



IPL-DAC

ADSL router with cellular backup

USER GUIDE

CONTENT

The IPL-DAC ADSL router with cellular backup is designed and manufactured by

ETIC TELECOM

**13 Chemin du vieux chêne
38240 MEYLAN
FRANCE**

TEL : + (33) (0)4-76-04-20-05
FAX : + (33) (0)4-76-04-20-01
E-mail : hotline@etictelecom.com
web : www.etictelecom.com

CONTENT

OVERVIEW	5
1 CERTIFICATE OF CONFORMITY	5
2 PRODUCT IDENTIFICATION	6
3 PRODUCT OVERVIEW	7
3.1 Applications	7
3.2 Functions	8
3.3 Router interfaces & organisation	9
4 DATA-SHEET	10
INSTALLATION	13
1 PRODUCT DESCRIPTION	13
1.1 Dimensions	13
1.2 Leds & Push buttons	14
1.3 Connectors	16
2 MOUNTING THE PRODUCT ON A DIN RAIL	17
3 COOLING	17
4 GROUNDING	17
5 SUPPLY VOLTAGE	18
6 DIGITAL INPUT AND OUTPUT	18
7 CONNECTING THE ROUTER TO THE ADSL LINE	18
7.1 Connecting the router to the line	18
7.2 ADSL subscription	19
8 CONNECTING THE ROUTER TO THE CELLULAR NETWORK	19
8.1 Before installing the router	19
8.2 Cellular antenna	19
8.3 Coaxial cable	20
8.4 Cellular service subscription	21
8.5 Installing the SIM card	21
8.6 Controlling the conformance of the connection	22

CONTENT

PREPARING THE SETUP	23
1 FIRST SETUP.....	23
2 PROTECTING THE ACCESS TO THE ADMINISTRATION WEB SERVER	23
3 HTTPS SET-UP MODIFICATIONS THROUGH THE WAN INTERFACE	24
4 RECOVERING THE FACTORY LAN IP ADDRESS.....	24
5 RESTORING THE FACTORY SET-UP.....	24
6 SAVING OR RESTORING A SET OF PARAMETERS.....	25
7 CONFIGURATION STEPS	26
MAINTENANCE	27
1 DIAGNOSTIC.....	27
1.1 Logs.....	27
1.2 Network status.....	27
1.3 « Ping » tool	28
2 FIRMWARE UPDATE.....	28

1 Certificate of conformity

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

Type of device : Cellular router IPL-DAC

conforms to the Council Directive 1999/5/EC related to radio and telecommunication terminal equipments.

The harmonized standards to which the equipment complies are :

Standard	Title
EN301489-1	Electromagnetic compatibility and Radio spectrum Matters : Part 1 : General requirements
EN301489-7	Electromagnetic compatibility and Radio spectrum Matters : Part 7 : Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio
EN61000-6-2 Ed. 2001	Immunity : EN60100-4-2 Electrostatic Discharge EN60100-4-3 Radiated Immunity EN60100-4-4 EFT/Burst Immunity EN60100-4-5 Surge Immunity EN60100-4-6 Conducted Immunity
EN61000-6-4 Ed 2001	Emission : EN55022 radiated and conducted emission
EN60950	Security
EN50385	Human exposure to radio frequency fields exposure
ITU G992.5	ADSL2+ et Reach Extended ADSL

Philippe DUCHESNE
Technical Director

5th January 2015

OVERVIEW

2 Product identification

ADSL & cellular router		
	IPL-DAC-	400
ADSL 2+ & RE-ADSL appendix A (analogue line)		•
3G+ UMTS-GPRS-EDGE cellular modem		•
Firewall SPI		•
25 users remote access server		•
IPSEC & OpenVPN VPN		•
Ethernet 10 / 100 BT		4
USB		1
IP router		•
NAT		•
Port forwarding		•
SNMP		•
DNS		•
DHCP server on the LAN interface		•
Digital input for alarm email		1
Backup status digital output		1
HTTPS / HTML / SSH configuration		•

OVERVIEW

3 Product overview

The IPL-DAC router includes at the same time an ADSL 2+ modem and a UMTS modem.

It is designed for critical industrial remote scada systems.

it provides the following functions :

Automatic backup between the ADSL line and the cellular network

Multi-WAN IP routing

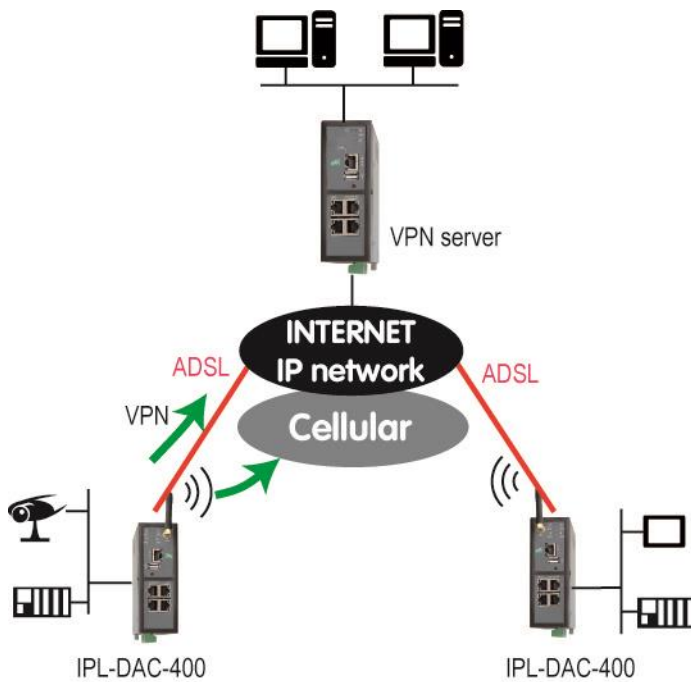
IPSec or OpenVPN client or server

Remote access server (RAS) for remote maintenance

SPI Firewall

3.1 Applications

HIGH AVAILABILITY SCADA SYSTEMS



OVERVIEW

3.2 Functions

Automatic backup

The IPL-DAC router makes possible to switch the data to the cellular network when the ADSL line fails.

Multi WAN IP router

The IPL-DAC router provides powerful, flexible and comprehensive solutions to route IP packets through the ADSL or the cellular network.

The solutions include static routes, RIP protocol and address translation (NAT, DNAT) and port forwarding

IPSec & OpenVPN tunnels

The IPL-DAC features IPSec and OpenVPN tunnels to provide a high level of security and also compatibility with existing devices.

Remote access server for PCs, tablets and smartphones

The IPL-DAC router can also behave like a remote access server.

If he is registered in the user list, a remote user can access to particular devices of a machine network depending on his identity.

The new HTTPS portal makes possible to access easily and safely to HMIs or PLCs web servers using a tablet, a PC or a smartphone.

Firewall

The firewall protects against the sophisticated attacks coming from the Internet.

It is also able to filter IP frames between the WAN interface or any VPN interface on one hand, and the LAN interface on the other hand.

VRRP redundancy

VRRP makes possible to use two routers shaping a redundant solution.

DNS server

DNS makes it possible to assign Internet names to devices or organizations independently of their public IP address.

The IPL-DAC router behaves like a DNS server for the devices connected to the LAN.

DHCP server

On the LAN interface, the IPL-DAC router can behave like a DHCP server.

OVERVIEW

3.3 Router interfaces & organisation

The IPL-DAC router provides, an ADSL interface, a cellular interface and four switched Ethernet interfaces.

WAN interfaces:

The IPL-DAC router provides three WAN interfaces:

- The ADSL interface is the main WAN interface
- The cellular interface
- The Ethernet interface of the RJ45 Nr1, which can be used as a WAN interface.

Only one interface can be selected as the WAN interface at the same time (ADSL, Ethernet port 1, Wi-Fi).

LAN interface:

The LAN interface consists of the four Ethernet ports.

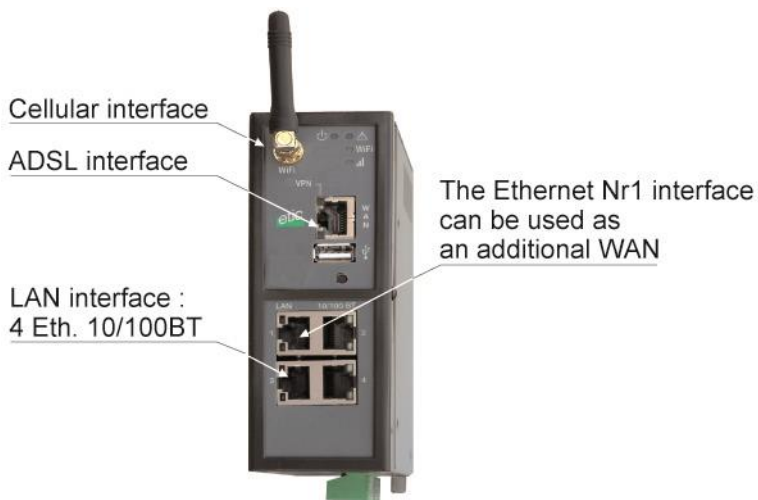
Firewall

The firewall filters the IP frames between the WAN interfaces or any VPN interface on one hand, and the LAN interface on the other hand.

Remote access server

The IPL-DAC provides a secure remote access server function (RAS function).

The RAS function is available on the WAN interfaces.



OVERVIEW

4 Data-sheet

General characteristics	
Dimensions	137 x 48 x 116 mm (h, l, p)
Electrical safety	EN 60950- UL 1950
EMC	ESD : EN61000-4-2 : Discharge 6 KV RF field : EN61000-4-3 : 10V/m < 2 GHz Fast transient : EN61000-4-4 Surge voltage : EN61000-4-5 : 4KV line / earth
RoHS	2002/95/CE (RoHS)
Supply voltage	10 to 60 VDC – 7 W
Operating T°	-20°C / + 60°C Humidity 5 – 95 %

ADSL Connection	
ADSL	ITU G992.5 (ADSL2+ et Reach Extended ADSL) Up to 2.4 Mbit/s downstream Up to 1 Mbit/s upstream
Encapsulation	PPPo Ethernet or PPPo ATM EoA : Ethernet over ATM RFC2684 Bridged IPoA : Routed IP over ATM, RFC2684 Routed

Cellular modem	
Type	UMTS 3G+ / GPRS-EDGE
UMTS freq.	850 / 900 / 1700 / 1900 / 2100 MHz
GPRS freq.	850 / 900 / 1800 / 1900 MHz
Antenna connector	SMA female

IP router	
Ethernet	10/100 BT – 2 or 4 switched ports
IP router	Static routes – RIP V2
IP address substitution	Source IP @ translation (NAT) Destination IP @ translation (DNAT) Port forwarding Masquerading
DHCP	LAN interface : Fixed IP @ or DHCP client or DHCP server

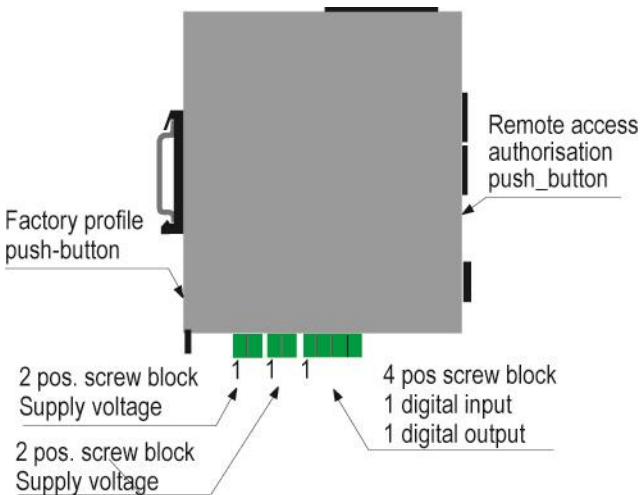
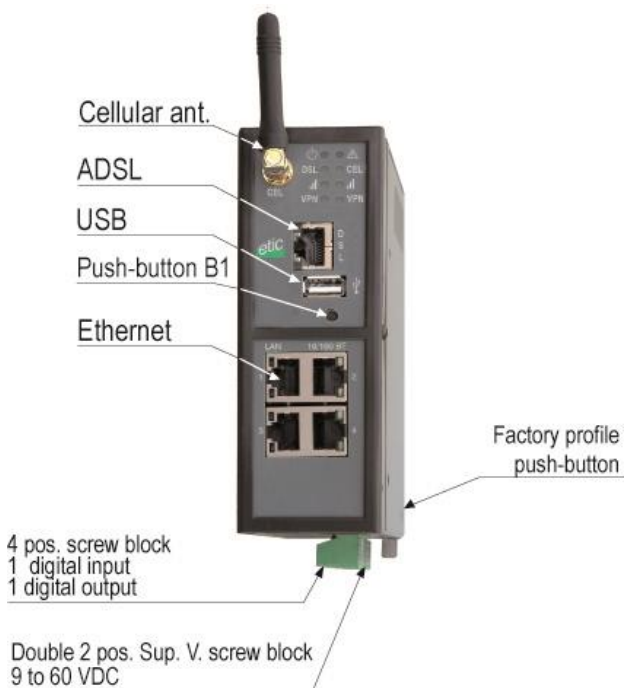
VPN & firewall	
VPN	Client or server IPSEC or OpenVPN Encryption AES256 3DES Certificate X509 or preshared key 16 VPNs maximum of the same type (OpenVPN or IPsec)
Firewall	Stateful packet inspection (50 rules) Deny of service filter Source & destination IP address & port number filter Remote users filter
Logs	Date and time stamped logs

OVERVIEW

Remote access server (RAS)	
User list	25 users
Connection	PPTP / L2TP-IPSec / Open VPN / HTTPS Login & password Certificate X509
M2Me (option)	VPN Compliant with the M2Me_Secure VPN client Compliant with the M2Me_Connect mediation service
Alarms	1 input : emails or SM (cellular models)




1 Product description


1.1 Dimensions




INSTALLATION

1.2 Leds & Push buttons

LED INDICATORS IPL-DAC-400			
	Designation	Function	
Operation		Green	The unit is ready
		Red	Power-up The SIM card is not present Hardware failure or firmware update process
Cellular Connection	Cel	Off Flashing slowly Flashing fast Green	SIM card not present – cellular interface disabled Connection in progress (1st step) Connection in progress (2nd step) Connected to the cellular ntwk
Cellular signal level	 Cel	Off 1 flash 2 flashes 3 flashes See detail further: cellular network connection §	Cellular interface disabled Faint not sufficient signal Sufficient signal Strong signal
VPN over the cellular ntwk	VPN	Off Flashing Green	No VPN has been enabled VPN processing One VPN at least is established on the cellular
ADSL connection	Dsl	Off Flashing T=4 s Flasning T= 2 s Flasning T= 0.5 s Green	ADSL interface disabled ADSL signal not still detected ADSL connection on process IP connection on process Connected
ADSL Signal quality	 Dsl	Off 1 flash 2 flashes 3 flashes	ADSL not enabled Weak not sufficient signal Sufficient signal Strong signal
Ethernet LAN	Led 1 to 4	Off Green	Ethernet interface not connected Ethernet interface connected
Ethernet LAN	Upper led 1	Green	The RJ45 has been setup as the WAN interface

Front panel push-button B1		
Pressing the front panel PB	led 	Function
During 5 seconds	3 flashes	The hotline of ETIC TELECOM is authorised to connect remotely to the router administration server within a 1 hour delay.
During 10 seconds	5 flashes	A remote user is authorised to connect remotely to the router administration server within a 10 mn delay without entering the login or password

Rear panel push-button		
Pressing the rear panel PB	 led	Function
During operation	Flashing red	The default IP address 192.168.0.128 is selected The current configuration remains active
During power-up	Flashing red	The factory configuration and the default IP address 192.168.0.128 are selected. The current configuration is deleted.

INSTALLATION

1.3 Connectors

Supply voltage connector		
Position	Signal	Function
1	Power 1 +	Supply voltage
2	Power 1 -	0V

Digital inputs & outputs		
Position	Signal	Function
1	0V	0 V
2	In	Digital input
3	F +	Digital output +
4	F -	Digital output -

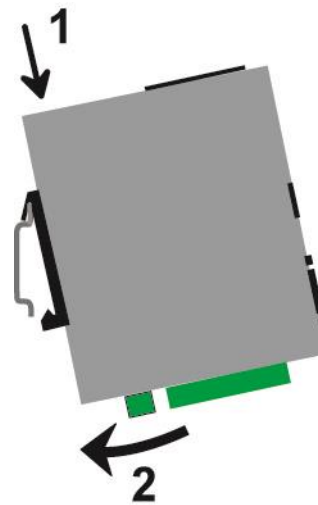
RJ45 Ethernet 1 to 4		
Position	Signal	Description
1	Tx +	Emission polarity +
2	Tx -	Emission polarity -
3	Rx +	Reception polarity +
4	N.C	-
5	N.C	-
6	Rx -	Reception polarity -
7	N.C.	-
8	N.C.	-

Cellular Antenna connector		
Network	Type	Observation
Cellular	SMA female	

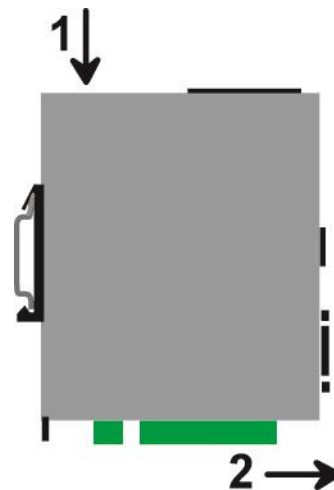
RJ45 ADSL connector		
Position	Signal	Function
1	N.C.	-
2	N.C.	-
3	N.C.	-
4	TIP	ADSL line
5	RING	ADSL line
6	N.C.	-
7	N.C.	-
8	N.C.	-

2 Mounting the product on a DIN rail

Mounting the unit on the 35 mm horizontal DIN rail



Removing the unit from the DIN rail



3 Cooling

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 Grounding

There is one grounding clip on the bottom side of the router. Connect clip to the grounding surface to ensure

INSTALLATION

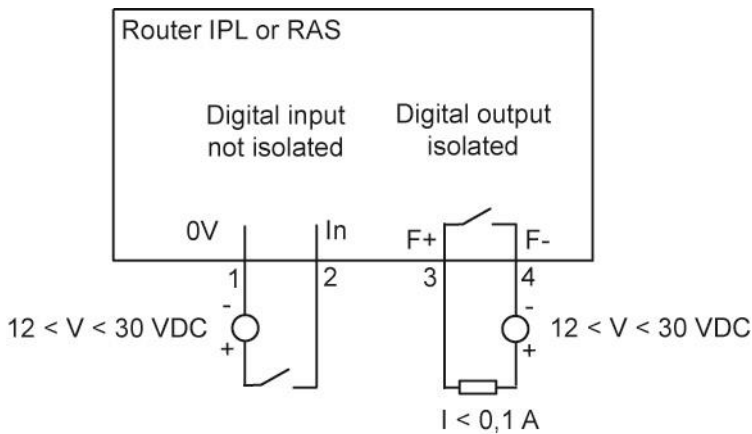
safety and prevent noise.

5 Supply voltage

IPL-DAC-400	Minimum input voltage : 10 V DC Maximum input voltage : 60 VDC
--------------------	---

The consumption is lower than 8 W.

6 Digital input and output



To check that the input and the output are correctly wired, select

Diagnostic > Hardware > Input / Output

The status of the input is displayed and the output can be switched ON or OFF.

7 Connecting the router to the ADSL line

7.1 Connecting the router to the line

The IPL-DAC router can be connected to an analogue line telephone line or an unbundled loop when the attenuation of the reception signal is better than 63 dB

When the reception level is close to the limit, disconnections may occur.

In that situation, we recommend to ask to the ISP to setup the line with the RE-ADSL modulation which is suited for long line and weak signal.

ADSL filter:

If the line must be used for analogue voice transmission simultaneously with ADSL transmission, it is necessary to connect an ADSL filter.

Surge arrester:

The ADSL board of the IPL-DAC router is protected very carefully against over voltage coming from the line.

However, when the line is exposed to lightning, we recommend to connect a surge arrester between the line and the IPL router.

Report to appendix 1 for wiring.

7.2 ADSL subscription

The IP address assigned by the ISP to the ADSL interface of the router can be a fixed or a dynamic public IP address.

If it is dynamic, it changes frequently; for instance at each ADSL connection.

It is why; the router which owns a dynamic IP address can only initiate the communication (transmit an IP packet or initiate a VPN for instance) towards a router owning a fixed IP address.

Reciprocally, a router owning a dynamic IP address cannot easily receive a connection except if a DynDNS or NoIP service is used.

The IP router is fully compatible with that services but we do not recommend to use that kind of service for a critical industrial application.

8 Connecting the router to the cellular network

8.1 Before installing the router

Authorisations to use a cellular connection

Check the cellular connection is authorised at the location where the router is supposed to be installed.

Control of the reception level before installing the machine

Before installing the router, refer to a coverage map over the Internet to check that the cellular reception signal is strong enough at the location where the machine is supposed to be installed.

Select the right mobile service provider.

Confirming the transmission quality with a smartphone before installing the router

If the wireless transmission seems possible, confirm with a control on site using a smartphone for instance. Most smartphones provide the reception level information (parameters or diagnostic menu).

To carry-out that control, use mandatorily a SIM card subscribed with the mobile service provider selected for the router RAS.

Remark:

The IPL router itself provides the reception level information in two ways:

- A reception levelled indicator

- The diagnostic menu of the administration web server of the router

8.2 Cellular antenna

We provide a complete catalogue of cellular antennas:

- Magnet mount antenna,

- Roof antenna,

- Ground plane antenna,

- Directive antenna,

- Omnidirectional antenna.

INSTALLATION

8.3 Coaxial cable

If necessary, the antenna can be connected to the IPL router through a coaxial cable.

The signal attenuation in a usual coaxial cable is 0.2 to 0.4 dB / m at 1 GHz, that is to say 2 to 4 dB for a 10 meter long cable.

If a coaxial cable must be used to connect the antenna to the router, the attenuation in the cable has to be taken into account to calculate the effective RF signal received by the router.

Refer to our cables and antennas catalogue.

8.4 Cellular service subscription

The router is designed to connect to the UMTS-GPRS data transmission service like the one used by the tablets.

The subscription should also provide the SMS service if SMS alarms are required.

A telephone service subscription is not needed.

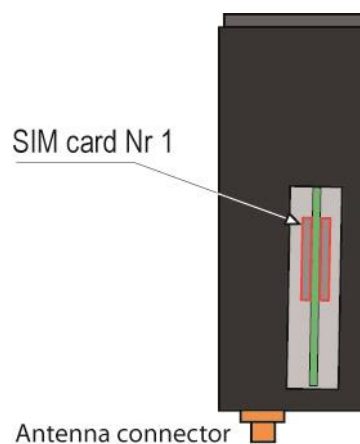
One will take care to subscribe to a service authorizing the right volume of data per month (MB/month) and to check the price of the MB exceeding the limit of the subscription plan, if it exists.

The subscription must be preferably signed in the country where the machine is supposed to be installed to avoid roaming costs.

8.5 Installing the SIM card

The router provides two SIM card holders. If you use only one SIM card, use the SIM card holder No 1.

- Power off the router.
- Remove the anti-steal lid at the top of the product
- Insert the SIM card according to the drawing



INSTALLATION

8.6 Controlling the conformance of the connection

After installing and setting up the router, control the conformance of the connection:

Reception level

The reception level must be better than -90 dBm (two flashes of the reception level led indicator). See the table below.

PING error rate


Each PING request must receive an answer.

Network response delay to a PING request

The response delay must be better than 500 ms.

If the delay is longer than one second, it means the network is overloaded or that the signal level is weak.

If the connection is not conform, change the position of the antenna or select an alternative service like UMTS instead of LTE for instance.

Cellular network reception level		
Led 	Reception level dBm (*)	
3 flashes	-50 à - 80	<u>Strong signal</u>
2 flashes	-81 à -90	<u>Sufficient signal</u>
1 flash	-91 à -110	<u>Weak not sufficient signal</u>
Off	< -111	<u>No signal</u>

(*) See the web server menu Diagnostic > Network > Interface.

PREPARING THE SETUP

1 First setup

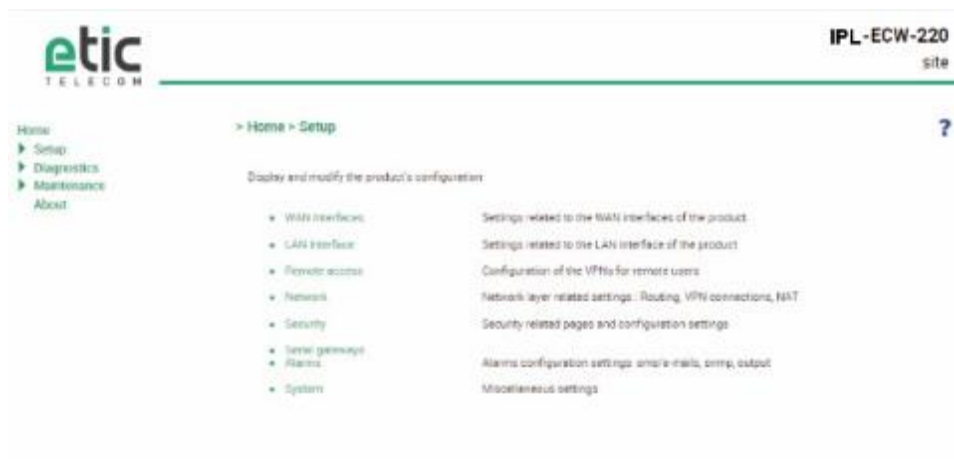
From factory, the IP address of the router is 192.168.0.128.

Step 1 : Create or modify the PC IP connection

Assign to the PC an IP @ in accordance with the router RAS IP address.
For the first configuration, assign for instance 192.168.0.127 to the PC.

Step 2 : Connect the PC directly to the LAN interface of the router

Step 3 : Launch the HTML browser : <http://192.168.0.128>



2 Protecting the access to the administration web server

- Select Set-up > Security > Administration rights.
- Enter an administration identifier and password.

PREPARING THE SETUP

3 HTTPS set-up modifications through the WAN interface

The administration web server is located at the LAN IP address.

Coming from factory, access to the administration web server is not allowed through the WAN interface

To use HTTPS instead of HTTP to setup the product or to authorise access to the administration web server through the WAN interface,

- Select Configuration > Security > Administration rights.
- Enter an administration identifier and password.
- Check the “HTTPS configuration” box.
- Check the “WAN access” box if you wish to access to the administration web server through the WAN interface.

Remark: the port No used to access to the administration web server with HTTPS is 4433.

Example: <https://192.168.38.191:4433>.

4 Recovering the factory LAN IP address

- Press the rear panel push-button ;

The OPERATION led indicator will flash.

The factory IP address 192.168.0.128 will be restored but the current configuration remains active.

5 Restoring the factory set-up

If firewall rules have been created finally preventing from reaching any IP address on the LAN interface including the router itself, it may be necessary to restore the factory configuration of the router.

To restore the factory configuration,

- Switch OFF the power supply of the router RAS.
- Press the rear panel push button and, switch-on the power supply.
- Keep the push button pressed until the operation led turns red.

Remark: The current configuration is cleared and the factory IP address 192.168.0.128 is restored.

6 Saving or restoring a set of parameters

Once a product has been set-up, the current set of parameters can be stored inside the router. In a second step, any set stored inside the router and displayed with the Configurations table can be saved as an editable file stored outside the ETIC router.

Inversely, a saved file can be loaded to the product Configurations table and then, if necessary, declared as the active set of parameters.

- Select the Maintenance > configuration management menu

To store the current configuration set of parameters in the configurations table,

- Assign a name for the current set of parameters ("configuration name" field) and click the Save button.

The updated Configurations table is displayed with an additional line.

To save a stored set of parameters as an editable file

- Select the set of parameters name in the Configurations table,
- Click the Export to the PC button.

The set_of_parameters.txt file is created.

To import an editable *.txt file

- Click the Select a file button,
- Browse the PC and select the file,
- Click the Import from PC button.

The updated Configurations table is displayed with an additional line.

To select a configuration set of parameters in the Configuration table, as the current configuration

- Select the set of parameters name in the Configurations table,
- Click the Load button.

The selected set of parameters is now the current set of parameters.

PREPARING THE SETUP

7 Configuration steps

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

- ADSL & Cellular interface setup
- LAN interface setup
- VPNs setup
- Routing and IP address translation functions setup
- Remote users connections, the user list and the access rights setup
- Serial or USB gateway setup
- Firewall setup

For detail about the configuration, refer to the IPL routers setup manual reference 90 234 09.

1 Diagnostic

1.1 Logs

- Select the Diagnostic > Logs menu

Main logs

It registers

The ADSL connections & disconnections

The VPN connections & disconnections

The remote users connections & disconnections

The router starts

OpenVPN & IPsec Logs

These logs registers the detail of the VPN connections

Advanced logs

That logs registers details about the following events:

Cellular & ADSL events

M2Me

RIP

DHCP

VRRP

Telnet gateway

Alarm emails

The filter checkbox allow to display particular classes of events.

1.2 Network status

To display the Interfaces status pages ,

- Select The Diagnostic > Network status>Interfaces menu.

The Interfaces page summarizes the current information of each interface of the router, like for instance :

LAN interface:	MAC and IP address Ethernet ports status ...
Ethernet WAN interface:	MAC and IP address, default gateway address Priority level...
Cellular & ADSL interface:	Connection Status IP address and remote IP address

MAINTENANCE

To display the M2Me page,

- Select The Diagnostic > Network status> M2Me menu.

The M2Me page summarizes the current status of the M2Me connection and also displays the M2Me logs.

To display the remote users page,

- Select The Diagnostic > Network status> Remote users menu.

This page displays the table of the remote users currently connected.

To display the VPN connections page,

- Select The Diagnostic > Network status> VPN (IPSec or OpenVPN) menu.

This page displays the table of the Open VPN or IPSec VPNs currently connected.

To display the Routes page,

- Select The Diagnostic > Network status > Routes menu.

This page displays the table of the routes set-up by the router and the ARP table.

1.3 « Ping » tool

Select the Diagnostic > Tool > Ping menu.

Enter the PING destination IP address.

2 Firmware update

The firmware update can be carried-out locally or remotely.

If the firmware update operation do not succeed, for instance if the connection fails, the ETIC router restarts with the current firmware.

Once the firmware update has been carried-out, the ETIC router restores the previous current set of parameters.

To update the firmware,

- Select Maintenance > Firmware update menu,
- Click the Select the firmware file button,
- Click Upgrade now.

When the firmware is updated, the product automatically reboots.



ETIC TELECOM
13 chemin du vieux Chêne
38240 Meylan
France
contact@etictelecom.com