XSLAN+

SHDSL Switch

USER GUIDE

The XSLAN+ SHDSL switch is designed and manufactured by

ETIC TELECOM

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DECLARATION OF CONFORMITY

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

- the Electromagnetic Compatibility (EMC) Directive 2014/30/UE ,
- the Low Voltage Directive (LVD) 2014/35/UE ,
- the Restriction of the use of certain Hazardous Substances (RoHS) Directive 2011/65/UE.

Type of product: SHDSL switch
Models:
XSLAN+140
XSLAN+1400, XSLAN+1220, XSLAN+1230, XSLAN+1260, XSLAN+1261
XSLAN+2400, XSLAN+2220, XSLAN+2230, XSLAN+2260, XSLAN+2261
XSLAN+BP2400, XSLAN+BP2220, XSLAN+BP2230, XSLAN+BP2260, XSLAN+BP2261
XSLAN+4400, XSLAN+4220, XSLAN+4230, XSLAN+4260, XSLAN+4261

The harmonized standards to which these products comply are:

Standard	Title
EN 61000-6-2 2006	Immunity: EN61000-4-2 Electrostatic Discharge EN61000-4-3 RF Radiated Immunity EN61000-4-4 EFT/Burst Immunity EN61000-4-5 Surge Immunity EN61000-4-6 RF Conducted Immunity EN61000-4-8 Power Frequency Magnetic Field Immunity
EN 61000-6-4 2007 A1/2011	Emission: EN55022 Radiated and conducted emission
EN 60950-1/A2 2014	Safety and Health

Date : 11th October 2017

Philippe Duchesne
Technical Director

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

TABLE OF CONTENTS

OVERVIEW

1 Purpose of this manual

The present user guide describes the features and the installation of the XSLAN+ switches family (it also applies to the switches family previously named XSRING+).

2 Products identification

The XSLAN+ is an industrial Ethernet switch that provides 1 to 4 SHDSL ports to extend the Ethernet transmission up to several kilometers using any existing copper pair.

The XSLAN+ switches family consists of these models :

XSLAN+1400, XSLAN+1220, XSLAN+1230, XSLAN+1260, XSLAN+1261
XSLAN+2400, XSLAN+2220, XSLAN+2230, XSLAN+2260, XSLAN+2261
XSLAN+BP2400, XSLAN+BP2220, XSLAN+BP2230, XSLAN+BP2260, XSLAN+BP2261
XSLAN+4200, XSLAN+BP4200

The main features are summarized hereafter :

XSLAN+ models								
	1400	12xx	2400	22xx	BP2400	BP22xx	4200	BP4200
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	2	2
RS232/RS485 *	N	Y	N	Y	N	Y	N	N
By-pass	N	N	N	N	Y	Y	N	Y
Failsafe ring	N	N	Y	Y	Y	Y	Y	Y
Serial gateway raw, telnet, modbus, unitelway	N	Y	N	Y	N	Y	N	N

*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 Specifications

Dimensions	136 x 48 x 138 mm (h, l, p)
Weight	Max 0.74 kg
Casing	Metallic IP20 – IEC60529 DIN rail mounted
Temperature	Storage: - 40°/ + 85°C Operating: - 40°/ + 70°C
Humidity	10 to 95 % (relative)
Power supply	2 power supply inputs Reverse polarity protection Nominal : 12-48 VDC (min 10 VDC - max 60 VDC)
Consumption	XSLAN+1400 or +12xx : 5W XSLAN+2400 or +22xx : 6W XSLAN+4200 : 9W
EMC	Susceptibility EN61000-6-2 : ESD : EN61000-4-2 : 4 kV contact – 8kV air RF radiated : EN61000-4-3 : 10V/m < 2 GHz Burst : EN61000-4-4 Surge : EN61000-4-5 : 4KV line / earth RF conducted : EN61000-4-6 Magnetic fields : EN61000-4-8 Emission conducted and radiated : EN 55022
Electrical safety	EN 60950-1
Hazardous materials	2011/65/UE (RoHS) REACH
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 time: 45 s typical STU-C / STU-R auto-negotiation
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 address	IPV4 and IPV6
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
Alarm	1 digital output SNMP traps
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.

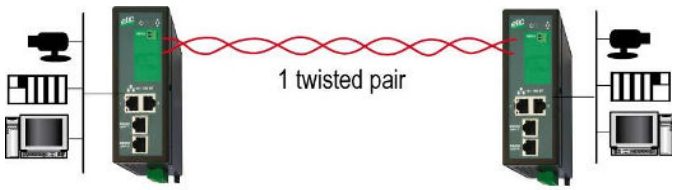
The products which can be connected to two twisted pair.
They provide two SHDSL interfaces.
The references of that products are XSLAN+2400 or XSLAN+22xx if they provide a serial port.
They are named XSLAN+2XXX hereafter.

The products which can be connected to four twisted pair.
They provide four SHDSL interfaces.
The references of that products are XSLAN+4200.

4.1 XSLAN+1XXX

Point to point link on a single twisted pair

Two XSLAN+1XXX extend Ethernet over one 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).



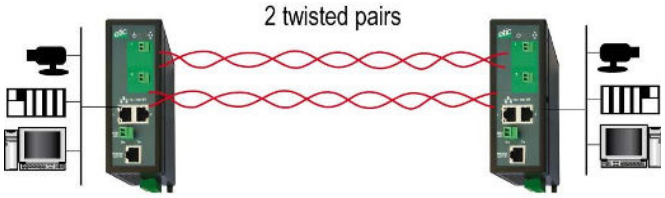
4.2 XSLAN+2XXX

Additional features compared to XSLAN+1XXX:

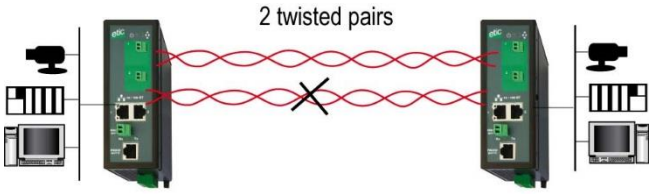
Point to point link on two twisted pairs

Two XSLAN+2XXX 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).

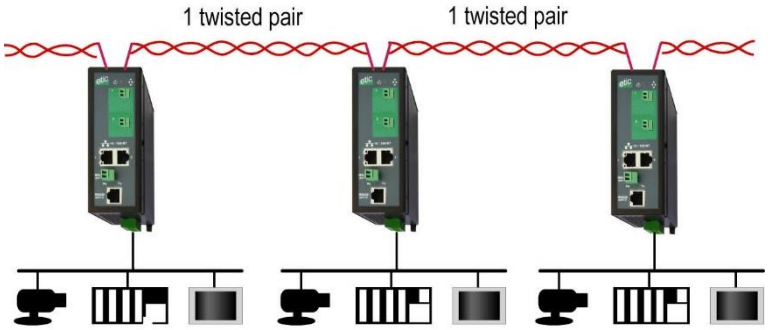


In case of a failure of a pair the data transmission is maintained on the other pair (backup).



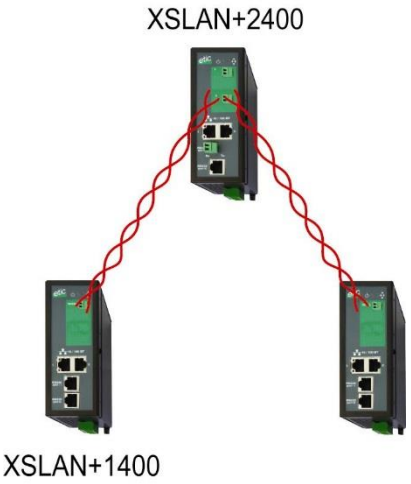
Daisy chain link

The XSLAN+2XXX is used to interconnect a series of Ethernet networks using a single twisted pair. Thanks to the Store and Forward principle, the number of switches is not limited.



Point to multipoint link

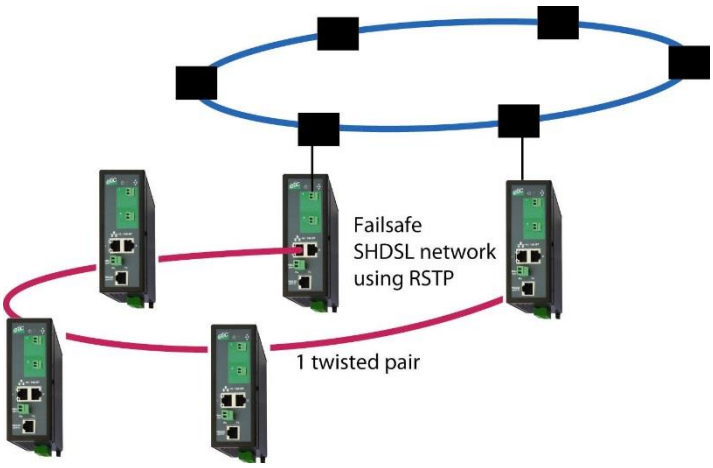
The XSLAN+2XXX is used to interconnect a central site with two remote sites.



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.



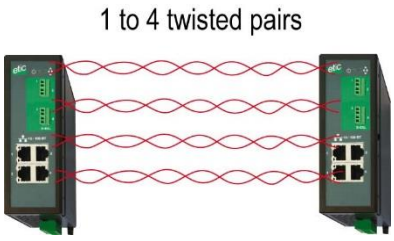
4.3 XSLAN+4200

Additional features compared to XSLAN+2XXX:

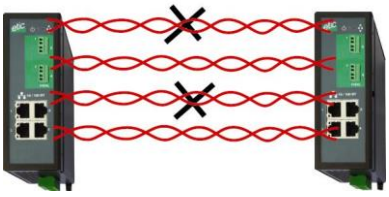
Point to point link on four twisted pairs

Two XSLAN+4200 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).

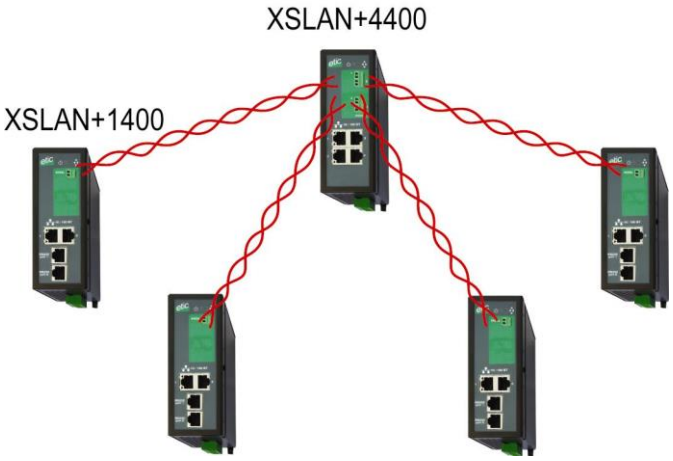


In case of a failure of one or more pairs, the data transmission is maintained on the remaining pairs (backup).



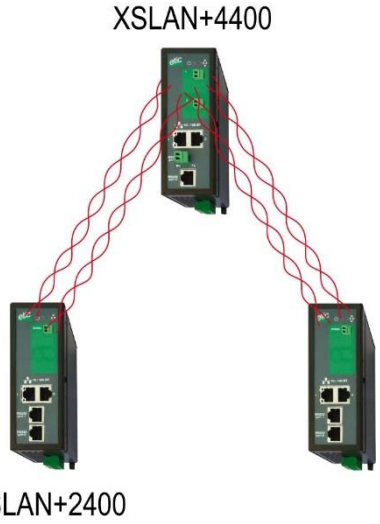
Point to multipoint link - Concentrator

The XSLAN+4200 is used to interconnect a central site with four remote sites.



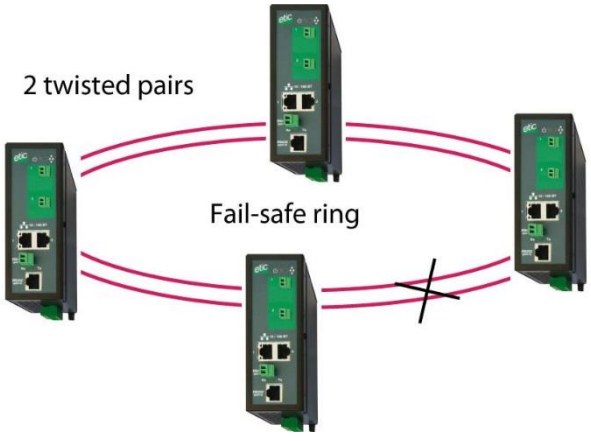
Point to multipoint link with doubled data rate

The XSLAN+4200 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.



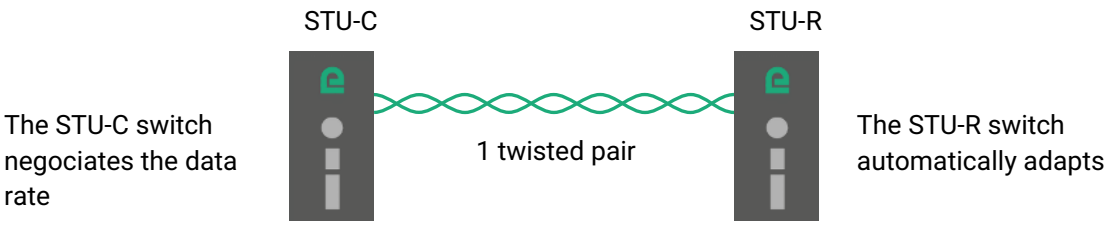
5 Highlighted features

5.1 STU-C / STU-R auto-negotiation

When two XSLAN+ 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+ configured both in STU-C will find a way to connect. One of the two will switch to STU-R.

5.2 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 XSLAN+ 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.

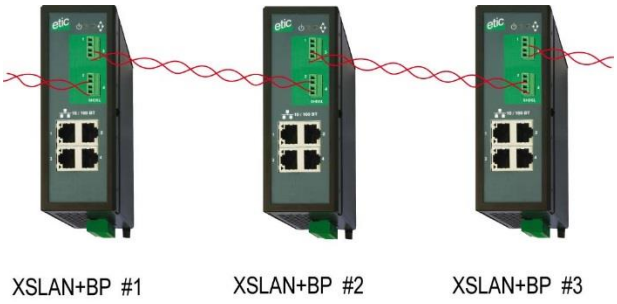
The advantages of that solution is that the failure detection delay and the recovery delay is only a few seconds (One second if the ring counts 5 SHDSL switches); moreover, it is very simple to configure.

5.3 The by-pass function

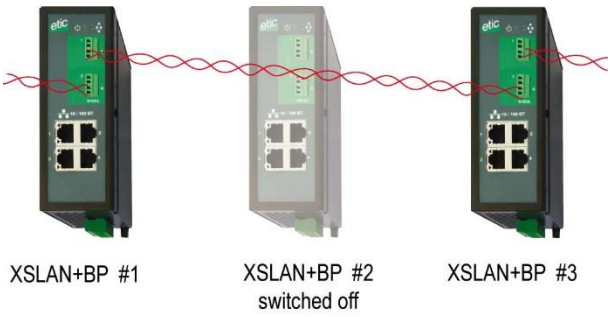
When the network is a daisy chain – that case is very frequent in industrial applications - and when, however, it is not possible to build a failsafe structure like a ring, the XSLAN+BP offers a very useful function called the “By-pass function”.

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.



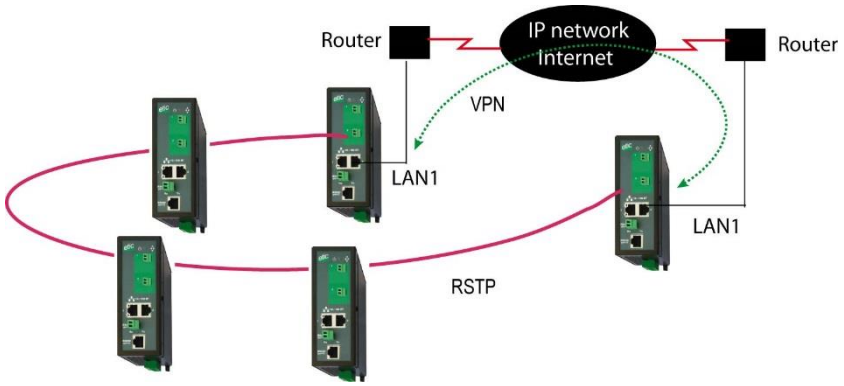
After a few seconds, the XSLAN+ #1 detects the connection default and establishes immediately the connection with the XSLAN+ #3.



5.4 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+ 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.



5.5 Other functions of the XSLAN+ family

Data rate versus distance
The table in Annex 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+ 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+ can be monitored by an SNMP manager and supports the main MIB of an Ethernet switch and the SHDSL MIB.

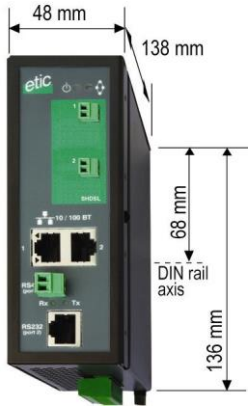
Configuration
The products are configured with an html browser.

INSTALLATION

1 Description

1.1 Dimensions

All models XSLAN+1XXX or XSLAN+2XXX or XSLAN+4200

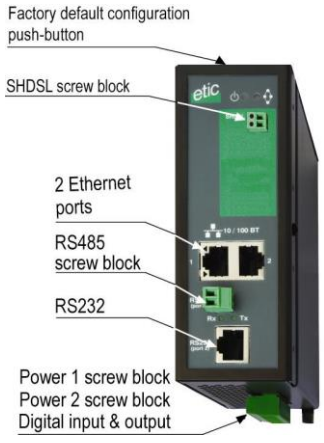


The height indicated ignores the bulk of the power connector on the bottom side.

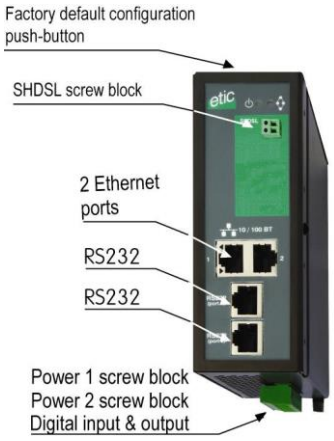
1.2 Connectors

XSLAN+1400

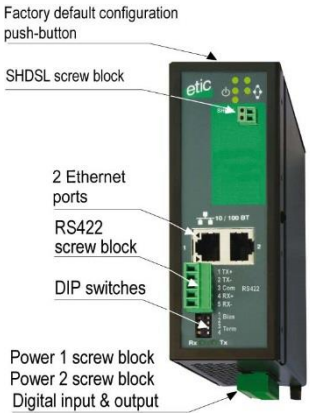
XSLAN+1220



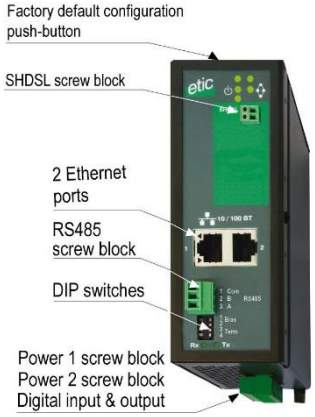
XSLAN+1230



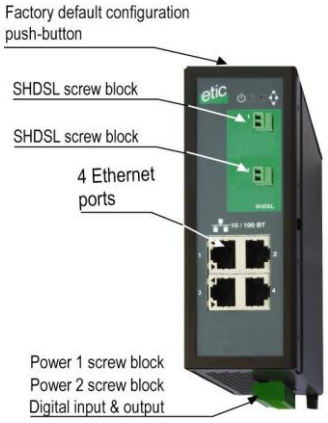
XSLAN+1260



XSLAN+1261

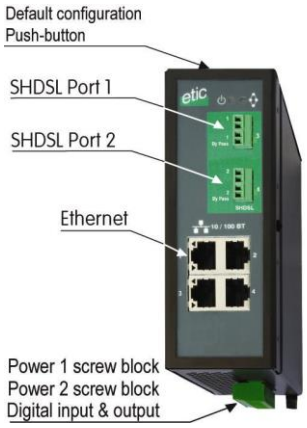


XSLAN+2400



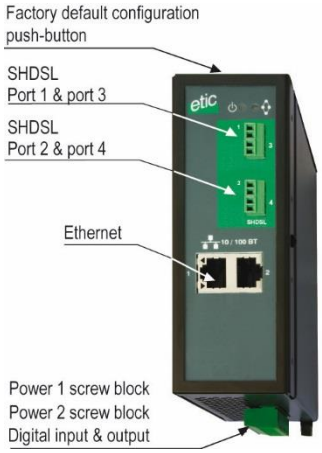
For XSLAN+22XX :
See XSLAN+12XX

XSLAN+BP2400

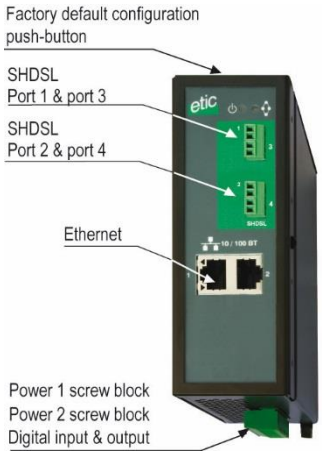


For XSLAN+BP22XX :
See XSLAN+12XX

XSLAN+4200



XSLAN+BP4200



The By-passed ports are port 3 and port 4 only.

Ground terminal	
Symbol	**Description**
	FASTON male lug 6.35 mm

2 positions screw terminal: Supply voltage 1 Position 1 at back - Protected against reverse polarity		
Position	**Signal**	**Function**
1	Power 1 +	+V : 12 – 48 V DC
2	Power 1 -	0V isolated from the enclosure

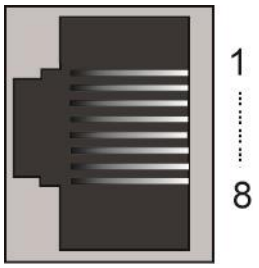
2 positions screw terminal: Supply voltage 2 Position 1 at back - Protected against reverse polarity		
Position	**Signal**	**Function**
1	Power 1 +	+V : 12 – 48 V DC
2	Power 1 -	0V isolated from the enclosure

4 positions screw terminal: Digital input and output Position 1 at back		
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+4200 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 & 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

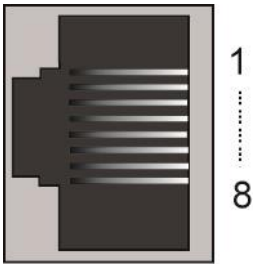
XSLAN+BP4200 2 positions screw terminal : SHDSL1 & SHDSL2 & SHDSL3 by_pass & SHDSL4 by-pass		
Position	**Signal**	**Function**
1	Line	SHDSL line conductor if the by-pass function is used
2	Line	SHDSL line conductor if the by-pass function is used

Ethernet RJ45 connector			
Position	**Signal**	**Function**	**RJ45**
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.	-	

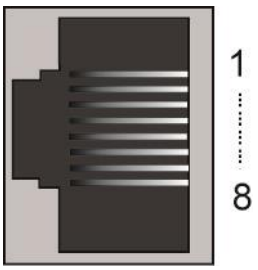
XSLAN+X220 2 positions screw terminal: RS485		
Position	**Signal**	**Function**
1	A	RS485 polarity A
2	B	RS485 polarity B

XSLAN+X261 3 positions screw terminal: RS485 isolated		
Position	**Signal**	**Function**
1	Com	Common isolated
2	B (+)	RS485 polarity B
3	A (-)	RS485 polarity A

XSLAN+X260 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 -

XSLAN+X220 et XSLAN+X230 RJ45 connector: RS232 To connect a DCE				
Position	**Signal**	**Direction**	**Function**	**RJ45**
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	

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

IPL-X-220 et IPL-X-230 RJ45 connector: RS232 To connect a DTE				
Position	**Signal**	**Direction**	**Function**	**RJ45**
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+.
IN = Signal supplied by the external device.

1.3 Push button

Push-button		
Pressing the PB	**LED** ⏻	**Function**
During operation	Flashing red	Temporary return to the factory configuration. (IP address 192.168.0.128) The current configuration is not lost.
During power-up	Flashing red	Return to the factory configuration. The current configuration is deleted except if it has been saved into a file.

1.4 LED indicators

LED indicators Depending on models		
Function	**LED**	**Description**
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 Slow blinking green: The unit is busy Steady red: Startup (15 s) – Otherwise : product failure 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 received from the RS485
	Tx	Bytes transmitted to the RS485
RS422 *	**Rx**	Bytes received from the RS422
	Tx	Bytes transmitted to the RS422

* Depending on models

2 Safety instructions

The product shall be installed in a fire electrical resistant cabinet by a qualified operator.

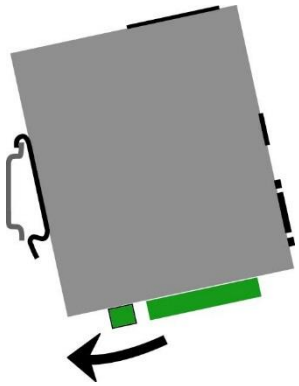
The product shall be connected only to equipments that comply with the IEC60950-1 or IEC62368-1 standards and that meet the following classifications:

- IEC60950-1 : Limited power circuits and SELV type – §2.2 and 2.5
- IEC62368-1 : ES1 & PS2

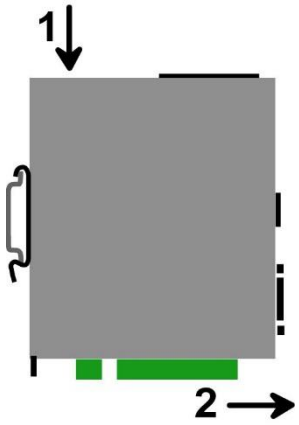
To avoid any risk of burns, it is strongly recommended to wear gloves to handle the product in operation when the ambient temperature exceeds 30 °C.

3 DIN rail mounting

Mounting the unit on the 35 mm horizontal DIN rail,



Removing the unit from the DIN rail,



4 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.

5 Power supply

The XSLAN+ has 2 power inputs allowing a redundancy power supply.
The supply voltage must be regulated and strictly between 10 and 60 Volt DC (nominal : 12 – 48 VDC).

The power consumption is 5W for XSLAN+1XXX, 6W for XSLAN+2XXX+ and XSLAN+BP2XXX and 9W for XSLAN+4XXX.

6 Isolation and earthing

The enclosure of the XSLAN+ is metallic ; For safety and EMC reasons, the ground terminal (on the underside) must be connected to the protective earth of the installation.

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;

7 RS232 serial connection (XSLAN+X220 or XSLAN+X230)

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

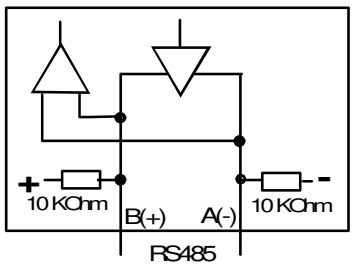
The RS232 cable must be shorter than 10 meters.

8 RS485 serial connection (XSLAN+X220)

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.



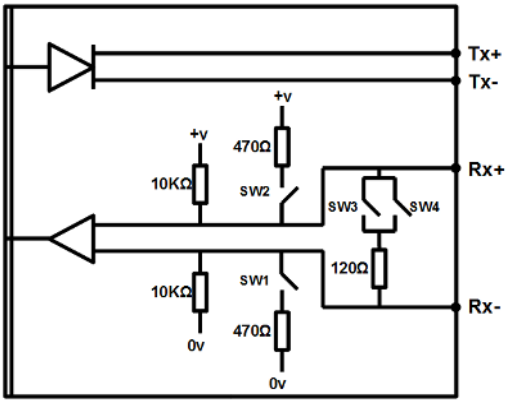
9 RS422 isolated serial connection (XSLAN+X260)

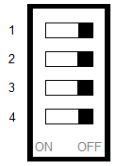
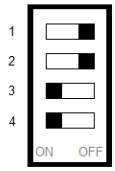
The polarization and termination resistors can be selected with DIP switches.
The termination resistor must be enabled when the product is located at the extremity of the RS422 bus.
The polarization resistors must be enabled by one device of the bus.

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+ 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+ must be connected to the RX+/RX- of all the other devices of the bus.



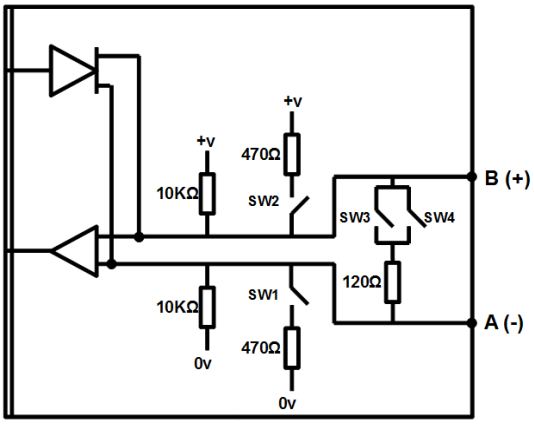
Micro-switches	
	No polarization No termination resistor
	470 Ohm polarization resistors No termination resistor
	No polarization 120 Ohm termination resistor
	470 Ohms polarization resistors 120 Ohm termination resistor
	All other combinations are prohibited

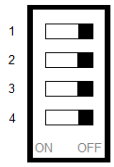
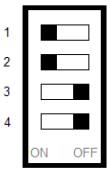
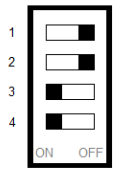
10 RS485 isolated serial connection (XSLAN+X261)

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.

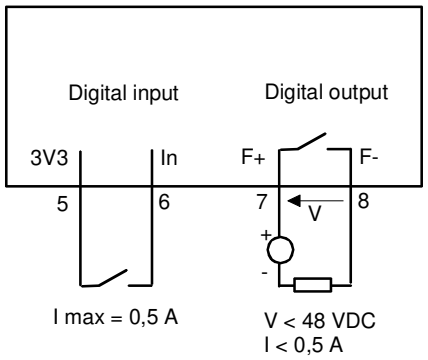


Micro-switches	
	No polarization No termination resistor
	470 Ohm polarization resistors No termination resistor
	No polarization 120 Ohm termination resistor
	470 Ohms polarization resistors 120 Ohm termination resistor
	All other combinations are prohibited

11 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



12 Preparing and checking the line

12.1 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.

Cable made of quads
It often happens that the twisted pairs of the same cable are wound in groups of two pairs; a group of two pairs rolled into each other is called a quad.
This type of cable is suitable. However, we will try to use only one pair per quad to avoid crosstalk (see below).

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+ 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.

12.2 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.

The closer the pairs, the greater the crosstalk. Thus the risk of crosstalk is higher between two pairs of the same quad.

This is why, if the cable is made up of quads, it is advisable to avoid using the two pairs of the same quad.

12.3 Shield earthing

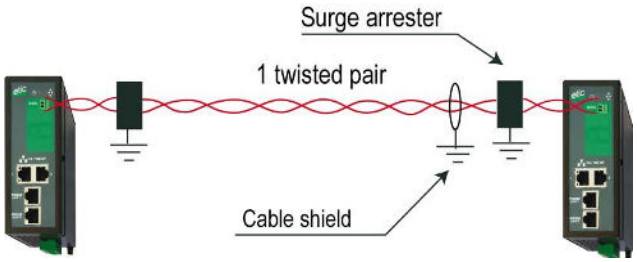
A shielded cable provides better noise immunity and surges protection during thunderstorms.

The best protection is provided when the shield is earthed at each end of the line.
However, there may be a large potential difference between the connection points to the earth, 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 earth at only one end of the cable.

12.4 Protecting the SHDSL switch from lightning

The XSLAN+ is coupled to the line by a transformer which provides isolation between the circuit board and the line. Moreover, the 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+ with a surge protector, as described below.



13 Connecting the XSLAN+ to the line

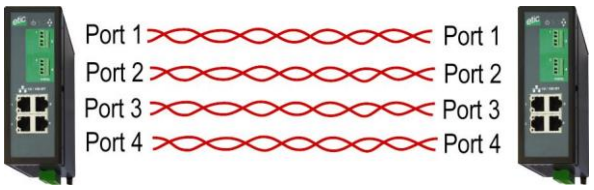
13.1 General precautions

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.

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

An aggregated link is a link between two XSLAN+ 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+4200) 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

13.3 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.

13.4 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.

PREPARING THE SETUP

1 Connecting a PC for configuration

1.1 Overview

The XSLAN+ 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 **?** 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 XSLAN+.
Subsequent changes can be made remotely.

Restoring the factory IP address :
The factory IP address 192.168.0.128 can be restored (see the User guide 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.

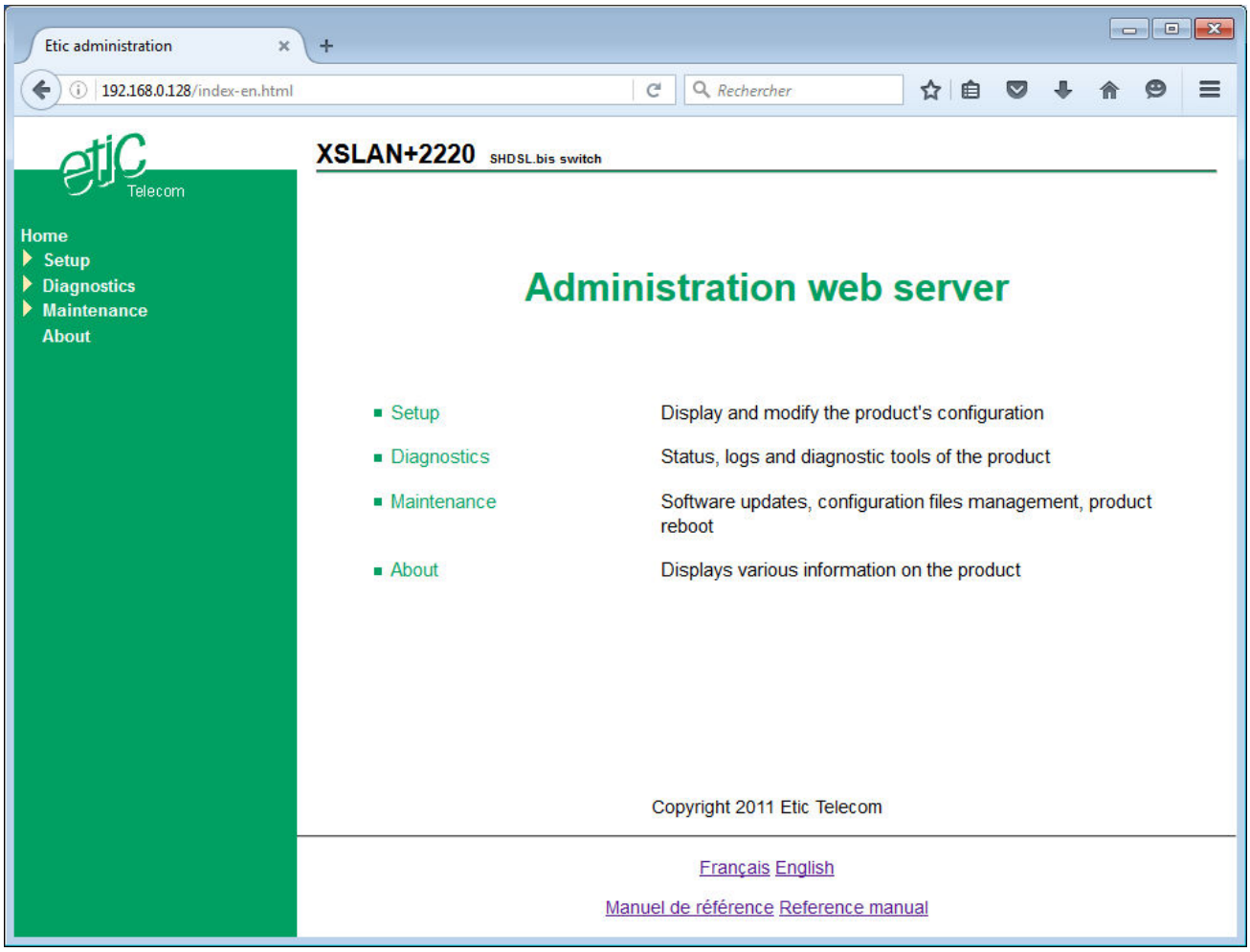
1.2 First configuration

Step 1 : Create or modify the PC TCP/IP connection
Assign to the PC an IP address different but consistent with the factory IP address of the XSLAN+.
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+ : 192.168.0.128

The Home page of the administration server is displayed.



Note : Access to the administration server is not protected when configuring the XSLAN+ for the first time.

1.3 Changing the configuration later

Thereafter, the XSLAN+ 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+.
- Enter, if any, the user name and password that protect the access to the administration server.

2 Temporary return to the factory settings

If the IP address of the XSLAN+ 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.

- Press the push-button located on the back, for example with a small screwdriver
- Keep the push-button pressed for about 3 seconds;
- The RUN LED ⏻ blinks red rapidly
- The administration server becomes accessible at the factory IP address (192.168.0.128), in HTTP without a password. 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 (B2) or reboot the product.
- The product can be reached at the registered IP address.

Note :
If the IP address of the XSLAN+ 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.

3 Restoring the factory settings

It is possible to restore the factory configuration permanently using the push button on the rear panel, or by using the administration server. In this case, the current configuration will be lost unless it has been saved to a file.

To restore the factory settings using the push button,

- Power off the XSLAN+,
- Press the push-button, for example with a small screwdriver,
- Power on the XSLAN+, while keeping the push-button pressed at least 10 s.

The RUN led ⏻ turns red ; the XSLAN+ 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.

4 Protecting the access to the administration server

- In the menu, choose **Setup > Security > Administration rights**
- Enter a user name and password to protect the administration server.
- Tick the **Password protect the web site access** checkbox

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.

5 Configuration steps

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

- 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

For detail about the configuration and the diagnostics, refer to the XLAN+ / XSMIL Setup Guide :
Reference : “DOC_DEV_XS_Setup guide_x”

ANNEX 1 : SHDSL data rate versus distance

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

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