to the other port (COM2 for ex.).

20.2.4 Modbus client gateway

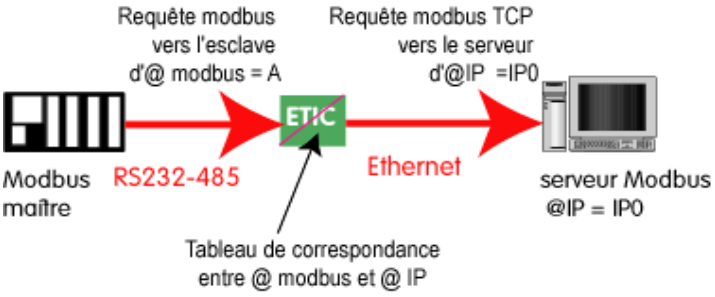
This gateway allows to connect a serial modbus master to the serial interface of the product.

The gateway can be connected to several Modbus TCP servers on the IP network

Other slaves can be connected to the serial link.



How the Modbus Client Gateway works :
In order to access a Modbus TCP server on the IP network, a mapping table between a Modbus slave address and an IP address is set ; so when the Modbus master sends a request to the Modbus slave at address A, the mapping table allow to transmit the request to the corresponding IP address.
In addition, the Modbus address field of the Modbus TCP frame is set to A.
The mapping table can contain 32 lines allowing a Modbus master to address 32 servers on the IP network.



To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Modbus > Modbus client »
- Tick the checkbox « Enable Modbus client ».

Parameter « COM port » :
Select the serial link 1 or 2 of the product.

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « Modbus protocol » :
Select RTU (hexa) or ASCII.

Parameter « Inter-character time » :
Set up the maximum delay the gateway will have to wait between a received character of a Modbus answer packet and the following character of the same packet.

Parameter « TCP idle Timeout » :
Set the time the gateway will wait before disconnecting the TCP link if no characters are detected.

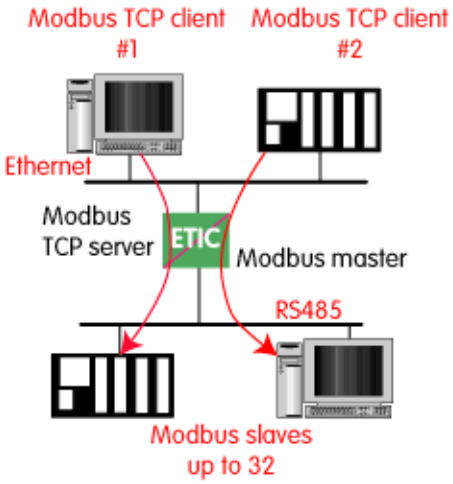
Parameter « TCP port » :
Set the port number the gateway has to use. The default Modbus TCP port is 502.

Table « Modbus slaves » :
The table allow the mapping of a Modbus slave address to an IP address.

20.2.5 Modbus server gateway

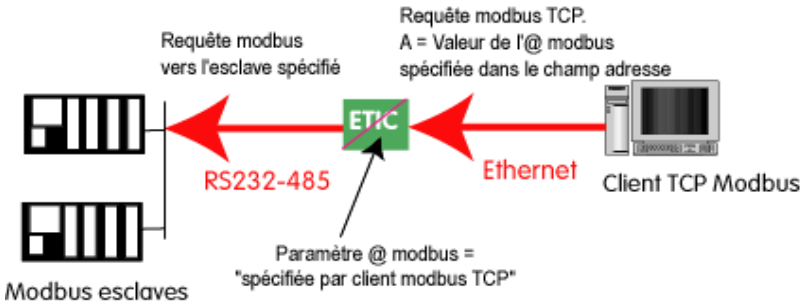
This gateway allows to connect serial modbus slaves to the serial interface of the product.

Up to 32 slaves, can be connected to the RS485 port.

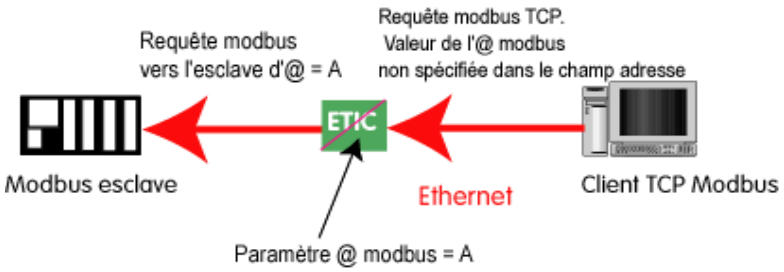


How the Modbus server Gateway works :
A Modbus TCP client send a Modbus TCP client to the gateway.
The gateway behave as a master on the serial link. It transcode and transmit the request on the serial link.
The Modbus slave address of the request is :

- Either the address contained in the Modbus TCP address field ; in this case, several slaves can be addressed on the serial link.



- Or a fixed address configured in the gateway (see below); in this case, only one slave can be addressed on the serial link.



Warning : Several TCP Modbus client can send requests to the slaves on the serial link. Nevertheless, care must be taken not to saturate the serial link since its flow rate is much lower than the Ethernet one.

To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Modbus > Modbus server »
- Tick the checkbox « Enable Modbus server ».

Parameter « COM port » :
Select the serial link 1 or 2 of the product.

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « Modbus protocol » :
Select RTU (hexa) or ASCII.

Parameter « Enable proxy/cache function » :
If this function is active, a request is only sent to a slave if the same query has not been sent since the time set by the “cache refresh" parameter.

Parameter « Cache refresh » :
Sets the minimum time between two identical requests to the same slave.

Parameter « Inter-character time » :
Set up the maximum delay the gateway will have to wait between a received character of a Modbus answer packet and the following character of the same packet.

Parameter « Modbus slave address » :
If the value "0" is selected, the gateway uses the Modbus address specified by the Modbus TCP client to address the Modbus slave on the serial link ; up to 32 slaves can be addressed on the serial link.

If a particular value is selected (1 to 255), the gateway sends all requests to the selected slave ; only one slave can be addressed on the serial link.

Parameter « TCP idle Timeout » :
Set the time the gateway will wait before disconnecting the TCP link if no characters are detected.

Parameter « Slave response timeout » :
Set the time the gateway will wait for a response from the slave.

Parameter « TCP port » :
Set the port number the gateway has to use. The default Modbus TCP port is 502.

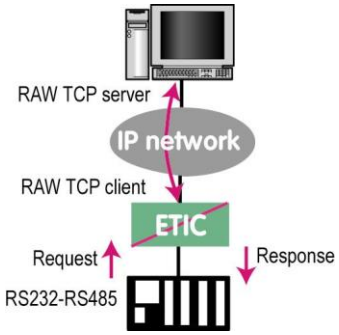
Parameter « Local reiteration count » :
Set up the number of times the gateway will repeat a request in case of no response from the slave.

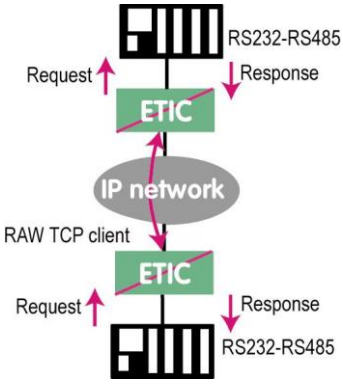
20.3 Raw TCP gateway

20.3.1 Raw TCP client

The Raw client gateway can be used if a serial “master” device has to send requests to one slave device (also called server) located on the IP network.

The server can be either an ETIC gateway or a PC including a software TCP server.





To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Transparent > Raw client COMx »
- Tick the checkbox « Enable ».

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « Receive buffer size » :
Set up the maximum length of an asynchronous string the gateway will store before transmitting it to the IP network.

Parameter « RS end frame timeout » :
Set up the delay the gateway will wait before declaring complete a string received from the asynchronous device.
Once declared complete, the gateway will transmit the string to the IP network.

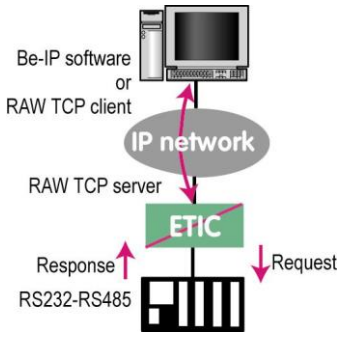
Parameter « TCP idle Timeout » :
Set the time the gateway will wait before disconnecting the TCP link if no characters are detected.

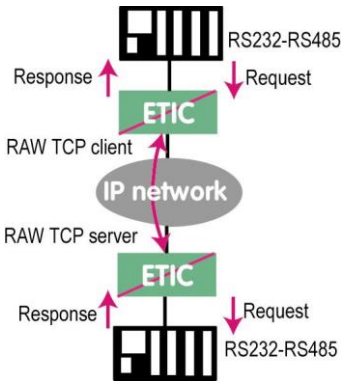
Parameter « TCP port » :
Set the port number the gateway has to use.
Warning : If two gateways of the same type are active on the two serial ports, they can not use the same TCP port number.

Parameter « Server IP address » :
Set the IP address of the Raw server. The gateway will connect to that server and send it the data received on the serial link.

20.3.2 Raw server gateway

That gateway can be used if a serial slave device has to answer requests coming from devices located on the IP network and acting like a master (also called TCP client).





To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Transparent > Raw server COMx »
- Tick the checkbox « Enable ».

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « Receive buffer size » :
Set up the maximum length of an asynchronous string the gateway will store before transmitting it to the IP network.

Parameter « RS end frame timeout » :
Set up the delay the gateway will wait before declaring complete a string received from the asynchronous device.
Once declared complete, the gateway will transmit the string to the IP network.

Parameter « TCP idle Timeout » :
Set the time the gateway will wait before disconnecting the TCP link if no characters are detected.

Parameter « TCP port » :
Set the port number the gateway has to use.
Warning : If two gateways of the same type are active on the two serial ports, they can not use the same TCP port number.

20.4 Raw UDP gateway

The RAW UDP gateway allows to connect together a group of serial or IP devices through an IP network.
The group can include IP devices if they have the software pieces able to receive or transmit serial data inside UDP.
Serial data transmitted by each device is transmitted to all other serial devices through the IP network.
A table of IP addresses define the list of the devices belonging to the group.
The serial data is encapsulated in the UDP protocol.
The UDP datagram is sent to each destination IP address stored in the table.

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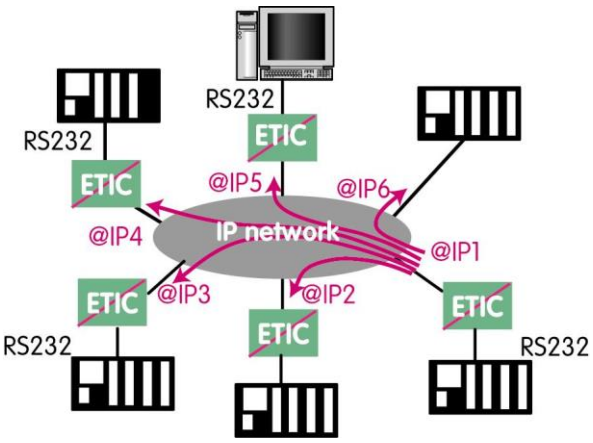


To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Transparent > Raw UDP COMx »
- Tick the checkbox « Enable ».

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « Receive buffer size » :
Set up the maximum length of an asynchronous string the gateway will store before transmitting it to the IP network.

Parameter « RS end frame timeout » :
Set up the delay the gateway will wait before declaring complete a string received from the asynchronous device.
Once declared complete, the gateway will transmit the string to the IP network.

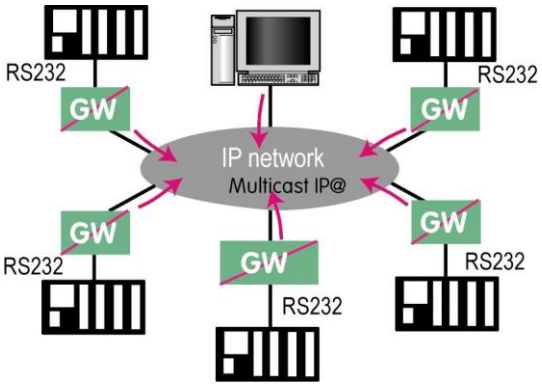
Parameter « UDP port » :
Set the port number the gateway has to use.
Warning : If two gateways of the same type are active on the two serial ports, they can not use the same UDP port number.

Table « Destinations » :
This table stores the IP addresses of the gateways to which the serial data, encapsulated inside UDP, have to be sent.
A different UDP port number can be entered for each destination IP address.

20.5 Raw multicast gateway

This gateway is designed to connect a serial device to several devices on an IP network.

It uses the "multicast" protocol that can simultaneously deliver an IP frame to many devices without increasing the traffic: The RS232 data are transmitted in an IP frame with a particular IP address called multicast address; all subscribers to this address can receive the frame.



To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Transparent > Raw Multicast COMx »
- Tick the checkbox « Enable ».

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « Receive buffer size » :
Set up the maximum length of an asynchronous string the gateway will store before transmitting it to the IP network.

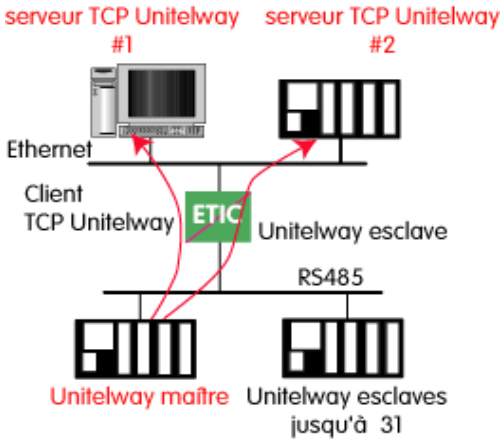
Parameter « RS end frame timeout » :
Set up the delay the gateway will wait before declaring complete a string received from the asynchronous device.
Once declared complete, the gateway will transmit the string to the IP network.

Parameter « UDP port » :
Set the port number the gateway has to use.
Warning : If two gateways of the same type are active on the two serial ports, they can not use the same UDP port number.

Parameter « Multicast group IP address » :
Set the IP address assigned to the multicast group in conformance with the IANA rules.

20.6 Unitelway gateway

The Unitelway gateway is used to connect a Unitelway master PLC to an IP network.
In particular it is used to perform the remote maintenance of a Schneider Electric RS485 PLCs via an IP network.



To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Unitelway »
- Tick the checkbox « Enable ».

Parameter « COM port » :
Select the serial link 1 or 2 of the product.

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « Xway address » :
Gateway address in the Xway network.

Parameter « TCP idle Timeout » :
Set the time the gateway will wait before disconnecting the TCP link if no characters are detected.

Table « Unitelway slaves » :
Mapping between the address of each Unitelway slave emulated by the gateway and the IP and XWAY addresses of the device on Ethernet.

20.7 Telnet gateway

This gateway allows a PC running a Telnet client software to connect to an equipment connected to the switch serial link XSLAN +.
The data rate and the format of the characters on the serial link can be controlled according to the RFC2217 standard.

To configure the gateway :

- Select the menu « Setup > IP-RS gateways > Telnet »
- Tick the checkbox « Enable ».

Parameter « COM port » :
Select the serial link 1 or 2 of the product.

Parameters « Bitrate, Parity, Data, stop bits » :
Allow to set the bitrate and the format of the asynchronous serial link..

Parameter « TCP idle Timeout » :
Set the time the gateway will wait before disconnecting the TCP link if no characters are detected.

Parameter « TCP port » :
Set the port number the gateway has to use.

1 Visual diagnostic

At power up, le Led ⏻ is red for about 30 seconds during the initialization of the product.

Then the Led turns steady green when the product is ready.

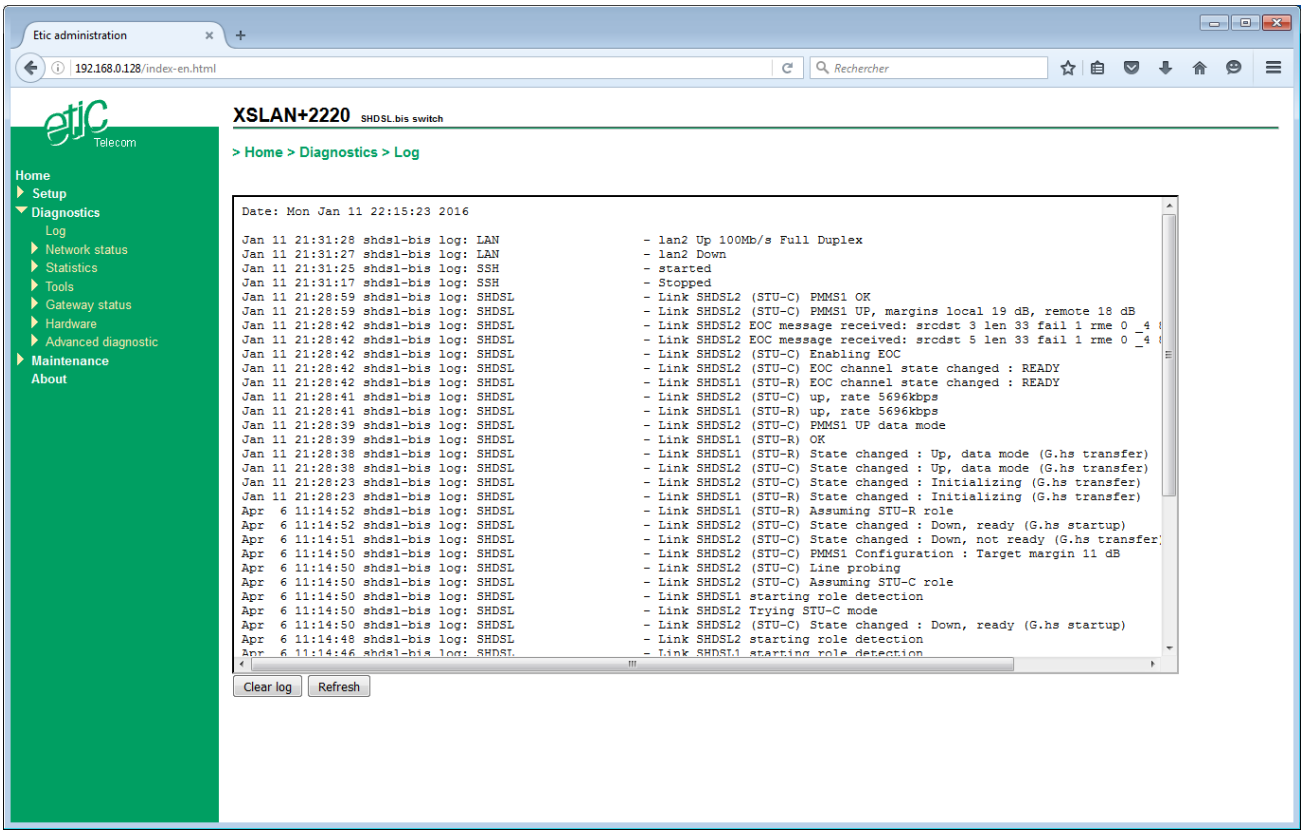
If the Led remains red after that delay, the product is probably faulty ; please contact the hotline.

2 Log

The log displays the last three hundred time-stamped events including the SHDSL connections and disconnections.

To access the log :

- Select the menu « Diagnostic > Log »



3 Link quality measurement

The quality of the connection can be verified using the following endpoints :

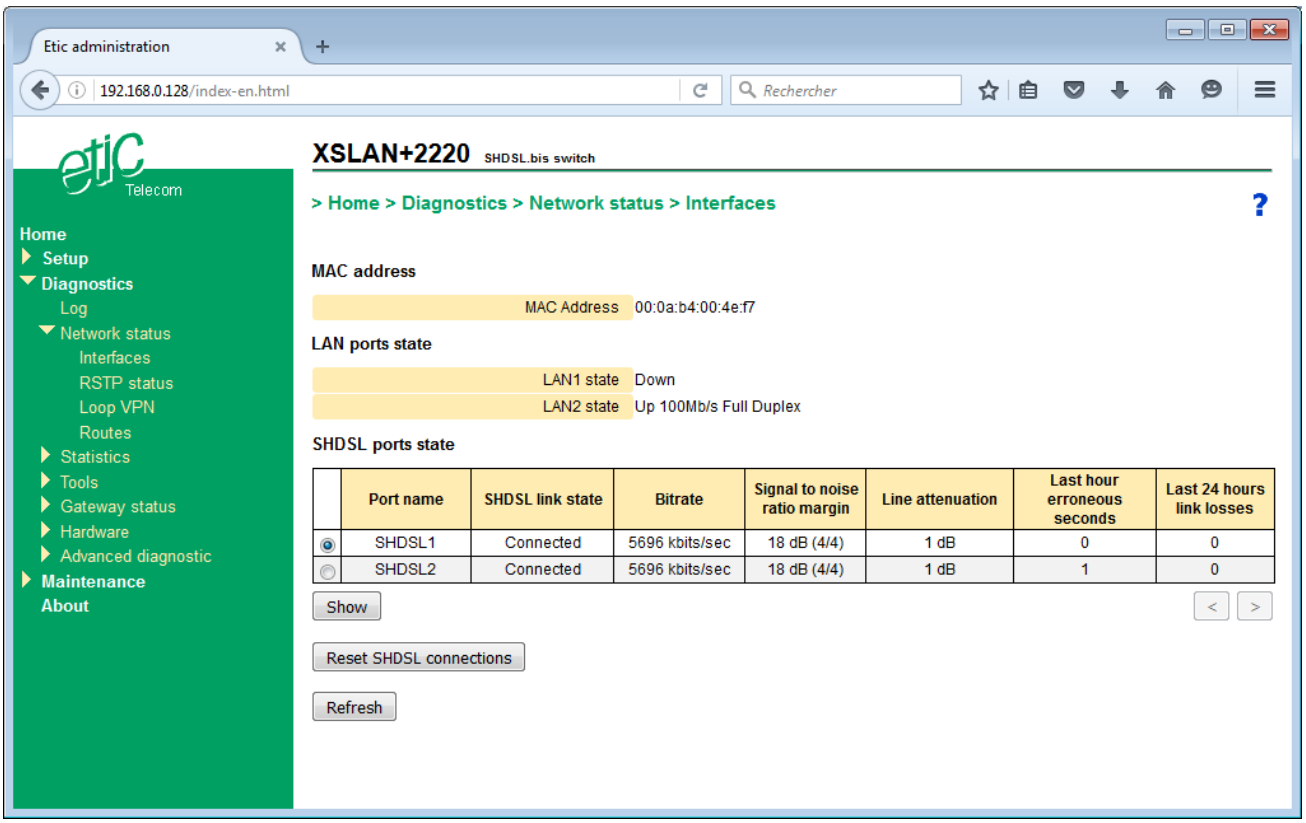
1 : The signal to noise ratio (SNR) margin
This the difference between the measured SNR and the minimum SNR needed to have an established connection.
The lower the value, the higher the risk to get transmission errors or disconnection in case of noise disturbances on the line.

2 : The link loss number
The number of disconnections is a good indicator of the quality of the link.
On a link that works fine disconnections must be very rare and should only happen during a thunderstorm or an electromagnetic disturbance.

3 : Error rate of the link
The number of errored seconds gives the error rate of the link.
When a link is working well, the number of erroneous seconds must be very low.
A few erroneous seconds may occur time by time, for instance during a thunderstorm or an electromagnetic disturbance.

To verify the link quality :

- Select the menu « Diagnostics > Network status > Interfaces ».



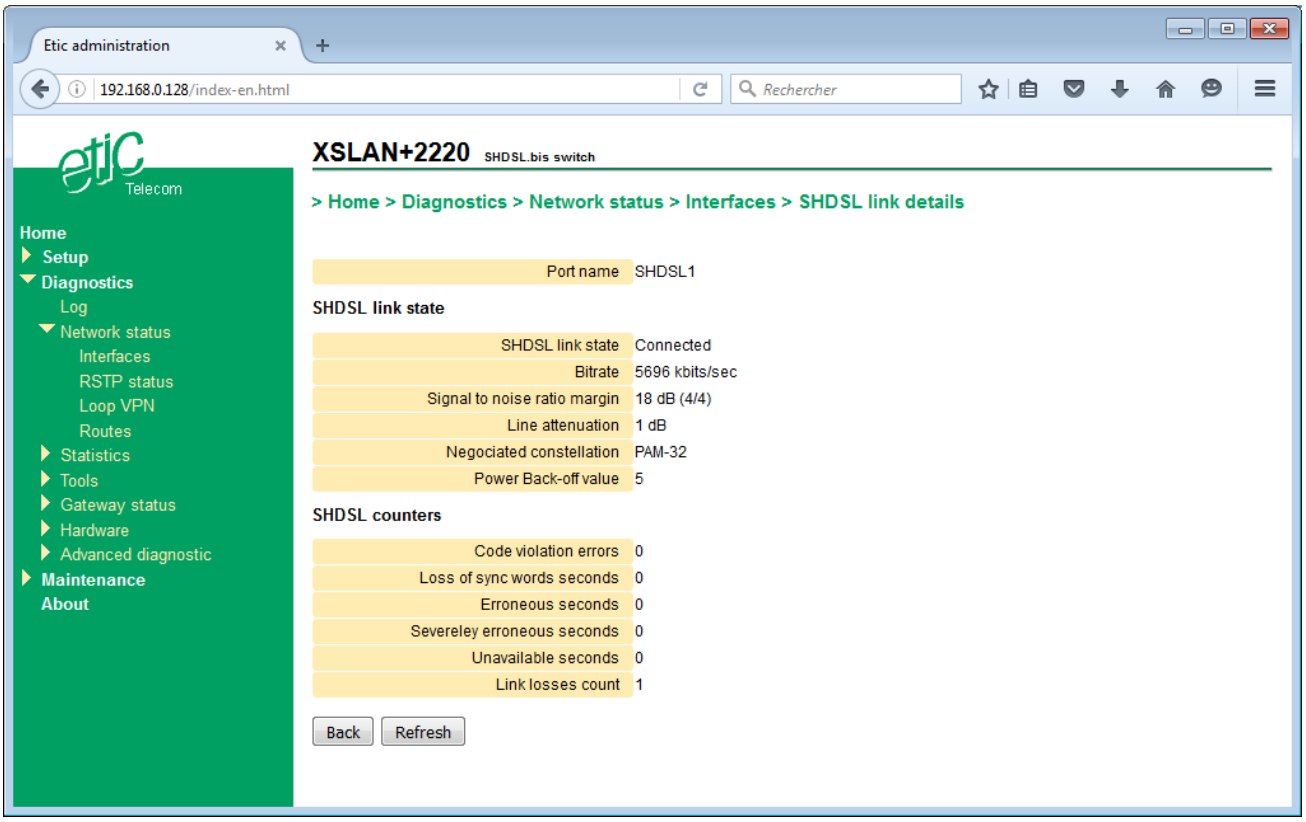
The summary table shows for each SHDSL line:

- If it is connected or not
- The data rate
- The line attenuation
- The SNR margin
- The number of erroneous seconds
- The number of disconnections

To diagnose a malfunction of an SHDSL link,

- Select the SHDSL link
- Click « Show ».

The detailed status of the link is displayed.



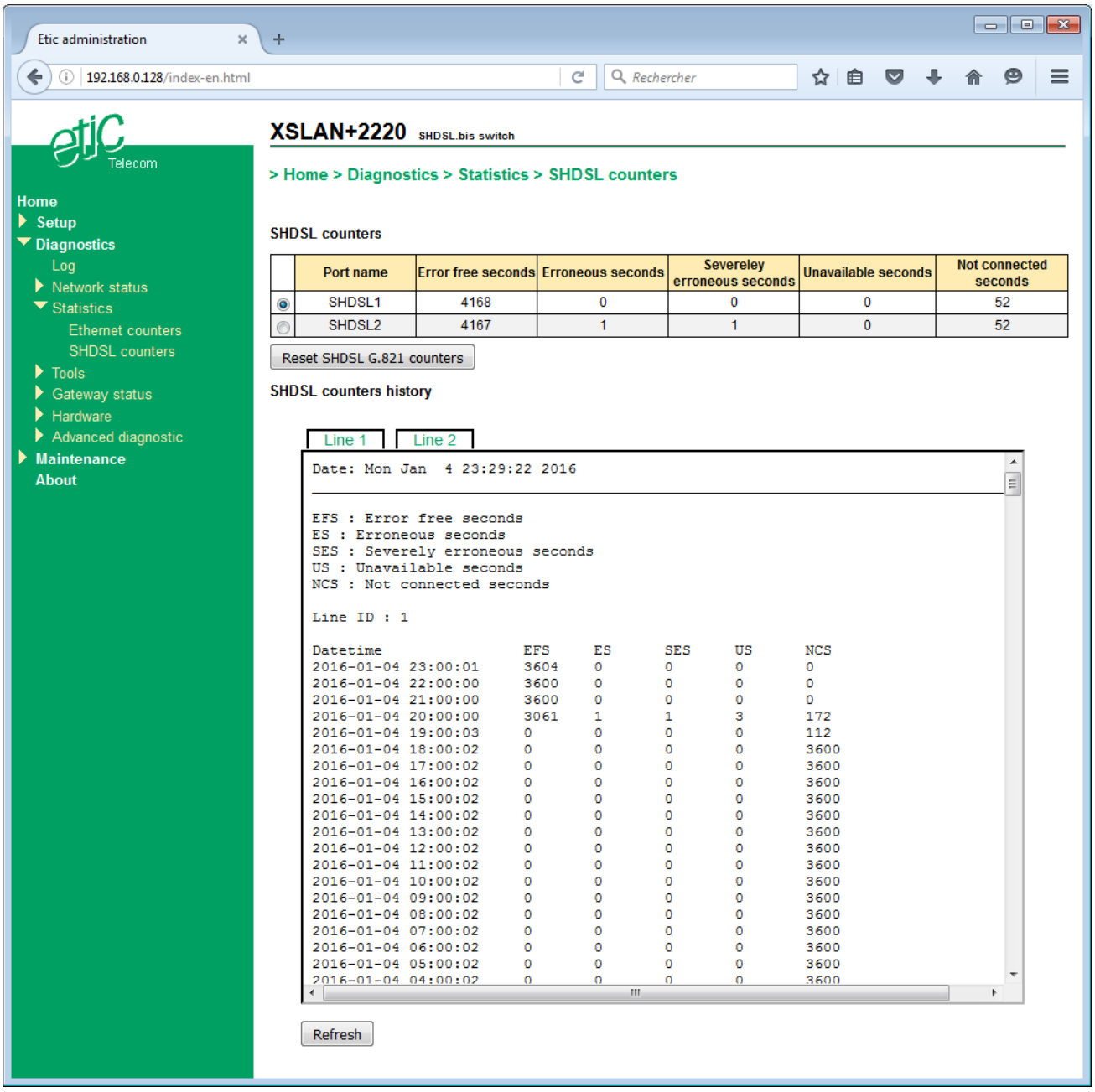
4 SHDSL statistics

SHDSL statistics allow a comprehensive view of the quality of the link by taking into account a long period of operation.

This is a set of counters indicating the link quality for every second, similarly to the G821 standard. Furthermore, an hour by hour history of these counters can be used to correlate transmission defects with other events, such as starting a motor and this to a depth of 15 days.

To access the SHDS statistics,

- Select the menu « Diagnostics > Statistics > SHDSL counters ».

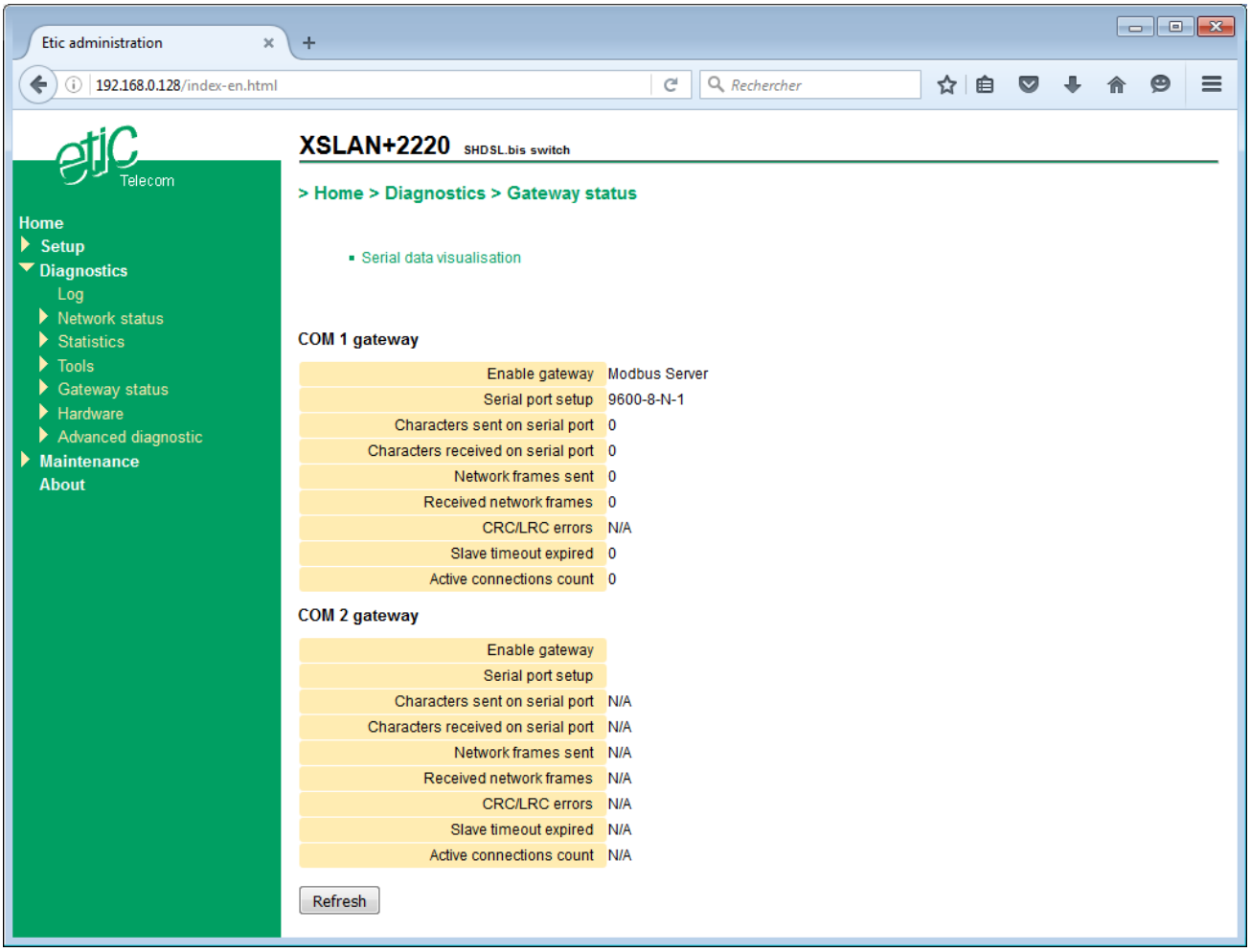


5 Gateways status

To access the status of the gateways„

- Select the menu « Diagnostics > Gateways status ».

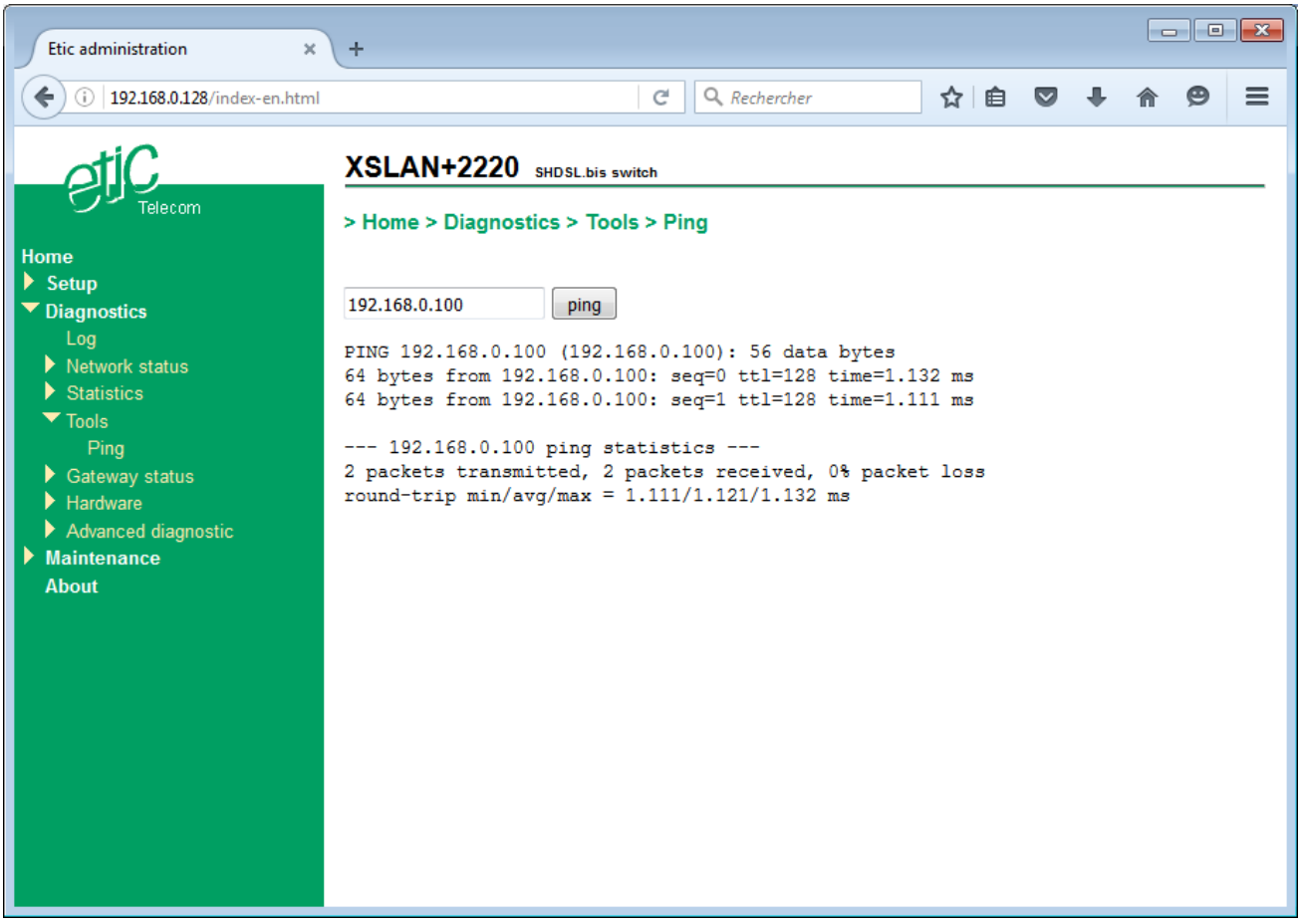
This page displays the current settings of the gateways, the number of bytes transmitted and the number of erroneous frames.



The menu « Serial data visualization » allows analyzing the RX and TX traffic on the serial link.

6 PING tool

This tool is used to send a "PING" frame from the product to a device on the network.



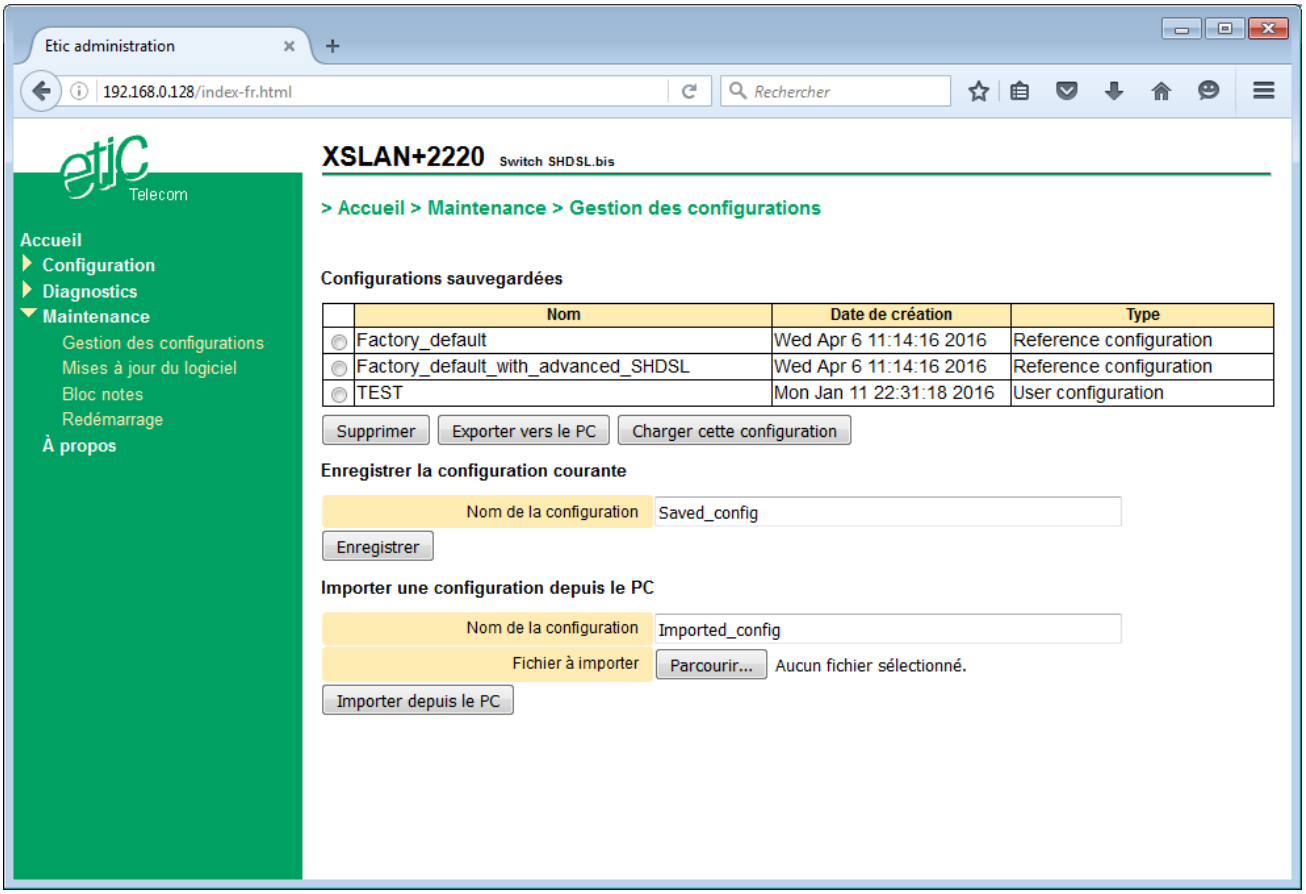
7 Saving and loading a configuration file

In each configuration page, the "Save" button is used to save the new settings. The configuration is saved in memory and takes effect immediately. If the product reboot, the configuration is not lost ; This is the running configuration.

it is possible to save the running configuration to a file in the product, or export it to a PC as an editable file.

Conversely, it is possible to load a configuration from the set of configurations stored in the product or to import a configuration file stored in a PC.

- Select the menu « Maintenance > Configurations management ».



To save the running configuration to a file in the product,

- In the field « Configuration name », enter a name for that configuration and click on « Save ».

The configuration is added to the table « Saved configurations ».

To load a configuration in the list as the running configuration,

- Select the configuration in the list and click on « Load this configuration ».

To export the running configuration to a file (.txt) in a PC ,

- First save the running configuration to a file in the product as previously stated.
- Then select in the list the configuration to export and click on « Export to ta PC ».

To import a configuration file from a PC,

- Click on « Browse » then select the file le (XXX.txt) to import.
- Optionally change the name of the configuration and click "Import from PC." This configuration appears in the list "Configurations saved »
- Select this configuration in the list and click on « Load this configuration ».; it becomes the running configuration.

Warning : A configuration file can only be downloaded to a product having the same firmware version.

8 Updating the firmware

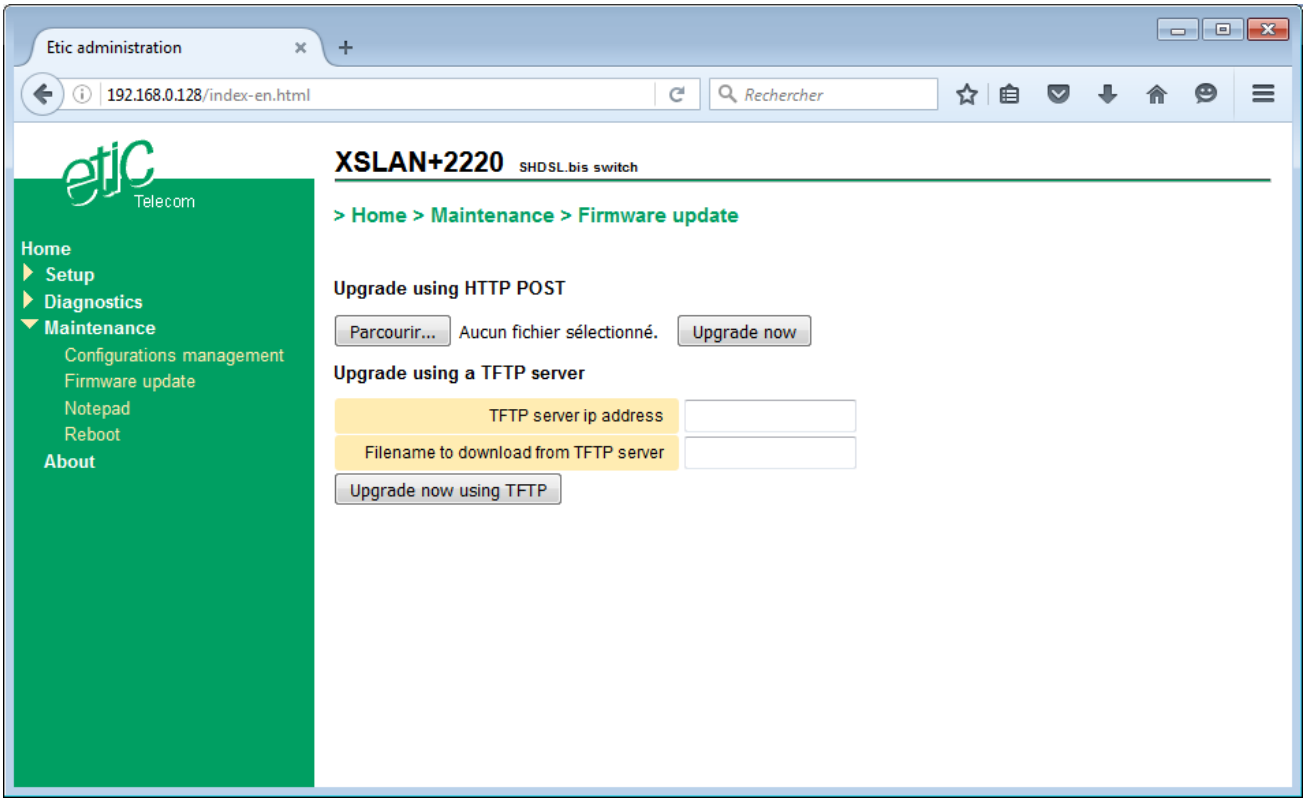
It is usually performed via the Ethernet port or remotely, via the SHDSL link.
The update does not change the setting of the product.

If the update is done remotely, verify that the new firmware version is compatible with the current setting to insure that the SHDSL link will go up automatically after the update.

The update can be done in two ways :

If the updated firmware file is accessible from the user's PC, it can be done directly with the browser using HTTP POST.

The update can also be done via a TFTP server there the updated firmware file has to be previously loaded.



To perform the firmware update using HTTP POST,

- Select the menu « Maintenance > Firmware update » ;
- Select the new firmware file ;
- Click on « Update now »

After a few seconds, the led ⏻ blinks red.

Wait about 5 minutes and then check that the update is done (menu "About").

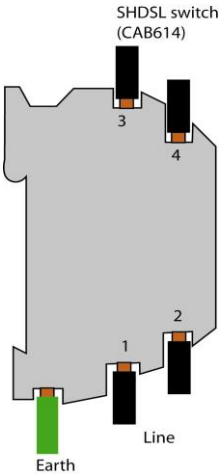
The table below shows the data rate which is possible to get on a SHDSL link depending on the wire diameter and the distance.

These values are indicative in noise free environment.

Data rate	192Kb/s	1,2Mb/s	2,3Mb/s	5,7 Mb/s	6.7 Mb/s	10 Mb/s	12 Mb/s	15 Mb/s
Distance (Ø 0.9 mm) *	13 km	8 km	6 km	3.7 km	2.5 km	1.5 km	1 km	0.7 km
Distance (Ø 0.4 mm) *	7 km	4 km	3 km	2 km	1.3 km	0.9 km	0.6 km	0.4 km

In case the line is exposed to the storm - airline, unshielded cable, stormy regions - we recommend to equip the ends of each twisted pair with a surge protectors connected to the Earth.

We have selected the Phoenix Contact module TT-2-PE-24D; it must be wired as indicated below.



If the line is shielded, the shield must be connected to the earth; only at one end if it is not interrupted along the line.

Date : 05/04/2012
Revision : 2

9 Purpose of the document

Tis document describes the MIBs and the OIDs supported by the XSLAN+ products manufactured by ETIC Telecom.

10 MIBs supported

It is only possible to read informations, not to write it.

- RFC1213-MIB (MIB-2)
- HDSL2-SHDSL-LINE-MIB
- HOST-RESOURCES-MIB
- IF-MIB
- IP-MIB
- BRIDGE-MIB
- RSTP-MIB

11 Accessible OIDs and MIBs

The OIDs used are standard and located under iso.org.dod.internet.mgmt.mib-2.
The interface index will not change for a given software version even after configuration changes and reboots. However, they are subject to change after updating the firmware.

12 Description of the supported OIDs

12.1 Group at.atTable.atEntry

- OIDs atIfIndex, atNetAddress, atPhysAddress : Table ARP of the product.

12.2 Group host.hrSystem

- OID hrSystemUptime : Time from the boot of the product

12.3 Group system

- OID sysDescr.0 : Type of product and firmware version (Planned)
- OID sysLocation.0 : Parameter “syslocation” in the web page
- OID sysName.0 : Parameter “sysname” in the web page

12.4 Group ip

IP addresses assigned to the network interfaces of the product.

12.5 Group interfaces

List of the network interfaces of the product.

The XSLAN+ can have up to 8 Ethernet interfaces :

- 4 ports 10/100BASE-T
- 4 ports SHDSL 2BASE-TL

The interfaces are named :

- lan1, lan2, lan3, lan4 for the 10/100BASE-T interfaces (from 1 to 4)
- sh1, sh2, sh3, sh4 for the lSHDSL interfaces (from 1 to 4).

- OID ifAdminStatus : Display the administrative state of the interface.

Warning : For the SHDSL port, the value ifAdminStatus is « up » when the connection is established, it is « down » otherwise.

- OID ifOperStatus : Is « up » when a connection is established, or « down » when were is no connection.
- OID ifDescr : Name of the interface as described above.
- OID ifIndex : Index of the interface, used in many tables of the product.
- OID ifSpeed : Data rate of the interface. Warning, for the SHDSL port this value is always 100Mb/s.

12.6 Group transmission.hdsl2ShdslMIB.hdsl2ShdslMibObjects

This group contains the informations relative to the SHDSL connections.

12.6.1 Table EndPointCurrTable :

- OID hdsl2ShdslEndpointCurrAtn : Line attenuation
- OID hdsl2ShdslEndpointCurrSnrMgn : SNR margin
- OID hdsl2ShdslEndpointrrActivationState : Line status, connected or not (Warning, the other fields are invalid when this parameter value is not « data »
- OID hdsl2ShdslEndpointCRCAnomalies : CRC errors on the line
- OID hdsl2ShdslEndpointLOSWS : Seconds with one or more synchronization loss
- OID hdsl2ShdslEndpointES : Erroneous seconds. A second is « erroneous » if there are one or several CRC errors or synchronization loss
- OID hdsl2ShdslEndpointSES : Severely erroneous seconds . A second is « severely erroneous » if there are at least 50 CRC errors or one or several synchronization loss.
- OID hdsl2ShdslEndpointUAS : Unavailable seconds. A second is « unavailable » after 10 consecutive severely erroneous seconds. It is necessary to have 10 seconds with no « severely erroneous » seconds to leave this state.

For more information, refer to ITU-T standard G.991.2 (G.SHDSL.bis).

The other fields are not supported.

12.6.2 Table SpanStatusTable

- OID hdsl2ShdslStatusActualLineRate : data rate of the SHDSL line.

The other fields are not supported and are set to 0.

12.6.3 Table SpanConfProfileTable

This table gives the list of the profiles defined for the SHDSL links configuration.
These informations are the same as the ones in the web page « SHDSL ports »

12.6.4 Table SpanConfTable

This table gives the SHDSL profile associated with each SHDSL port.

12.7 Groupe dot1dBridge

Information about the bridge are gathered under this OID.

12.7.1 OID dot1dBridge.dot1dBase

The following information is displayed :

- OID dot1dBaseBridgeAddress : Bridge MAC address
- OID dot1dBaseNumPorts : Number of ports in the bridge
- OID dot1dBaseType : Type of bridge (Tranparent-only)

12.7.2 Table dot1dBasePortTable :

This table provides details of the bridge ports. Throughout the BRIDGE-MIB, ports are referenced by number. This table associates a bridge port number with ifIndex (network interface number).

- OID dot1dBasePort : Port number
- OID dot1dBasePortIfIndex : Port index in the ifTable table
- OID dot1dBasePortCircuit : Always 0
- OID dot1dBasePortDelayExceededDiscards : Not supported
- OID dot1dBasePortMtuExceededDiscards : Not supported

12.7.3 OID dot1dBridge.dot1dTp

This oid gathers information on transparent bridges (= Ethernet switches).

12.7.4 Table dot1dTpFdbTable

This table contains the MAC address table learned by the product.

- OID dot1dFdbAddress : MAC address learned by the switch
- OID dot1dFdbPort : Which port to send a frame with the destination MAC address above.
- OID dot1dFdbStatus : the state of the entry in the table: learned or fixed.

This table allows you to draw a "map" of the network and equipment connected to it.

12.7.5 OID dot1dSTP

This OID displays information about the Spanning Tree Protocol (STP) used by bridges to eliminate loops in Ethernet networks.

ANNEX 4
XSLAN and XSLAN+ switches compatibility

A XSLAN switch and a XSLAN+ switch can interwork through a twisted pair.

The firmware version of the XSLAN+ switch must be later than V1.3.2.

1/ Case 1 : XSLAN is a STU-R (NTU)

Compatibility between a XSLAN switch and a XSLAN+ switch is guaranteed unconditionally.

The XSLAN+ switch must be configured with the "STU-C, Standard" profile or with a fixed data rate profile. In this case the data rate must be less than or equal to 2304 Kb/s.

2/ Case 2 : XSLAN is a STU-C (LTU)

Compatibility between a XSLAN switch and a XSLAN+ switch is only guaranteed if the XSLAN firmware version is at or later than V2.20.

The data rate must be at least 192 kb/s.

The XSLAN+ switch must be configured with the "STU-R, Auto" profile.

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