



QuadroFXO

The PSTN/VoIP Gateway



Manual I:

Installation Guide

for QuadroFXO, SW-Version 5.1.x

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FCC Statement (Part 15) Class A

The Epygi Quadro 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 in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and device
- Connect the equipment to an outlet different from the receiver
- Consult a dealer or an experienced Radio/TV technician for assistance

You are cautioned that any change or modification to the equipment not expressly approved by the manufacturer could void the user's authority to operate this device.

Administrative Council for Terminal Attachments (ACTA) Customer Information

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ATCA.

If the QuadroFXO causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of the QuadroFXO does not disable your alarm equipment. If you have any questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

Electrical Safety Advisory

To reduce the risk of damaging power surges, we recommend you install a quality AC surge suppressor in the AC outlet from which the QuadroFXO is powered.

Industry Canada Statement

This product meets the applicable Industry Canada technical specifications.

Safety Information

Before using the QuadroFXO, please review and ensure the following safety instructions are adhered to:

- To prevent fire or shock hazard, do not expose your QuadroFXO to rain or moisture.
- To avoid electrical shock, do not open the QuadroFXO. Refer servicing to qualified personnel only.
- Never install wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specified for wet locations.
- Never touch un-insulated telephone wire or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying cable or telephone lines.
- Avoid using your QuadroFXO during an electrical storm.
- Do not use your QuadroFXO or telephone to report a gas leak in the vicinity of the leak.
- An electrical outlet should be as close as possible to the unit and easily accessible.

Emergency Services

The QuadroFXO SIP Service is intended to function as a secondary telephone service. These services are made available through the Internet and therefore are dependent upon a constant source of electricity and network availability. In the event of a power outage, the QuadroFXO SIP Service will automatically be disabled. User understands that in the event of a power or network outage, the QuadroFXO SIP Service will not support 911 emergency services and further that such services will only be available via the user's regular telephone line not connected to the QuadroFXO. User further acknowledges that any interruption in the supply or delivery of electricity or network availability is beyond Epygi's control and that Epygi shall have no responsibility for losses arising from such interruption.

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Manual II: see Administrator's Guide

Describes in detail the QuadroFXO management menus and includes all system default values at a glance, too.

About This Installation Guide

This Installation Guide explains the installation of the QuadroFXO gateway.

This Installation Guide does not provide advanced configuration information. For these features, refer to the Administrator's Guide.

The QuadroFXO is an analogue gateway that allows connectivity between the PSTN and a VoIP network. The QuadroFXO gateway can be configured to work as

- An FXO expansion board to supplement a Quadro IP PBXs with additional LINE ports.
- A standalone analogue gateway.

In case of using QuadroFXO as LINE expansion board it can be connected both to WAN and LAN for Quadro IP PBX to emulate additional FXO ports on Quadro IP PBX with diverse configurations depend on usage scenarios.

This document describes how to configure the QuadroFXO as an LINE expansion board connected to the LAN interface of a Quadro IP PBX to increase the FXO capability on the Quadro IP PBX with minimal configuration.

For the detailed information on how to install and use the QuadroFXO refer to the **QuadroFXO Manual II: Administrator's Guide**.

For the detailed information on how to install and use Quadro IP PBXs refer to the **Quadro IP PBX Manual I and II: Installation and Administrator's Guide**.

[Hardware Overview](#) shows all plugs and LEDs of the QuadroFXO.

[Installing the Quadro FXO](#) explains connection of cables and devices to the QuadroFXO.

[Configuring the Standalone Gateway QuadroFXO](#) describes the configuration steps needed to establish QuadroFXO as a standalone gateway. The chapter includes information about the System and Internet Configuration Wizards to integrate the QuadroFXO in your network environment and about the basic setting up of the call routing functionality.

Please Note: The QuadroFXO configuration described in this Installation Guide describes basic configurations only. For more complex configurations, please refer to the QuadroFXO Administrator's Guide.

[Configuring the QuadroFXO as an IP PBX Expansion device](#) describes the configuration steps that might be needed to establish QuadroFXO as a LINE expansion for a Quadro IP PBX.

Please Note: For more details on this configuration, please refer to the **Quadro IP PBX Using Shared FXO Lines** document on the Epygi WEB Support portal.

[Registering on Epygi's Technical Support](#) shows you how to gain access to the Epygi Technical Support Center and the Epygi SIP Server.

[Appendix: PC DHCP Settings](#) explains how to configure your PC to access the Quadro configuration GUI.

[Appendix: Changing the Admin's Password](#) explains how to change the default administrator password.

[Appendix: Configuring SIP NAT Traversal](#) explains configuration of the Quadro if it is placed behind a NAT enabled router.

[Appendix: Checking the Connections](#) gives hints to solve common problems.

Requirements

- One 120/240 V power outlet in close proximity to the QuadroFXO.
- One RJ-45 Ethernet 10/100 broadband Internet connection, if QuadroFXO shall be used as a standalone gateway
- One CAT 5 Ethernet cable with an RJ-45 connector to connect to the QuadroFXO LAN port
- One PC with a 10Mbps or a 10/100 Mbit/s Ethernet card or adapter installed.
- TCP/IP network protocol installed on each PC.
- For optimal results, Internet Explorer 5.5 or higher, or Netscape Navigator 4.7 or higher are recommended.

Please Note: The QuadroFXO is shipped with one straight RJ-45 CAT 5 cable. If the LAN connector of the QuadroFXO is to be connected to a hub or switch, a crossover cable may be required.

Hardware Overview

QuadroFXO's Rear Panel



Fig. I-1: QuadroFXO's backplate

- 1 Power supply socket. **Use only the power adapter delivered with the QuadroFXO.**
- 2 LINE sockets to connect the Quadro to the PSTN network using standard analog phone service. These are FXO (Foreign Exchange Office) analog ports
- 3 The Reset button may be used in two ways: (1) to initiate a normal reset, (2) to carry out a factory reset. A normal reset is executed by pressing the Reset button with a paper clip for an instant.

Pressing the reset button and holding it down for 7 seconds or more will execute a factory reset. This will restore the factory defaults and clear all settings including the IP address and the administration password you entered.

Please Note: A Factory Reset forces the default LAN IP address of 172.28.0.1 and default administrator's password of 19.

- 4 RJ-45 socket to attach a Local Area Network (LAN) via an Ethernet CAT 5 cable. If a Quadro IP PBX or a PC is connected directly to this socket, a straight cable is used. If an Ethernet hub, router or switch is used, a crossover cable may be required.
- 5 RJ-45 socket to attach the Internet Uplink (WAN) via an Ethernet CAT 5 cable.

QuadroFXO's Front Panel LEDs



Fig. I-2: QuadroFXO's Front Panel LEDs

1	BUSY , green Status of CPU	off : No power on or blinking : Normal activity	
2	INFO/FAULT , yellow/red/green System information	on (yellow): device is booting on (red): error or system is booting on (green): system is operational	blinking (yellow/green): event occurred, details specified in the System Event section of the Management interface blinking (red/green): system unusable blinking (red/yellow): emergency firmware is needed blinking (red/green/red/yellow): firmware update
3	LINE 1 , green Status of the FXO LINE 1	on : line in use off : line not in use	
4	LINE 2 , green Status of the FXO LINE 2	on : line in use off : line not in use	
5	LINE 3 , green Status of the FXO LINE 3	on : line in use off : line not in use	
6	LINE 4 , green Status of the FXO LINE 4	on : line in use off : line not in use	
7	LINE 5 , green Status of the FXO LINE 5	on : line in use off : line not in use	
8	LINE 6 , green Status of the FXO LINE 6	on : line in use off : line not in use	

LED Indication during a firmware update

A firmware update is indicated by the yellow/red/green **Info/Fault** LED. It will blink red/green for about five minutes while the firmware is updated. The QuadroFXO will then re-boot automatically showing the boot LED sequence.

LED Indication during a boot sequence

A boot sequence is indicated as follows: The yellow/red/green **Info/Fault** LED will glow red for a few seconds, then turn to yellow for another four or five minutes while the green **Busy** LED is blinking. Once the **Info/Fault** LED is green, the boot sequence has been completed successfully.

LED indication during uploading an emergency firmware

The yellow/red/green **Info/Fault** LED will stop blinking alternately red/yellow and start blinking red/green/red/yellow. This shows that Quadro has accepted the emergency firmware and is loading it. After a few seconds, Quadro will boot, showing the boot LED sequence.

Installing the QuadroFXO

Networking Overview

To establish a connection between the PSTN (or your PBX) and the Internet, a gateway is needed. The QuadroFXO, used as a standalone gateway, will perform the task of connecting your PSTN (or PBX) via its WAN port to a Private Data Network that includes Quadro IP PBXs (Quadro-2x, -4x and/or -16x) or the Internet. The QuadroFXO will process and regulate the voice traffic between these networks by means of Call Routing paths that are specified by the administrator according to a dial plan. The QuadroFXO has one LAN port that is used to connect a PC for management purposes. The WAN port transmits up to 10 Mbps, and the LAN port transmits at 10 Mbps or 100 Mbps.



Fig. I-3: Standalone gateway: Connection overview

Every device within an IP network requires a unique IP address to identify itself. Since the QuadroFXO, used as a standalone gateway, connects to both the LAN (Admin PC) and the WAN (Private Data Network or Internet), it has to be part of both networks, and must have two IP addresses: one for the WAN side and one for the LAN side. The QuadroFXO's integrated firewall/NAT functionality will hide the LAN IP address from the WAN (Internet) side. (As the firewall is switched off per default, you need to enable it.)

There are two ways of assigning an IP address: statically or dynamically. The QuadroFXO can be configured with a static IP address on the WAN interface. You also can use a DHCP server assigned IP address on the WAN side.

Please Note: A DHCP client is software that requests an IP address from a DHCP server. A DHCP server assigns on request a unique IP address to a device. The QuadroFXO acts as a DHCP client on its WAN interface and as a DHCP server on its LAN interface.

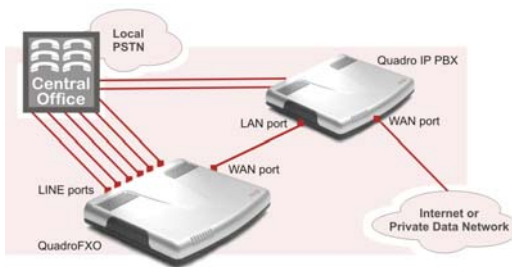


Fig. I-4: LINE expansion: Connection overview

Besides acting as a standalone gateway, Quadro FXO may serve as a LINE expansion for Quadro IP PBXs. In this case, QuadroFXO needs only a LAN IP address which it gets from the DHCP server of the attached Quadro IP PBX (see chapter [Configuring the QuadroFXO as an IP PBX Expansion device](#)).

Connecting the Hardware

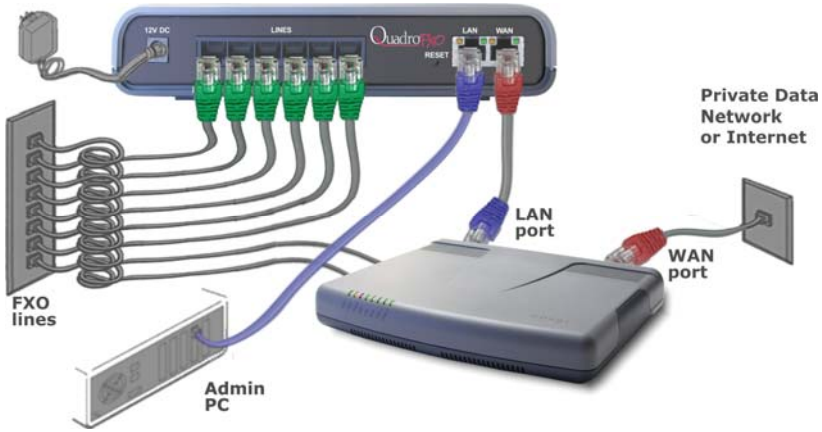


Fig. I-5: Connecting the Hardware

- Verify the product package contents are complete. Refer to the contents sheet included in the packaging to determine if all the items were shipped in the box.
- Connect the QuadroFXO's LINE ports to your PBX or the trunk from the PSTN Central Office.
- If the QuadroFXO is used as a standalone gateway, a PC may be connected via a straight CAT 5 cable with an RJ45 connector to the LAN socket of the QuadroFXO. If a hub or switch shall be connected, use a crossover cable from the LAN interface of the QuadroFXO to the hub or switch.

The LAN port is not needed, if QuadroFXO shall be used as a LINE expansion.

- If the QuadroFXO shall be used as a standalone gateway, connect its WAN port to the Internet service via a cable or DSL modem. In this case, you should enable the firewall, as it is disabled by default).

Connect the WAN port of the QuadroFXO to the LAN port of the Quadro IP PBX to use the QuadroFXO as an LINE expansion for the Quadro IP PBX.

- When using a DSL or Cable modem, power up the modem before the Quadro.
- Connect the power adapter to the POWER port on the QuadroFXO's rear panel and plug the power adapter into a power outlet. Only use the original power adapter and plug it into a power strip with surge protection or to a UPS if available.

The red LED (Fault) will glow for several seconds followed by the yellow LED (Info), which will glow for several minutes. As soon as Info is off, the QuadroFXO is operational.

- Check the LEDs: The green Busy LED should glow continuously. The green LAN and WAN LEDs will blink when cables are connected to these ports and all devices are powered up. If the green LAN and WAN LEDs do not blink, verify cabling and ensure that all devices are powered up.

Please Note: CAT 5 cables can be faulty without visual indication. The LAN and WAN LEDs verify that the Ethernet connection is established between the end points. If these LEDs are not illuminated, there is a connection problem between the QuadroFXO and the other device. Some modems, hubs, switches and routers will require the use of crossover cables.

Configuring the Standalone Gateway QuadroFXO

To configure the standalone gateway QuadroFXO basically, two steps are needed:

Step1: Basic Configuration using the System Configuration Wizard and the Internet Configuration Wizard

Step 2: Specifying the **Call Routing paths** according to your dial plan

The most important settings required in **Step 1: Basic Configuration** are:

Static IP address for the WAN Interface. If you use a DHCP server, please configure it to deliver a static IP address. In this case, QuadroFXO will get its IP address automatically, as it acts as a DHCP client on the WAN side.

Bandwidth - used to regulate a number of calls allowed by the QuadroFXO to avoid degradation in low bandwidth conditions.

Regional Settings - if your QuadroFXO is located outside the United States, it is important to properly configure your line connections to the PSTN in your location

Firewall - enable and configure the firewall to make the QuadroFXO safe and accessible for management.

To customize these settings, connect a PC to QuadroFXO's LAN port, log in and complete the **Basic Configuration** as described in the following sections.

Logging in to QuadroFXO

Start a browser (MS Internet Explorer, Netscape, Opera) on a PC connected to QuadroFXO's LAN port. Enter **http://172.28.0.1** (QuadroFXO's default LAN IP address) into the address field. The **Login** page of the QuadroFXO will be displayed:



Fig. I-6: QuadroFXO's login page

Enter **admin** as the Username and **19** as the Password to log in as the administrator.

After logging in, the **QuadroFXO Management** page will be displayed.

Please Note: If you enter a wrong password and/or username five times, the device will become unavailable for login during the next five minutes.

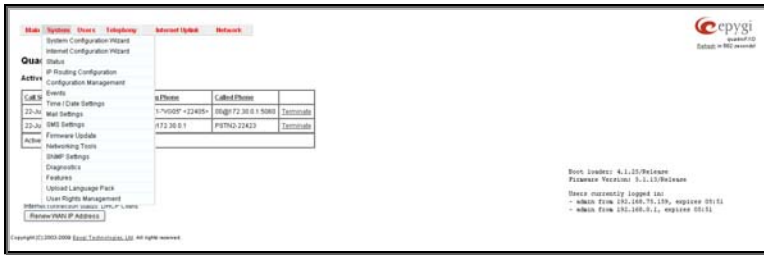


Fig. I-7: QuadroFXO's Management page

Basic Configuration

Two Configuration Wizards are available to accomplish the basic configuration of Quadro devices:

- **The System Configuration Wizard** - a tool for the administrator to define the Quadro's Local Area Network settings and to specify regional configuration settings to make Quadro operational in its LAN. It must be run upon Quadro first startup.
- **The Internet Configuration Wizard** - a tool for the administrator to configure the WAN settings and to adjust Quadro's connectivity in the global network. It must be run if Quadro is desired to be connected to the Internet.

Please Note: It is strongly recommended that factory default settings are left unchanged if their meanings are not completely clear.

Run the System Configuration Wizard

Open the **System Configuration Wizard** by selecting the corresponding menu item on the **System** menu. The page **Getting Started** will be displayed:



Fig. I-8: System Configuration Wizard

This first page of the System Configuration Wizard is for information only and lists the items to be configured. Click on the **Next** button to get to the **System Configuration** page.

System Configuration

Enter into the **Host Name** field a unique name for the QuadroFXO. This is useful when many Quadro's are part of a network and one administrator has remote access to all of them. All Web Management pages show this **Host Name** in the top right corner.

For a basic configuration, the **LAN IP address** needn't be changed. If you have to change it (e.g. to integrate the device into an existing LAN), enter a new LAN IP address and have it handy. You need it to re-access Quadro management.

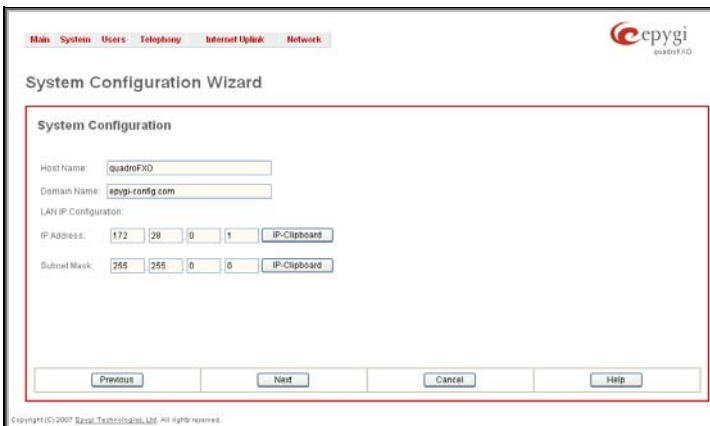


Fig. I-9: System Configuration page

Clicking **Next** shows the page DHCP Settings for the LAN Interface.

DHCP Settings for the LAN Interface

If the DHCP server is enabled, the QuadroFXO will assign dynamic IP addresses to the Admin PC connected to its LAN port.

If you didn't change the default IP address of the QuadroFXO, you may also leave the default values for **IP Address Range**. Make sure your connected Admin PC belongs to the same network as the LAN port of your QuadroFXO.

Please Note: Make sure there is only one DHCP server on the LAN. Otherwise, unpredictable network behavior can occur.

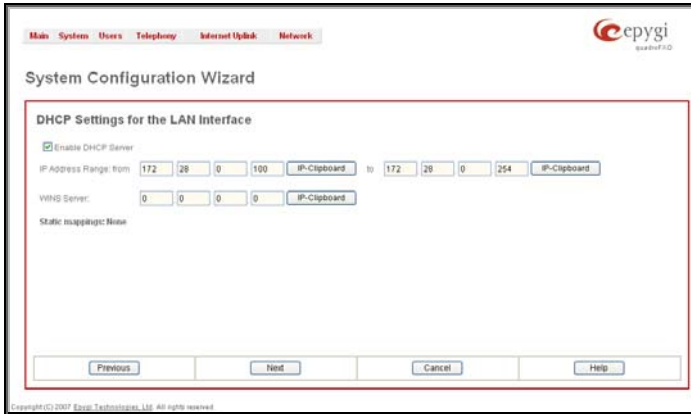


Fig. I-10: DHCP Settings for the LAN Interface page

Click on **Next** to display the **Regional Settings** page.

Regional Settings

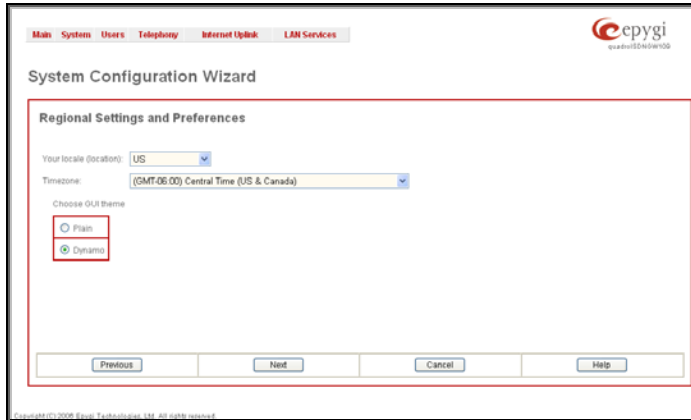


Fig. I-11: Regional Settings page

Proper configuration of **Regional Settings** is important to the functionality of the voice sub-system. The Regional Settings determine the proper telephony parameters for the specified country. Select the country where the QuadroFXO is located. If you do not find your country

in the list, pick the closest. If this setting does not work, issue a request to Epygi technical support under the Support section of www.epygi.com.

The Quadro gets the correct time automatically over the Internet from a time server. If you are not located in US/Central Standard Time Zone, you will need to change the **Timezone** to your region.

Click **Next** to show the summary page.

Finishing the System Configuration Wizard

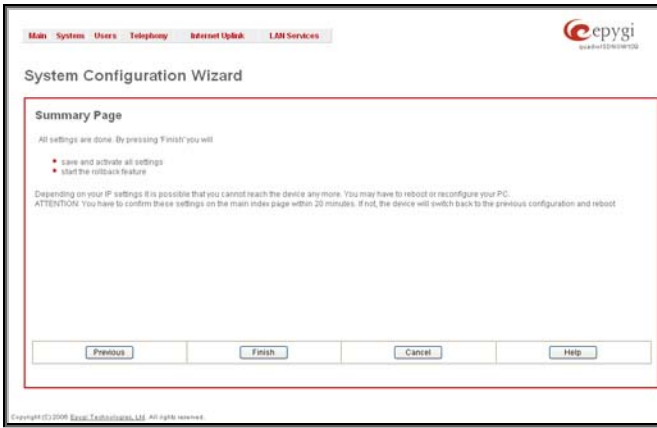


Fig. I-12: System Configuration Wizard finishing page

Click the **Finish** button to complete the System Configuration Wizard. The QuadroFXO will then stop internal functions and apply the changes made in the wizard.

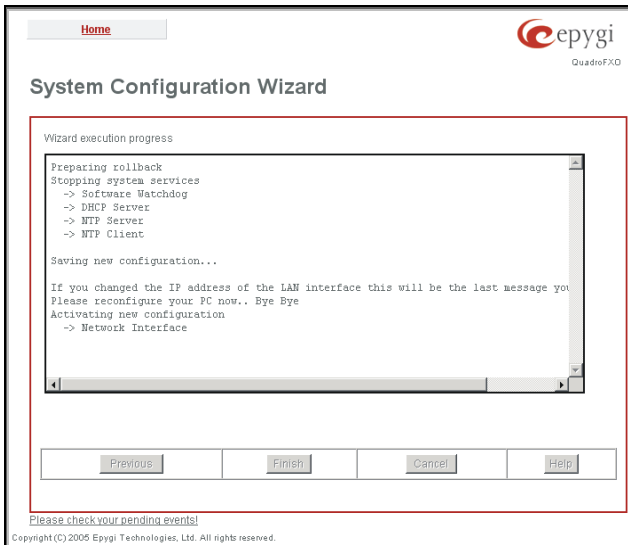


Fig. I-13: Wizard execution process

After this is complete, the QuadroFXO will reply with the **Confirm Settings** page requesting confirmation of the changes. Press the **OK** button to confirm the settings.



Fig. I-14: Confirm Settings page

Please Note: you must confirm the settings within 20 minutes. If not, the device will **revert back to the previous configuration and reboot**.

Please Note: If you do not use DHCP for your LAN and you have changed your LAN settings, make sure that the IP address of the PC connected to Quadro is still within the specified IP address range. Otherwise, your PC might be unable to establish a connection to Quadro.

If you changed the network configuration of the LAN, you may have to reboot your PC to get a new IP address from the new network. You can then access the Web Management of the Quadro on the new IP address you assigned to the Quadro.

Run the Internet Configuration Wizard

Open the **Internet Configuration Wizard** by selecting the corresponding menu item on the **System** menu. The page **Getting Started** will be displayed:



Fig. I-15: Internet Configuration Wizard

This first page of the Internet Configuration Wizard is for information only and lists the items to be configured, Click on the **Next** button to get to the **Uplink Configuration** page.

Uplink Configuration

Select here the **WAN Interface Protocol** required by you ISP: **PPPoE** (Point to Point Protocol over Ethernet) **PPTP** (Point to Point Tunneling Protocol) or **Ethernet**.

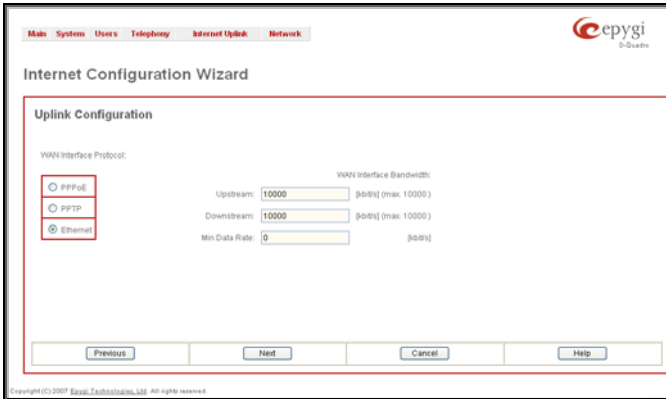


Fig. I-16:Uplink Configuration

Enter **WAN Interface Bandwidth** to assure the quality of IP calls. If available bandwidth is used to the point of which the quality of an additional IP call would suffer, new IP calls are rejected.

The bandwidth provided by your ISP must be specified for both **Upstream** and **Downstream** fields. The default entry in both fields is **10000**, the maximum bandwidth of the 10 MB uplink module.

The **Min Data Rate** text field is used to specify the amount of bandwidth reserved for data applications. The value entered here has to be smaller than the value specified for **Upstream**

Bandwidth. Specify the **WAN Interface Protocol** by choosing between **PPPoE** (Point to Point over Ethernet) and **Ethernet**. Use Ethernet for DHCP or static IP.

Clicking **Next** shows **WAN IP Configuration** page. If **PPPoE** is the selected WAN Interface Protocol, the next page will be [PPP/PPTP Configuration](#).

WAN IP Configuration

Your Internet Service Provider (ISP) should provide this information.

- **Assign automatically via DHCP** - The parameters are set automatically by the ISP. This is common with cable modem and DSL service.
- **Assign Manually** requires the administrator to enter the external **IP Address**, the corresponding **Subnet Mask**, and the IP address of the **Standard Gateway**. This is common when you have a static IP address with your ISP.

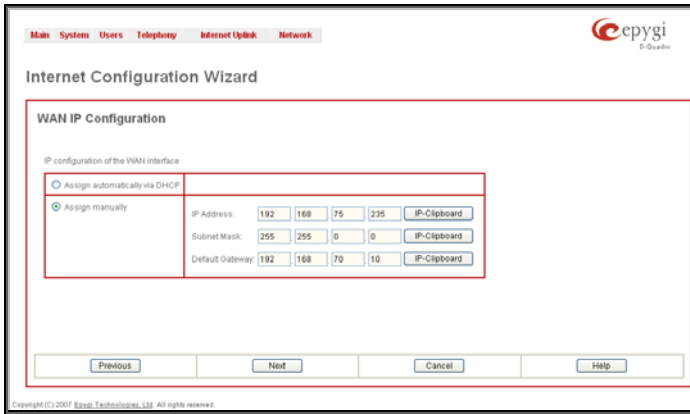


Fig. I-17: WAN IP Configuration page

Click the **Next** button to display the **WAN Interface Configuration** page.

PPP/PPTP Configuration

Enter the IP address of the PPTP server into the **PPTP Server** text field.

Choose the encryption for the traffic over the PPTP interface from the **Encryption** drop down list.

Authentication Settings require the Username and the Password used for the authentication on the ISP server.

Dial Behavior radio buttons:

- **Dial Manually** - if this radio button is activated, a button will be displayed in the main management window that serves to switch the Internet connection on/off. When accessing the Internet, every station of the connected LAN has to connect to Quadro first.
- **Always connected** - Quadro stays in the always connected mode. This will allow Quadro always remain online in the network.

The **IP Address Assignment** field is used to specify the external IP address given to the Quadro. Usually it is a dynamic address but in some cases you may be given a static IP address.

The screenshot shows the 'Internet Configuration Wizard' window with the 'PPP / PPTP Settings' tab selected. The window has a navigation bar at the top with 'Main', 'System', 'Users', 'Telephony', 'Internet UpLink', and 'Network'. The 'ePygi' logo is in the top right. The main content area contains the following settings:

- PPTP Server:** 172 | 11 | 169 | 00 | IP-Clipboard
- Encryption:** 128 Bit
- Authentication Settings:**
 - User name: quadro
 - User password: ****
- Dial behaviour:**
 - Dial manually
 - Always connected
- IP Address Assignment:**
 - Dynamic IP Address
 - Fixed IP Address: 192 | 168 | 75 | 235 | IP-Clipboard
- Keep connection alive

At the bottom, there are four buttons: 'Previous', 'Next', 'Cancel', and 'Help'. A small copyright notice 'Copyright (C) 2008 Epygi Technologies Ltd. All rights reserved.' is visible at the very bottom of the window.

Fig. I-18: PPP/PPTP Configuration page

If your ISP assigns a dynamic IP address, activate the **Dynamic IP Address** radio button, otherwise activate the **Fixed IP Address** radio button and enter the IP address you were assigned by your ISP.

Keep Connection alive checkbox enables keeping the connection alive by sending control packets dedicated for the link state verification.

Click the **Next** button to display the **WAN Interface Configuration** page.

WAN Interface Configuration

If your ISP requires a specific MAC address (e.g., for authentication), it can be entered on this page. The required MAC address can be entered into the **User defined** field. If a specific MAC address is not required, leave the default selection **This device** selected.

Internet Configuration Wizard

WAN Interface Configuration

MAC Address Assignment

This device: 00:13:b0:02:25:01

User defined: 1e fa 68 09 73 cd

Maximum Transfer Unit (MTU)

MTU: 1400 Bytes

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Fig. I-19: WAN Interface Configuration page

Click **Next** to display the **DNS Settings for the LAN Interface** page.

DNS Settings

Select **Fixed Nameserver** and enter its IP address. If you use your DHCP server and if it will deliver a DNS server, you may select **Dynamically by Provider**. When using a static IP address, fixed values must be entered.

Internet Configuration Wizard

DNS Settings

Nameserver assignment

Dynamically by provider

Fixed Nameserver Address

Nameserver: 192 168 70 10

Alternative Nameserver: 192 168 0 2

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Fig. I-20: DNS Settings page

Click **Next** to show the summary page of the Internet Configuration Wizard:

Finishing the Internet Configuration Wizard

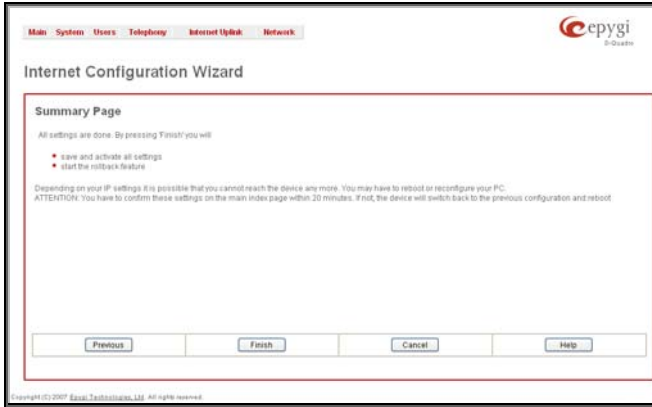


Fig. I-21: Internet Configuration Wizard Summary page

Click the **Finish** button to complete the Internet Configuration Wizard. The Quadro will then stop internal functions and apply the changes made in the Wizard. After this is complete, the Quadro will reply with the **Confirm Settings** page requesting confirmation of the changes. Press the **OK** button to confirm the settings.

Please Note: you must confirm the settings within 20 minutes. If not, the device will **revert back to the previous configuration and reboot**.

Please Note: If you do not use DHCP for your LAN and you have changed your LAN settings, make sure that the IP address of the PC connected to the QuadroFXO is still within the specified IP address range. Otherwise, your PC might be unable to establish a connection to the QuadroFXO.

If you changed the network configuration of the LAN, you may have to reboot your PC to get a new IP address from the new network. You can then access the Web Management of the QuadroFXO on the new IP address you assigned to the QuadroFXO.

Configuring the Firewall

Select **Firewall/NAT** from the **Internet Uplink** menu to open the **Firewall Configuration** page. By default, the Firewall configuration is disabled on the Quadro, which allows any incoming traffic from the WAN.

It is recommended to leave the firewall disabled if QuadroFXO acts as a FXO expansion board.

If QuadroFXO acts as a standalone board, it is recommended to configure the firewall on the QuadroFXO. To do so, check the **Enable Firewall** checkbox and select an adequate security level to protect your QuadroFXO:

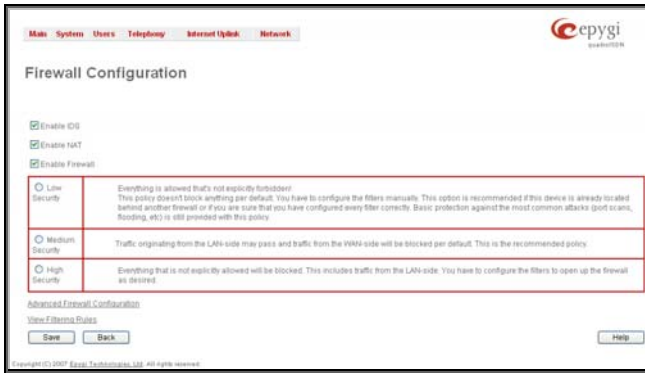


Fig. I-22: Firewall Configuration page

If you have enabled the firewall and if the QuadroFXO shall be managed through the WAN port, a configuration of the filtering rules is needed. Open **View Filtering Rules** from the **Firewall Configuration** page and configure the rule **Management Access** accordingly.

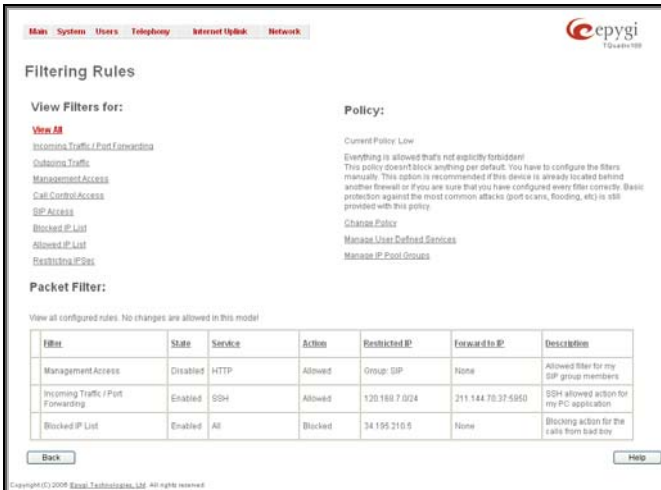


Fig. I-23: Filtering Rules page

Setting up Call Routing

The Call Routing service allows you to specify the communication structure between all involved devices by developing a dialing plan and setting the call routing paths accordingly. For the Quadro extension users, the call procedure should be simple and familiar for all kinds of calls (internal, IP, PSTN or IP-PSTN).

The possibilities Call Routing offers are numerous. The following configuration just a single and simple example used to explain the setup of the QuadroFXO as a gateway:

In this example, the QuadroFXO is connected within a protected Private Data Network built of a Quadro2x with the extensions 11, 12 and a Quadro4x with the extension 21, 22, 23 and 24. Each of these extensions will be configured such that they all shall reach the PSTN using the prefix 9. All extensions also shall be reached by calls from the PSTN.

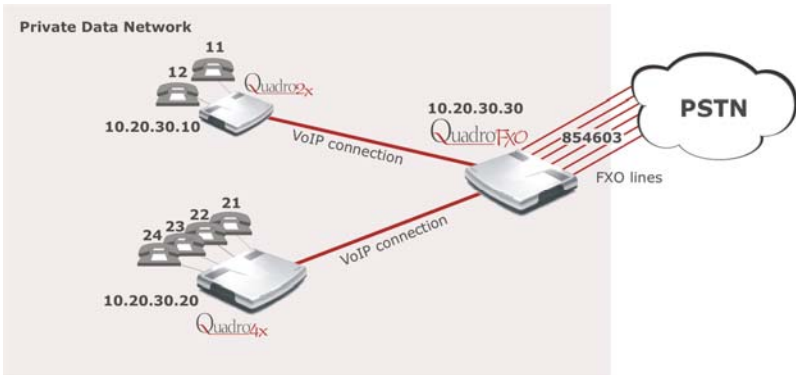


Fig. I-24: Call Routing example

Your PSTN Service Provider supplies you with a telephone number for the FXO lines connected to the QuadroFXO. If you want to allocate the incoming calls of that number, you need to

- Create a dial plan to define **Call Routing paths** on the QuadroFXO and on each of the other Quadro devices.
- modify the QuadroFXO's Auto Attendant welcome message inform the callers about the extension numbers to enable them to reach the desired destination

To illustrate the dial plan with an example, we will assume, you have got the phone number 854603 and you want to offer connections assigned the numbers as follows:

Quadro 2x (IP: 10.20.30.10)		Quadro4x (IP: 10.20.30.20)		QuadroFXO (IP: 10.20.30.30)
Extension 11	-11	Extension 21	-21	All incoming calls from the PSTN will be caught in the Auto Attendant: The welcome message of the Auto Attendant may inform the callers about the extension numbers.
Extension 12	-11	Extension 22	-21	
		Extension 23	-21	
		Extension 24	-21	

In this case, the following call routes are needed:

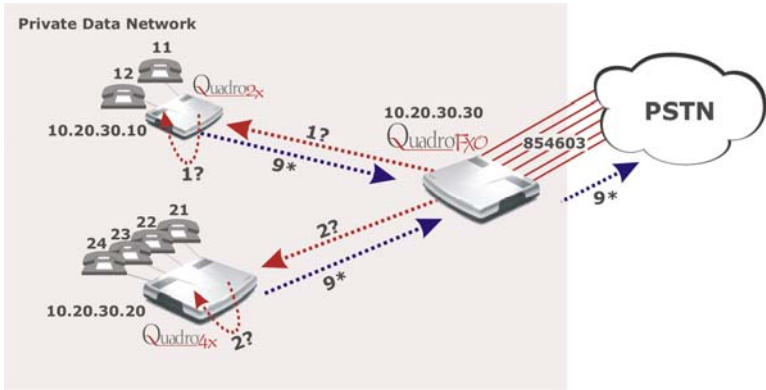


Fig. I-25: Call Routing example; dialing plan

QuadroFXO

Pattern	NDS	Prefix	Call Type	Destination Address	Description
1?			SIP	10.20.30.10	path to Quadro2x
2?			SIP	10.20.30.20	path to Quadro4x
9*			PSTN	10.20.30.30	path for all outgoing calls to PSTN

Quadro2x

Pattern	NDS	Prefix	Call Type	Destination Address	Description
1?			PBX		path to the single extensions
9*			PSTN	10.20.30.30	path for all outgoing calls to PSTN

Quadro4x

Pattern	NDS	Prefix	Call Type	Destination Address	Description
2?			PBX		path to the single extensions
9*			PSTN	10.20.30.30	path for all outgoing calls to PSTN

To define the call routing paths needed on QuadroFXO open **Call Routing** in the **Telephony** menu and select **Local Routing Table**. The **Call Routing - Local Routing** page will be displayed:

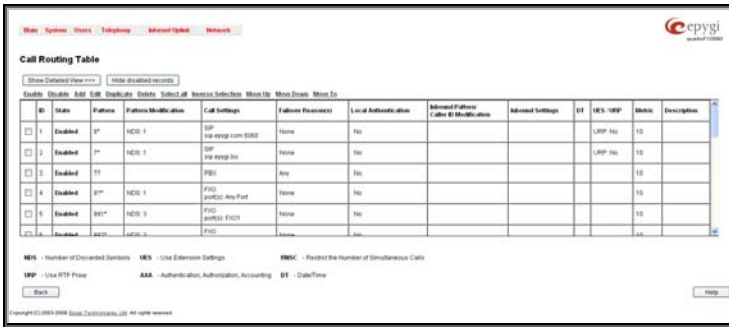


Fig. I-26: Call Routing example; dialing plan

Per default, in standalone mode, Call Routing Table is empty on QuadroFXO. You need to add all routing rules manually.

Select **Add** to set the **1?** route that leads the incoming PSTN calls to the Quadro2x:

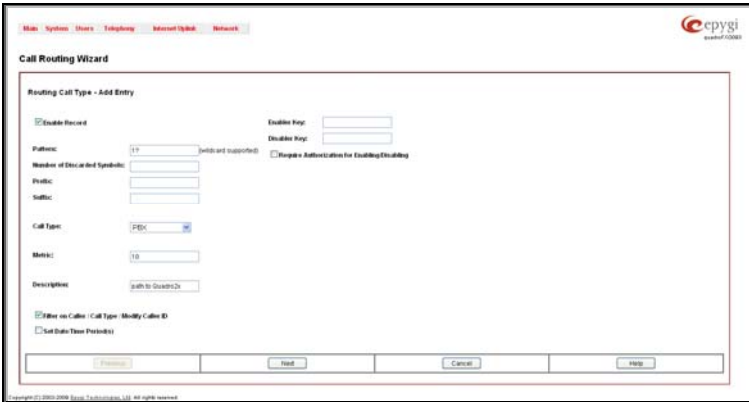


Fig. I-27: Local Call Routing Wizard: Routing Call Type Add Entry page 1

The **Enable** checkbox is used to enable the newly created routing rule. By default, this checkbox is selected, so the newly created routing rule will be enabled. But if you wish to create a routing rule for a later use, disable it from this page. The new routing rule will be added to the Call Routing Table but will be disabled and will not be considered when placing calls through the call routing unless it is enabled again.

Pattern requires the routing pattern. To make the specified call, the appropriate Call Code should be dialed prior to the routing pattern. Only digit values and wildcard symbols are allowed here:

- the "?" character stands for only one unknown digit
- the "*" character stands for any number of any digits.
- the "!" character stands for exclusion.
- "[", "]", "{", "}", "!" and "!" are used to define a range or a quantity of numbers.

Number of Discarded Symbols (NDS) specifies the number of digits that that should be discarded from the beginning of the routing pattern. In this example, no digits have to be discarded, so leave that field empty.

Prefix specifies digits that will be inserted at the beginning of the routing pattern. Leave the field empty if no digits need to be added.

Suffix specifies digits that will be inserted at the end of the routing pattern. Leave the field empty if no digits need to be added.

Call Type gives a possibility to select the routing call type (PBX, SIP, FXO or IP-PSTN). For this example **SIP** has to be selected.

Metric allows entry of a rating for the selected route in a range from 0 to 20. If no value is inserted into this field, 10 will be used as a default. When two route entries match a user's dial string, the route with the lower metric will be preferred. In this example the **Metric** field will be left empty.

Description allows entry of short text, e.g. to name the path.

Filter on Caller/Call Type Modify Caller ID allows to limit the functionality of the current route to be used by the defined caller(s) only. If this checkbox is enabled, inbound caller information (Inbound Caller Pattern, Inbound Call Type, Inbound Port ID, etc.) will be required later in the Local Call Routing Wizard (see Manual-II, Administrator's Guide). In this example, no caller specific limitation is needed, so leave that checkbox unchecked empty.

Set Date/Time Period(s) allows setting a time period, during which the route shall be valid. For this purpose, an own page is displayed as the third page of the Local Call Routing Wizard.

Next will display the second page of the **Local Routing Wizard**:

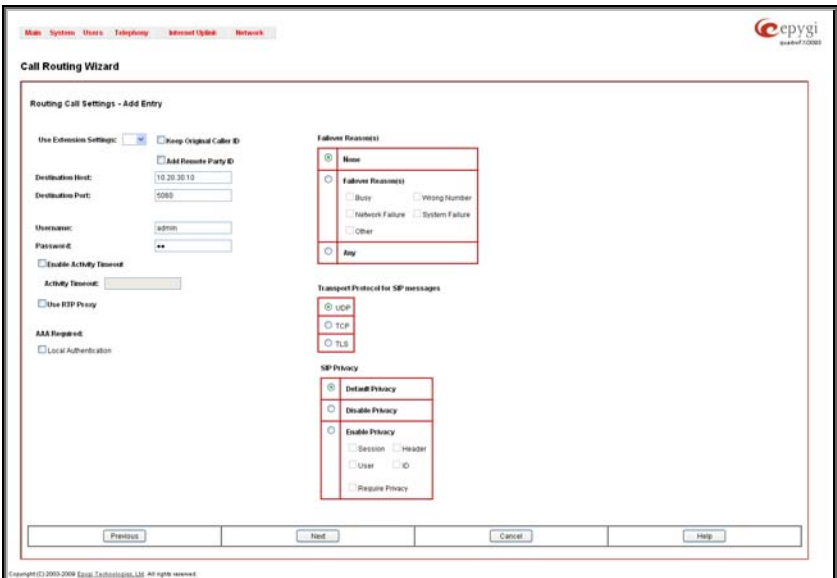


Fig. I-28: Local Call Routing Wizard: Routing Call Type Add Entry page 2

Use Extension Settings is applicable to SIP and IP-PSTN call types only and allows to select the extension (also Auto Attendant) on behalf of the call that will be placed. The SIP settings of the selected extension will be used as the caller information. If no entry is selected in this list, the original caller information will be kept. If the **Keep original DID** checkbox is selected, the called destination will receive the original caller's information, rather than the information of extension selected from the **Use Extension Settings** list.

Destination Port requires the port number of the destination or the SIP server. As Quadro devices use port 5060 per default, enter **5060**.

User Name and **Password** are identification settings for public SIP servers or servers requiring authentication. Leave these fields empty.

AAA Required checkboxes are used to choose one or more Authentication, Authorization, and Accounting (AAA) settings:

- **Local Authentication** – with this checkbox selected, callers will need to pass authentication through Local AAA table (see below) when dialing the current pattern.
- **RADIUS Authentication and Authorization** – checkbox is present when RADIUS client is enabled. With this checkbox selected, when dialing the current pattern, callers will need to pass the authentication through RADIUS server (see above).
- **RADIUS Accounting** - checkbox is present when RADIUS client is enabled. With this checkbox selected, no authentication will take place, but a caller identifying CDR (call detail report) will be sent to the RADIUS server. Checkbox selection enables accounting on the RADIUS for the certain call.

Fail Reason offers a list of fail reasons depending on the selected call type. If the selected fail reason occurs, the local routing table will be parsed for the next matching pattern, and if found, the call will be routed to the destination specified there. In the example described here, the default value **None** is used.

The **Transport Protocol for SIP messages** manipulation radio buttons group is available for **SIP** or **IP-PSTN** call types only and allows you to select the transport (UDP, TCP or TLS) to transmit the SIP messages through.

The **SIP Privacy** manipulation radio buttons group is only available for the **SIP** call type and allows you to select the security of the SIP route by means of hiding (or replacing, depending on the configuration of the SIP server) the key headers of the SIP messages used to establish the call.

- **Default Privacy** – with this selection, Quadro specific SIP privacy will not be applied and all privacy will rely on the configuration of the SIP Server.
- **Disable Privacy** – with this selection, SIP call security will not be disabled and all headers of the SIP message will be transparently visible to the destination.
- **Enable Privacy** - with this selection, SIP privacy will be specified for the corresponding route. This selection enables a group of checkboxes in order to choose the key headers that are to be fully or partly hidden or replaced. The **Require Privacy** checkbox selection is used to restrict the delivery of the SIP message if any of the selected headers cannot be hidden (or replaced, depending on the configuration of the SIP server) before being sent to the destination.

The last page of the Local Call Routing Wizard summarizes all settings and **Finish** will save the route. The **Call Routing – Local Routing** page is displayed again showing the new call routing path.

Configuring the QuadroFXO as an IP PBX Expansion device

QuadroFXO as a LINE expansion device does not require further configuration but the FXO line sharing, if the Quadro IP PBX

- **is connected to the network and all network settings are done without any issues**
- **still acts as a DHCP Server as it does by default**

The only required configuration for sharing the FXO lines of the QuadroFXO to the Quadro IP PBX is the sharing mode configuration on both devices (see details in [Step 3: Sharing Mode Configuration on Quadro IP PBX](#) and [Step 4: Sharing Mode Configuration on QuadroFXO](#)).

In this case, the QuadroFXO has to be connected with its WAN interface to the LAN interface of the Quadro IP PBX and with its LINE ports to the FXO telephone lines. The QuadroFXO will get its IP address from the DHCP server of the Quadro IP PBX and will automatically route all incoming PSTN calls to the Auto Attendant of the Quadro IP PBX and will allow all routed calls from the Quadro IP PBX to access the FXO lines of the QuadroFXO.

If your Quadro IP PBX does not act as a DHCP server and/or does not use the default LAN IP address any more, follow the step-by-step instructions presented below on both the Quadro IP PBX and QuadroFXO setups for incoming/outgoing calls through QuadroFXO ports.

Step 1: Connecting the Quadro FXO

- Connect the WAN port of the QuadroFXO to the LAN port of the Quadro IP PBX via a straight-through Cat 5 cable with a RJ 45 connector.
- Make sure that the LINE ports of the Quadro IP PBX and the QuadroFXO are connected to FXO telephone lines.

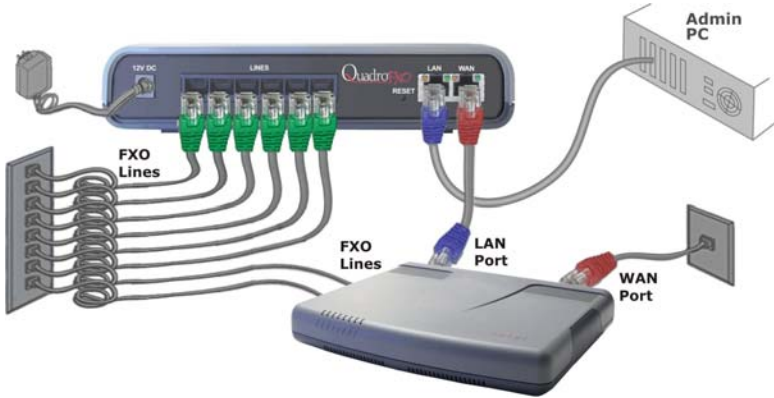


Fig. I-29: Installation of QuadroFXO as a LINE expansion for a Quadro IP PBX

- The software image SOHO-SW 4.1.x or later must be running on the Quadro IP PBX.
- The software image FXO-SW 4.1.x or later must be running on the QuadroFXO.

Step 2: Enable the DHCP Server on the Quadro IP PBX

The QuadroFXO has to have an IP address to identify itself in the Quadro IP PBX LAN. This IP address can be assigned to it manually or dynamically via the DHCP server of the Quadro IP PBX. The simple way from the configuration perspective is to dynamically get an IP address from the Quadro IP PBX (default IP is 172.28.0.1). This will be done automatically, if the connected Quadro IP PBX acts as a DHCP server and if the QuadroFXO acts as a DHCP client. Both devices will do so in their default settings.

To make sure, that the Quadro IP PBX will serve as a DHCP server, login to the Quadro IP PBX as an administrator and select **DHCP Settings for the LAN Interface** from the **LAN services** menu.

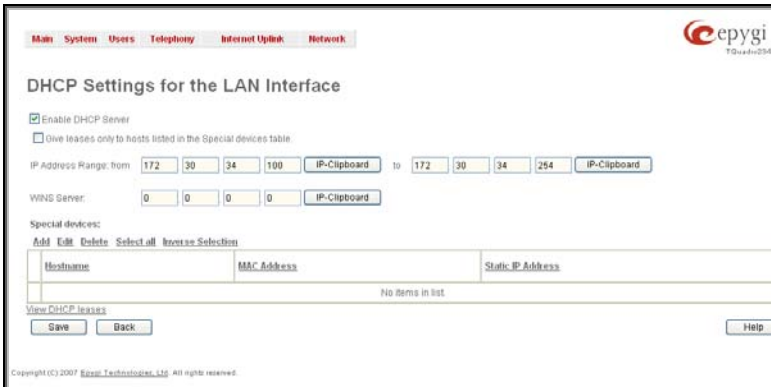


Fig. I-30: LAN-DHCP Settings pager

Make sure the **Enable DHCP Server** checkbox is selected and the **IP Address Range** is configured.

To make sure, that the DHCP Server of the Quadro IP PBX assigned a valid IP address to the QuadroFXO, go to the **LAN Services** Menu of the Quadro IP PBX, click on **DHCP Settings for the LAN Interface** and select **View DHCP Leases**. The table on the opened page should list the IP address and other details of QuadroFXO.

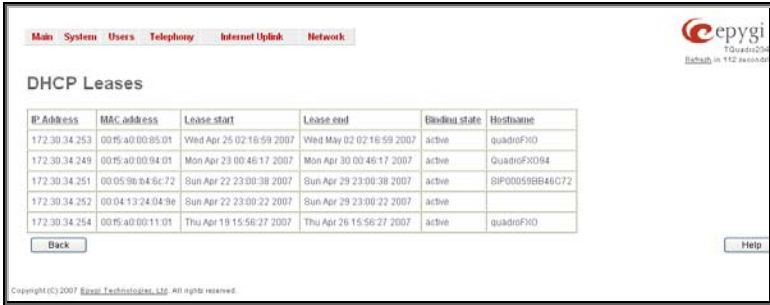


Fig. I-31: DHCP Leases page of the Quadro IP PBX

Step 3: Sharing Mode Configuration on Quadro IP PBX

This configuration is required on the Quadro IP PBX in order to make it use the shared FXO lines on the QuadroFXO, as well as to configuration the appropriate settings for the successful authorization between Quadro IP PBX and the QuadroFXO.

Connect to the Web GUI of the Quadro IP PBX and login as an administrator. From **Telephony** menu, enter **External PSTN Gateways** page.



Fig I-32 – External PSTN Gateways page on Quadro IP PBX

Select the **Use PSTN lines of the other device** checkbox and press **Save** to apply changes. Press the **Authorization Parameters** link. **External PSTN Gateways – Authorization Parameters** page is displayed. Here, a list of authorized devices should be configured.

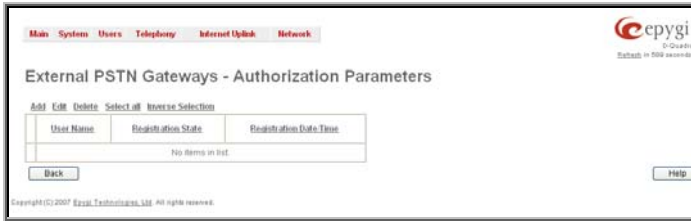


Fig I-33 – External PSTN Gateways – Authorization Parameters page on Quadro IP PBX

Press **Add** functional link to add new authorization parameters for the QuadroFXO.



Fig I-34 – External PSTN Gateways – Authorization Parameters – Add Entry page on Quadro IP PBX

On the opened page, insert the **Username** and the **Password** in the corresponding text fields. These authentication parameters should match on both Quadros. Save the parameters.

Step 4: Sharing Mode Configuration on QuadroFXO

This configuration is required on the QuadroFXO to share its FXO lines to the QuadroFXO. Open the Web Management of the QuadroFXO in your browser (by default QuadroFXO IP is 172.28.0.1).

Go to **Telephony** menu, enter **PSTN Lines Sharing** menu.

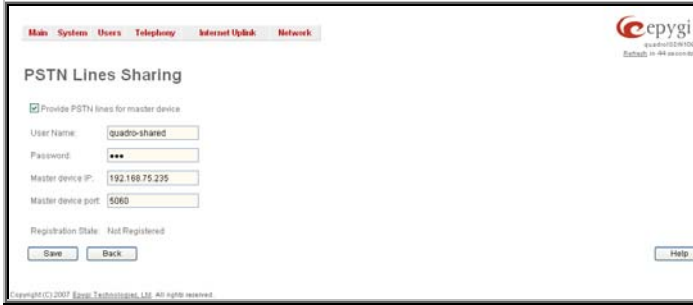


Fig 1-35 – PSTN Lines Sharing page on QuadroFXO

Select the **Provide PSTN lines for master device** checkbox. Insert the **Username** and the **Password** in the corresponding text fields. These authentication parameters should match on both Quados. Enter the IP address of the Quadro IP PBX into the **Master device IP** text field. Enter the SIP Port of the Quadro IP PBX into the **Master device port** text field. Save the inputs.

The results:

The configuration above will cause the corresponding 6 FXO lines of the QuadroFXO device to be shared to the Quadro IP PBX.

Additional FXO lines appear in **FXO Settings** page on the Quadro IP PBX:

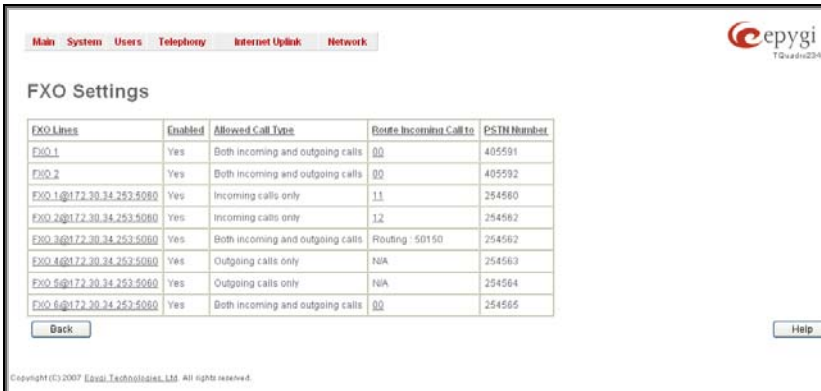


Fig 1 – FXO Settings page with shared FXO lines on Quadro IP PBX

New routing rule (#16) is automatically added to the **Call Routing** table on the Quadro IP PBX:

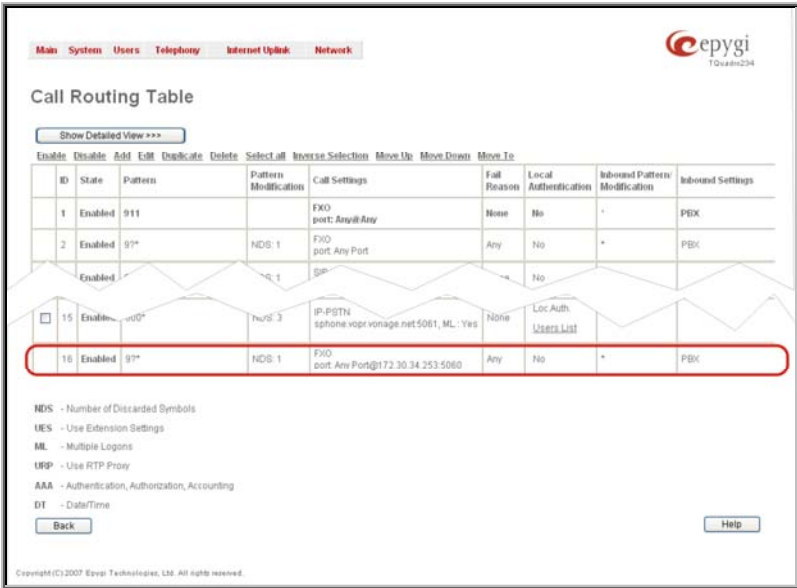


Fig 2 – Call Routing table on Quadro IP PBX

FXO Settings page becomes read-only on the QuadroFXO:

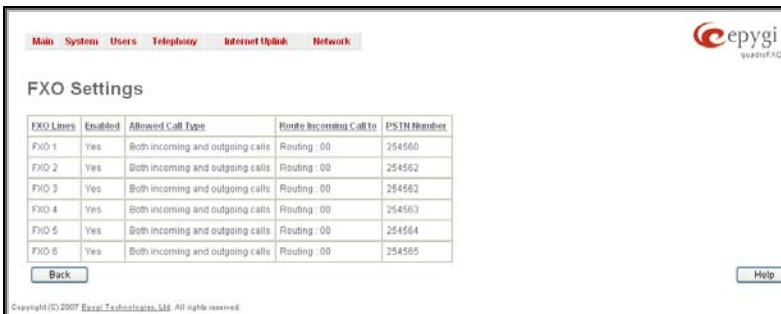


Fig 3 – FXO Settings page in read-only mode on QuadroFXO

New routing rules (# 1-9) are automatically added to the **Call Routing** table on QuadroFXO:

ID	Status	Pattern	Prefix	Call Settings	Full Prefix	Local Extension	Forwarded Prefix	Forwarded Settings	DID	DID Type	Enable/Disable	Extension	Block	Description
1	Enabled	00	000	112.30.24.1.0000	None	No	* Ext Prefix: 1	FXO port FX01	1237	MS	Enabled	1237		For Routing PSTN calls To Master Device
2	Enabled	00	000	112.30.24.1.0000	None	No	* Ext Prefix: 2	FXO port FX02	1238	MS	Enabled	1238		For Routing PSTN calls To Master Device
3	Enabled	00	000	112.30.24.1.0000	None	No	* Ext Prefix: 3	FXO port FX03	1239	MS	Enabled	1239		For Routing PSTN calls To Master Device
4	Enabled	00	000	112.30.24.1.0000	None	No	* Ext Prefix: 4	FXO port FX04	1240	MS	Enabled	1240		For Routing PSTN calls To Master Device
5	Enabled	00	000	112.30.24.1.0000	None	No	* Ext Prefix: 5	FXO port FX05	1241	MS	Enabled	1241		For Routing PSTN calls To Master Device
6	Enabled	00	000	112.30.24.1.0000	None	No	* Ext Prefix: 6	FXO port FX06	1242	MS	Enabled	1242		For Routing PSTN calls To Master Device
7	Enabled	*	*	FXO port Any Port	Any	Any	*	FXO port	000	MS	Enabled	000		
8	Enabled	911	911	FXO port Any Port	None	No	*	FXO port FX06	112.30.24.1	MS	Enabled	112.30.24.1		Emergency Call
9	Enabled	00*	N000	FXO port Any Port	Any	No	*	FXO port FX01	112.30.24.1	MS	Enabled	112.30.24.1		For Routing calls From Master Device to PSTN

Fig 4 – Call Routing table on QuadroFXO

All these routing rules cannot be edited or deleted.

Please Note: Any changes made in the **FXO Settings** on the Quadro IP PBX will automatically be reflected in this table.

Please Note: Following dependencies are used when sharing the FXO lines:

- The configuration of all FXO lines (line state, PSTN Number, Allowed Call Type, etc.) on the QuadroFXO gateway is transparent to Quadro IP PBX and will be displayed in the table on the **FXO Settings** page.
- Independent of the configuration on the QuadroFXO, the incoming calls on all shared FXO lines will be automatically routed to the default Auto Attendant (00) once FXO sharing is activated. Occasionally, routed destinations can be changed on Quadro IP PBX by clicking on the corresponding FXO line.
- Any changes applied to the configuration of shared FXO lines on Quadro IP PBX will be automatically reflected in the **FXO Settings** page and **Call Routing** table on the QuadroFXO gateway.
- All custom Call Routing rules created on the Quadro IP PBX and dedicated for some advanced call routing through the shared QuadroFXO gateway will be automatically deleted once the FXO line sharing is disabled. Those routing rules will not be recovered if the sharing is enabled again.

How this configuration works:

When the Quadro IP PBX user dials 9 followed by a PSTN number (or 9+ # + PSTN number) and no FXO line is available on the Quadro IP PBX (they are either in use or disabled), the call will be routed to QuadroFXO and will go through the first available FXO line port on the QuadroFXO.

When incoming call arrives to either of the FXO port on the QuadroFXO, it will be automatically routed to the Auto Attendant on the Quadro IP PBX (unless stated otherwise from the **FXO Settings** page on the Quadro IP PBX).

Registering on Epygi's Technical Support

It is recommended that you register your QuadroFXO on the Epygi Technical Support web page. Registration will give you access to the Technical Support Database. There, you can send requests concerning technical problems as well as refer to the frequently asked questions. In addition, the technical support page allows users to download new firmware, manuals and other information. You can access the support section only if you are registered. Additionally, registration at Epygi's Technical Support web page gives you the username and password to login to the Epygi SIP Server.

To register, you need to know the serial number of your QuadroFXO, which you will find on QuadroFXO's bottom label and its purchase date. Next, open the Epygi home page (www.epygi.com), select **Support** and click on **Registration Form**. The online registration page will appear:

Complete all fields and record the **Login Name** and **Password** in a safe place. You will need it for the SIP server.

Please Note: In some cases the QuadroFXO units will be shipped pre-configured from the factory with the Support login and password already set-up. In this case, an information sheet is included in the packaged contents indicating the user-name/password to access Epygi's online Support and the Epygi SIP Server.

The registration form is titled "Registration Form" and includes a note: "* Required Information". It is divided into four main sections, each with a red question mark icon:

- Product Information:**
 - Serial Number: 112233001729
 - Purchase Location: United States
 - Purchased From: EPYGI
 - Purchase Date: 05/21/2004 (format: mm/dd/yyyy)
- Login Information:**
 - Login Name: Samantha
 - Password: [masked]
 - Confirm Password: [masked]
- Customer Information:**
 - First Name: Samantha
 - Last Name: Donaldson
 - Company: OmniTec, Ltd
 - Email: samantha.donaldson@omnitec.com
 - Street: [empty]
 - City: Seattle
 - Country / State: Washington
 - Zip / Postal Code: [empty]
 - Phone 1: [empty]
 - Phone 2: [empty]
 - Fax: [empty]
- Information Requested:**
 - New Software Version
 - New Product
 - New Security Issue
 - Maintenance Announcement

At the bottom right, there are "SUBMIT" and "CANCEL" buttons.

Fig. I-36: Registration form

Appendix: PC DHCP Settings

The QuadroFXO LAN port has a DHCP server that provides DHCP IP addresses to devices connected to the LAN either directly or through an Ethernet hub or switch. Appendix A describes how to configure Windows PCs for DHCP. The PC used to access the QuadroFXO must meet the following conditions:

- TCP/IP network protocol has to be installed.
- DHCP has to be activated to request the IP address automatically.

Please Note: If your PC is already configured for DHCP, then simply power it on. Verify the LAN LED is lit. If not, check the cable connections.

Follow the instructions below to install TCP/IP and enable DHCP functionality:

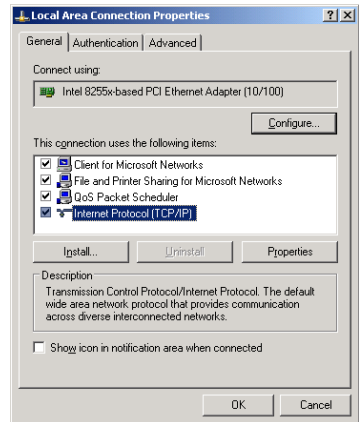
TCP/IP and DHCP under Windows 2000/Windows XP

Windows 2000 and Windows XP PCs with Ethernet cards or adapters normally are configured with a TCP/IP network connection by default. Nothing additional needs to be installed. To enable the DHCP functionality, you may have to modify the properties of TCP/IP:

1. Click the **Start** button. Choose **Settings**, then **Control Panel**.
2. Double-click on the **Network Connection** icon to open the corresponding window. Select **Local Area Connection** with the right mouse button and select **Properties**.



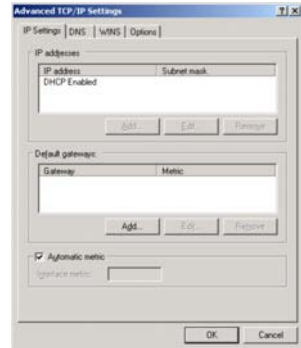
3. Highlight **Internet Protocol (TCP/IP)** and click **Properties**. The corresponding window will be displayed.



4. Select **Obtain an IP address automatically**, then click on **Advanced**.



5. You will see the entry **DHCP Enabled**.
6. Click **OK** three times to close all windows.



TCP/IP and DHCP under Windows 95/98/ME

1. Click the **Start** button. Choose **Settings**, then **Control Panel**.
2. Double-click on the **Network** icon to open your Network window. Select the **Configuration** tab.
3. Click **Add**.
4. Double-click on **Protocol**.
5. Highlight "Microsoft" under the list of manufacturers.
6. Find and double-click on **TCP/IP** in the list to the right.
7. The Network window will appear with the TCP/IP protocol now listed.
8. Highlight "TCP/IP" and click on **Properties**.
9. Select **Getting IP address automatically** to enable the DHCP functionality.
10. Click **OK**.
11. Windows will ask you to restart the PC. Click **Yes**.

The TCP/IP installation is now complete and the DHCP functionality is enabled.

Appendix: Changing the Admin's Password

For security reasons, it is recommended that you change the default admin password. The username of the administrator (**admin**) cannot be changed.

To change the administrator password, go to the **System** menu, **User Rights Management**.

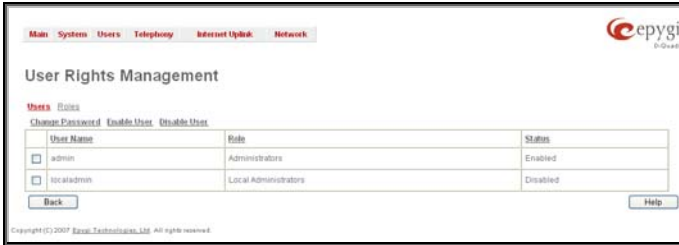


Fig. I-37: User Right Management page

Choose **admin** from the list and press the **Change Password** functional button from the **User Right Management** page toolbar.

The **Change Password** page will be displayed.

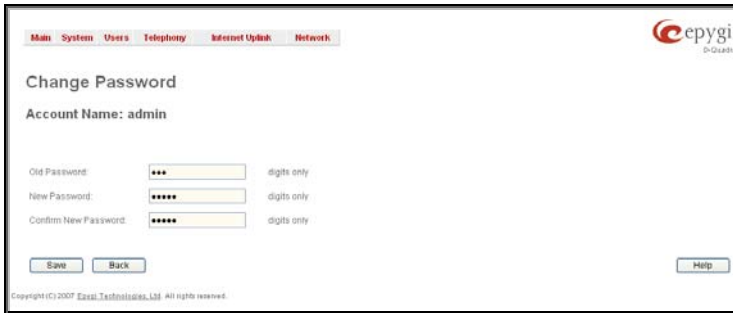


Fig. I-38: Change Password page

Enter the **Old Password** (19) and the **New Password** in both the **New Password** and **Confirm New Password** fields. Please note that only numeric digits may be entered here.

Write down the password somewhere and keep it in a secure place. If the password is lost, a factory reset will be required on the unit (see Administrator's Guide, Hardware Overview). All settings are lost after a factory reset. After a factory reset the default password (19) will be restored.

Appendix: Configuring SIP NAT Traversal

The QuadroFXO initiates and receives SIP calls from the network connected to the WAN port) To receive SIP calls, the QuadroFXO must be able to receive packets from the SIP server or any other device that is trying to make an incoming call. If the QuadroFXO is placed behind a router with NAT, like most basic routers on the market today, the QuadroFXO will not be able to receive calls. To resolve this issue, either STUN must be enabled on the QuadroFXO or SIP NAT traversal must be set up in the router and in the QuadroFXO to properly route the incoming calls.

NAT or Network Address Translation is a common feature used to expand the use of connected PCs and other networked devices without having to use multiple global Internet public IP address. Most ISP will assign one public IP address to each customer that is connected to the Internet. The customer can use a router to provide NAT capability and create a private network of PCs and other devices not visible to the Internet. This method offers security and also eliminates the need to assign global Internet public IP addresses to each device.

Please Note: SIP NAT traversal only works with Internet connections that have static IP addresses. Verify from your provider this is the case for your Internet connection. Some ISPs provide dynamic IP addresses that may change from time to time, and are not appropriate for SIP NAT traversal.

Please Note: If you have more than one router in series between the QuadroFXO and the Internet, the same port forwarding setup must be configured on each router.

SIP NAT Traversal Setup

- Install the QuadroFXO behind the router. If the QuadroFXO is configured with its factory default settings, it is already configured for DHCP and will obtain an IP address automatically from the router. If the DHCP was changed, please [Run the System Configuration Wizard](#) to place the QuadroFXO in DHCP mode. Power up the QuadroFXO.
- Connect a PC or laptop to the QuadroFXO LAN port and power it up.
- Verify the QuadroFXO can connect to the Internet by opening a browser window and browsing to a familiar WEB site. If the QuadroFXO can not reach the Internet, verify the LAN/WAN LEDs and the cabling. Verify the QuadroFXO is set up for DHCP on the WAN and that the router has the DHCP server enabled for the devices behind it.
- Find the address of the router and log into the router. Refer to the router user manual on how to open the router configuration.
- Set up port forwarding on the router to forward the UDP ports according to the ports specified for SIP (Mapped Port for SIP, default: 5060) and RTP/RTCP (Min mapped RTP/RTCP port (default 6000 and Max mapped RTP/RTCP port (default 6099)) on the QuadroFXO. The router should forward that UDP (USP/TCP for SIP) ports to the IP address assigned to the QuadroFXO. You can see the IP address of the QuadroFXO in the System menu under Status. The IP address will be listed as the WAN IP address. Your router may also indicate the IP address assigned to the QuadroFXO.
- Find out the public Internet address of the router. To do so, open a browser and go to www.whatismyip.com. The site will return your public Internet IP address. Record this IP address.
- From the **QuadroFXO Management** menu, go to the **Telephony** menu, select **NAT Traversal Settings/SIP Settings** and check **Use Manual NAT Traversal**.

- For **Mapped Host**, enter the router IP address found on the step above and the port number **5060** for **Mapped Port**. **Save** the settings
- Select the **RTP Parameters** link, check **Use Manual Nat Traversal**, enter again the router's IP address into the **Mapped Host** field. In the area **Mapped RTP/RTCP Port Range for FXS Lines** enter for **Min: 6000** and for **Max 6059**.
- Click the **Save** button to save the contents.

The QuadroFXO will activate the settings and register the extension on the Epygi SIP Server after a few minutes. You can verify the settings from the main **QuadroFXO Management** menu under **Status** in the **SIP Registration Status** section.

Appendix: Checking the Connections

If the system seems to work incorrectly even when all cables are connected properly, it may be helpful to **Start Network Diagnostics**: The WAN link, IP configuration, gateway, DNS server, and STUN-NAT (if used) will all be checked.

To start diagnostics, open the **System's** menu item **Diagnostics** and click **Start Network Diagnostics**.



Fig. I-39: System Diagnostics page

In the case of a successful test, the output of the system looks as follows:

Basic Tests:

```

Checking for physical link:           WAN link ok
Checking IP configuration:           dynamically via DHCP Client
    DHCP Client is running
Checking internet connectivity (ICMP ping):
    Gateway:           reached
    Primary nameserver: reached
    Secondary nameserver: not configured
    www.epygi.com:     reached
STUN Network Address Translation (NAT) Check:
    External visible address: 212.126.210.179
    Detected NAT type   : Restricted cone
  
```

Performing MTU Discovery:

```

    preparing system
    Sending UDP Datagram of size 1500   got answer
    clean up
    Largest usable MTU size is: 1500 Bytes
Test successful.
  
```

Depending on where the test is failing, the diagnostic can give some advice to solve the problem. See the example below of a failed test:

Basic Tests:

```

Checking for physical link:           no WAN link
Please check the physical connection of the WAN interface. Cable not
plugged or broken?
Test failed.
  
```

If you pass the diagnostics successfully, but are still not able to place a call to 899# then check the SIP registration status.

Open the SIP Registration Status page using the QuadroFXO management **System** menu item **Status**. If QuadroFXO is placed behind a NAT router, the detected NAT type and the IP address of this router's WAN port are displayed.

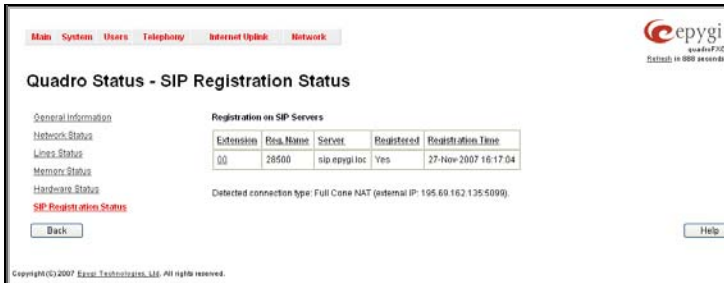


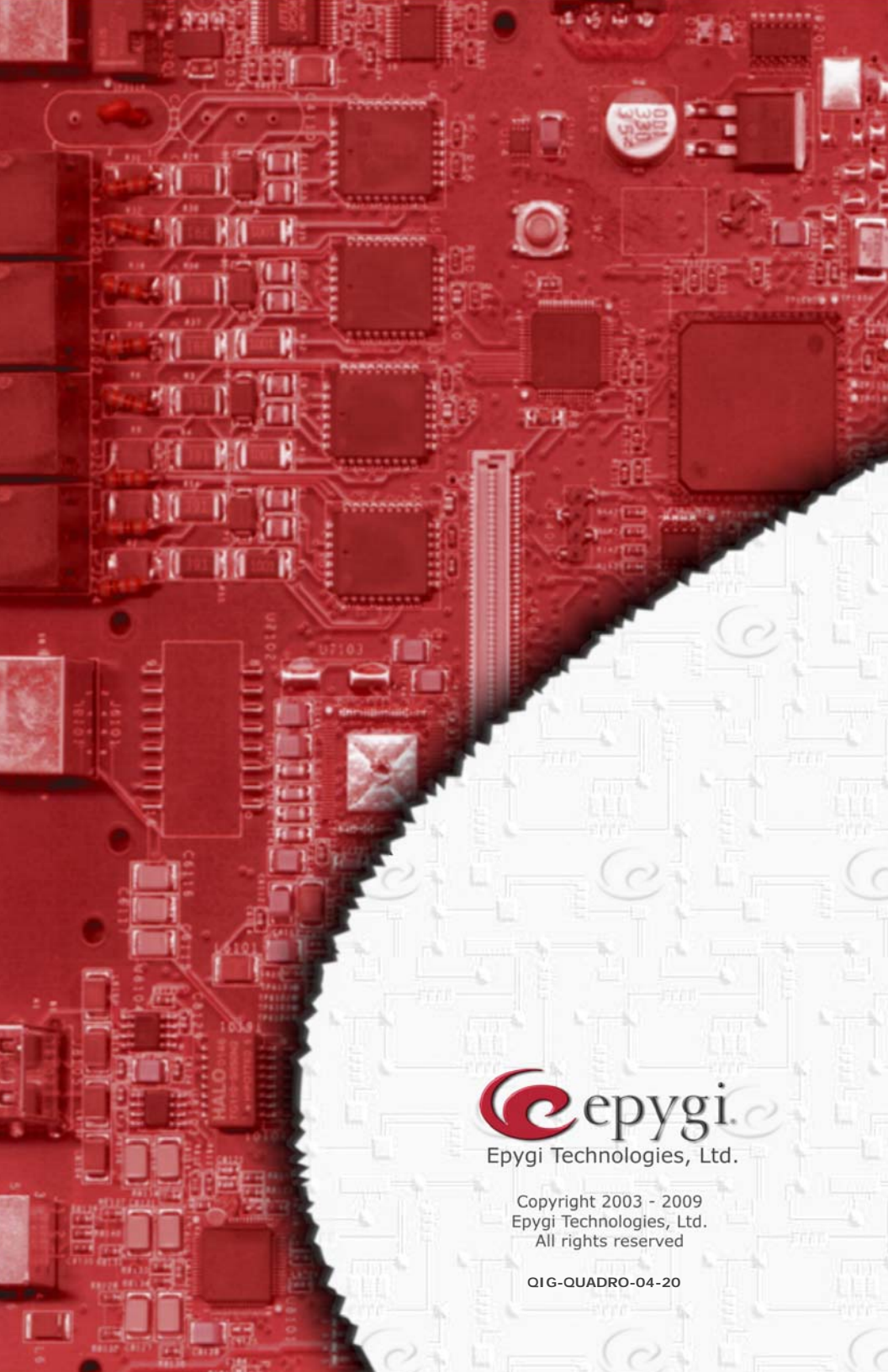
Fig. I-40: SIP Registration Status page

If you are using the STUN functionality the page shown above will additionally display the Detected Connection Type. Unsupported Connection types will cause one of the following messages:

- Unknown connection - unexpected error,
- Symmetric NAT,
- Symmetric Firewall,
- Blocked UDP

If the **Detected Connection Type** is any of the types listed above, QuadroFXO cannot work behind your router. You must either connect the QuadroFXO in front of the router, or configure NAT traversal manually as explained in [Appendix: Configuring SIP NAT Traversal](#)

If you are unable to resolve your problems, please send us a technical support request on the **Support** section of <http://www.epygi.com/>. Please prepare a system log file and attach it to your request. To create a system log file, open the **System Diagnostics** page **System** menu item **Diagnostics**) and click **Download System Logs**.



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QIG-QUADRO-04-20