

QuadroE1/T1

The VoIP Gateway



Manual I: Installation Guide

for QuadroE1/T1, SW-Version 3.2.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 QuadroE1/T1 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 QuadroE1/T1 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 QuadroE1/T1 is powered.

Industry Canada Statement

This product meets the applicable Industry Canada technical specifications.

Safety Information

Before using the QuadroE1/T1, please review and ensure the following safety instructions are adhered to:

- To prevent fire or shock hazard, do not expose your QuadroE1/T1 to rain or moisture.
- To avoid electrical shock, do not open the QuadroE1/T1. 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 QuadroE1/T1 during an electrical storm.
- Do not use your QuadroE1/T1 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 QuadroE1/T1 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 QuadroE1/T1 SIP Service will automatically be disabled. User understands that in the event of a power or network outage, the QuadroE1/T1 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 QuadroE1/T1. 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 QuadroE1/T1 management menus and includes all system default values at a glance, too.

About This Installation Guide

This Installation Guide explains the installation of the QuadroE1/T1 VoIP gateway. It gives step-by-step instructions to provision the QuadroE1/T1 and configure the phone extensions with the Epygi SIP Server. After successfully configuring the QuadroE1/T1, a user will be able to make SIP phone calls to remote QuadroE1/T1 devices, make local calls to the PSTN and access the Internet from devices connected to the LAN.

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

[Installing QuadroE1/T1](#) explains connection of cables and devices to the Quadro.

[Configuring the QuadroE1/T1](#) describes the configuration steps necessary to integrate the Quadro into a network environment and to setup the voice features. The chapter includes information about the System and Internet Configuration Wizards to integrate the QuadroE1/T1 in your network environment, about the basic E1/T1 settings and about the basic setting up of the call routing functionality.

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

[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 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 QuadroE1/T1.
- One RJ-45 Ethernet 10/100 broadband Internet connection.
- One off-the-shelf analog phone with an RJ-11 telephone cable.
- One CAT 5 Ethernet cable with an RJ-45 connector to connect to the QuadroE1/T1 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 QuadroE1/T1 is shipped with one RJ-11 cable and one straight RJ-45 CAT 5 cable. If the LAN connector of the QuadroE1/T1 is to be connected to a hub or switch, a crossover cable may be required (see [Appendix: Pin Assignment of E1/T1](#), too).

Hardware Overview

QuadroE1/T1's Rear Panel



Fig. I-1: QuadroE1/T1's backplate

- 1 Power supply socket. **Use only the power adapter delivered with the QuadroE1/T1.**
- 2 PHONE socket with a RJ-11 connector enables connectivity of a regular analog telephone. This is a FXS (Foreign Exchange Station) analog port.
- 3 RJ-45 socket to attach the Local Area Network (LAN) via an Ethernet CAT 5 cable. If 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.
- 4 RJ-45 socket to attach the Internet Uplink (WAN) via an Ethernet CAT 5 cable.
- 5 RJ-45 socket to attach the E1/T1 trunk. See [Appendix: Pin Assignment of E1/T1](#).
- 6 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 172.30.0.1 and default administrator's password of 19.

QuadroE1/T1's Front Panel LEDs

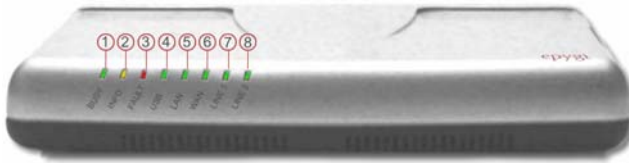


Fig. I-2: QuadroE1/T1's Front Panel LEDs

1	BUSY green (Status of the CPU)	on: device is booting off: No power blinking: activity
2	INFO yellow (System information)	on: device is booting off: no information blinking: an event occurred that was specified in Event Management
3	FAULT red (System status)	on device is booting/ error off: no error blinking: system unusable
4	SPARE green	undefined
5	LAN green (Status of the LAN interface)	on: link ok off: no link flickering: traffic on the link
6	WAN green (Status of the WAN interface)	on: link ok off: no link flickering: traffic on the link
7	Line1 green (Status of the E1/T1 link)	on: frame synchronization is ok off: frame synchronization is not ok flickering: link is down
8	Line2 green (Status of the E1/T1 link)	on: Link ok off: RED alarm indication flickering: link is down

LED Indication during a firmware update

A firmware update is indicated by the red (**Fault**) and yellow (**Info**) LED. Both will blink simultaneously for about five minutes while the firmware is updated. The QuadroE1/T1 will then re-boot automatically showing the boot LED sequence.

LED Indication during a boot sequence

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

Installing QuadroE1/T1

Networking Overview

To establish a connection between the PSTN (or your PBX) and the Internet, a VoIP gateway is needed. The QuadroE1/T1 is a VoIP gateway, and will perform the task of connecting your PSTN (or PBX) via its E1/T1 port to a Private Data Network that includes Quadro SIP routers (Quadro2x, -4x and/or16x) or the Internet. The QuadroE1/T1 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 QuadroE1/T1 has one additional 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.

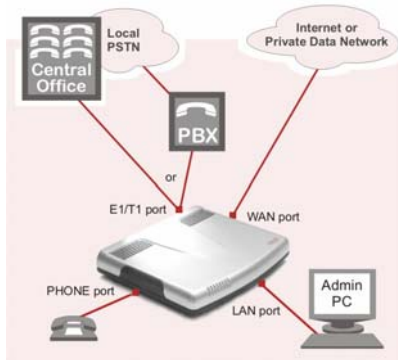


Fig. I-3: Connection overview

Every device within an IP network requires a unique IP address to identify itself. Since the QuadroE1/T1 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 QuadroE1/T1's integrated firewall/NAT functionality will hide the LAN IP address from the WAN (Internet) side.

There are two ways of assigning an IP address: statically or dynamically. The Quadro E1/T1 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 QuadroE1/T1 acts as a DHCP client on its WAN interface and as a DHCP server on its LAN interface.

Connecting the Hardware

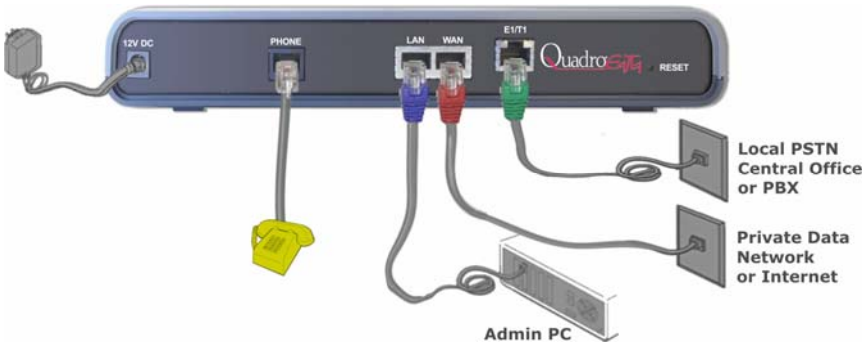


Fig. I-4: Connecting the Hardware

- 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 a telephone to the PHONE port on the QuadroE1/T1's rear panel.
- **Connect the QuadroE1/T1's E1/T1 port to your PBX or the trunk from the PSTN Central Office ONLY after configuring the E1/T1 settings according to the specifications of your PSTN provider (see [Appendix: Pin Assignment of E1/T1](#)).**
- Connect the Ethernet port on your PC via a straight CAT 5 cable with an RJ-45 connector to the LAN socket of the QuadroE1/T1. If a hub or switch is connected between the QuadroE1/T1 and your PC, use a crossover cable from the LAN interface of the QuadroE1/T1 to the hub/switch.
- Connect the WAN port of the QuadroE1/T1 to the Private Data Network or Internet service.
- When using a DSL or Cable modem, power up the modem before the Quadro.
- Connect the power adapter to the POWER port on the QuadroE1/T1'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 QuadroE1/T1 is operational.
- Power up any hub or switch followed by any PC and other devices on the LAN side.
Please Note: The PC must be configured for DHCP to receive an IP address directly from the QuadroE1/T1. Refer to [Appendix: PC DHCP Settings](#) for instructions on how to set up a PC for DHCP operation.
- 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 QuadroE1/T1 and the other device. Some modems, hubs, switches and routers will require the use of crossover cables.

Configuring the QuadroE1/T1

To configure the QuadroE1/T1 basically, four steps are needed:

Step 1: Basic Configuration using the System Configuration Wizard and the Internet Configuration Wizard.

Step 2: Entering the **E1/T1 settings** provided by your PSTN Provider.

Step 3: 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, QuadroE1/T1 will get its IP address automatically, as it acts as a DHCP client on the WAN side.

Bandwidth – used to regulate the number of calls allowed by the QuadroE1/T1 to avoid degradation in low bandwidth conditions.

Regional Settings - if your QuadroE1/T1 is located outside the United States, it is important to properly configure your line connections to the PSTN in your location

Firewall - if your QuadroE1/T1 is connected behind a router configure the firewall to make the QuadroE1/T1 accessible for management.

To customize these settings, connect a PC to QuadroE1/T1's LAN port, log in and complete the **Basic Configuration** as described in the following sections.

Logging in to QuadroE1/T1

Start a browser (MS Internet Explorer, Netscape, Opera) on a PC connected to the LAN port.

Enter **http://172.30.0.1** (QuadroE1/T1's default LAN IP address) into the address field.

The **Login** page of the QuadroE1/T1 will be displayed (see picture below).



Fig. I-5: QuadroE1/T1's login page

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

After logging in, the **QuadroE1/T1 Management** page will be displayed.

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

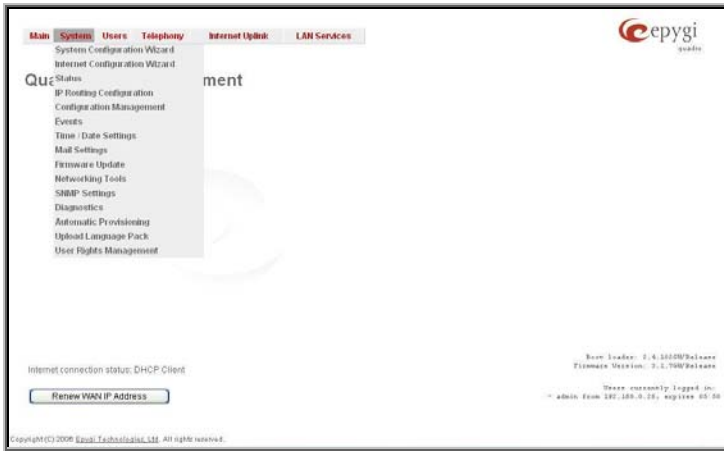


Fig. I-6: QuadroE1/T1's Management page

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-7: 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 QuadroE1/T1. 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, leave the default **LAN IP address**. If you want to change the default **LAN IP address**, e.g. in order to integrate the device into an existing LAN, insert the new LAN IP address into the **IP Address** text field and have it handy. You need it to re-access Quadro management.

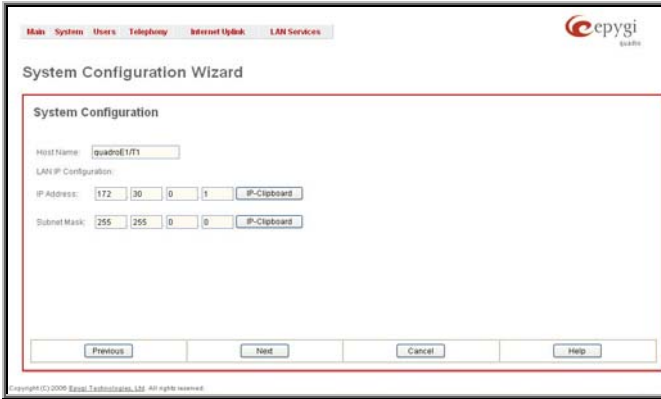


Fig. I-8: System Configuration page

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

DHCP Settings for the LAN Interface

If the DHCP server is enabled, the QuadroE1/T1 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 QuadroE1/T1, 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 QuadroE1/T1.

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

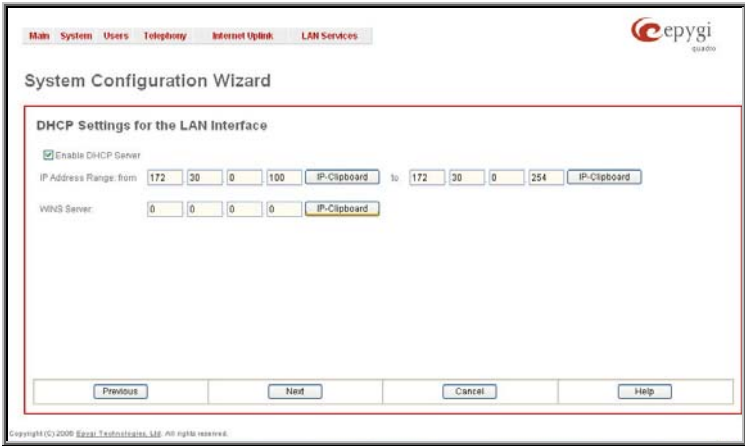


Fig. I-9: DHCP Settings for the LAN Interface page

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

Regional Settings

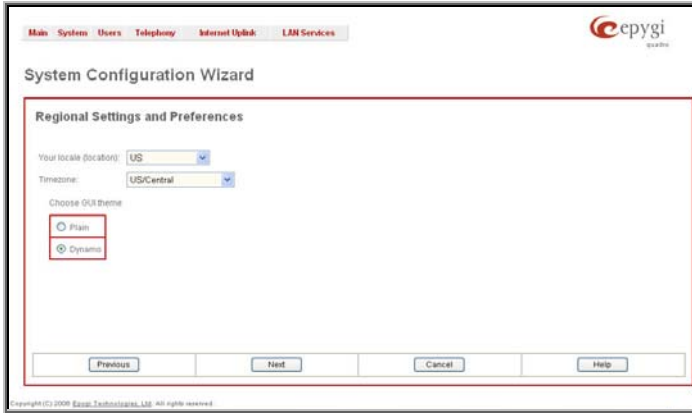


Fig. I-10: Regional Settings page

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 QuadroE1/T1 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

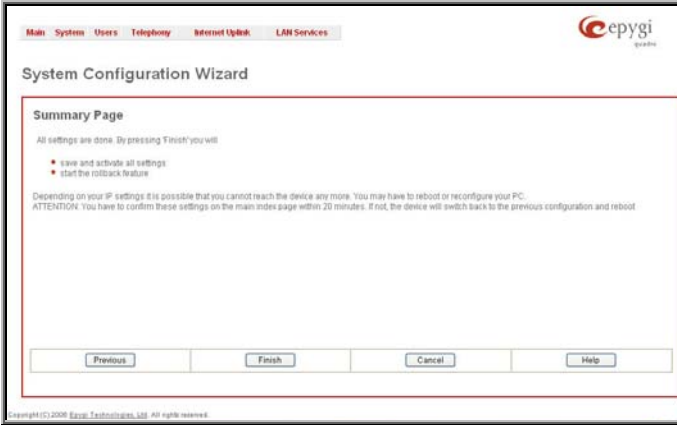


Fig. I-11: System Configuration Wizard finishing page

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

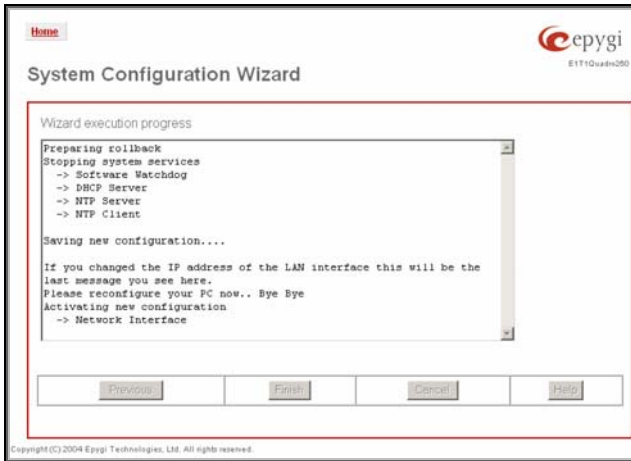


Fig. I-12: Wizard execution process

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.



Fig. I-13: 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:

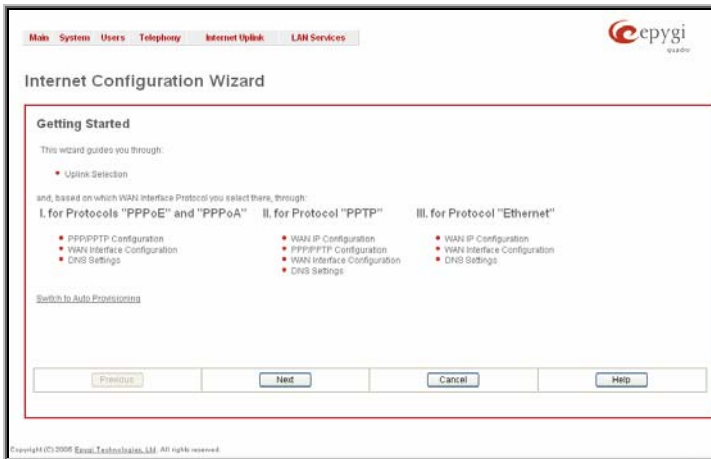


Fig. I-14: Internet Configuration Wizard

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**.

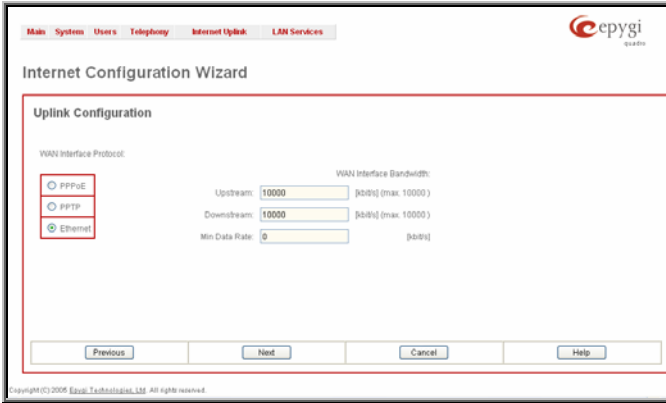


Fig. I-15:Uplink Configuration

If the available bandwidth is used to the point where the quality of an additional IP call would suffer, then 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. For basic DSL and cable modem service in the United States, typical values are **300** for Upstream and **1500** for Downstream.

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

Specify the **WAN Interface Protocol** by choosing between available WAN interface protocols: **PPPoE** (Point to Point over Ethernet), **PPTP** (Point to Point Tunneling Protocol) and **Ethernet**. Use Ethernet for DHCP or static IP.

For **Ethernet**, clicking **Next** will display the **WAN IP Configuration** page. If **PPPoE** is the selected WAN Interface Protocol, the next page will be [PPP/PPTP Configuration](#). For **PPTP** WAN Interface Protocol, [PPP/PPTP Configuration](#) page will follow the **WAN IP 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.

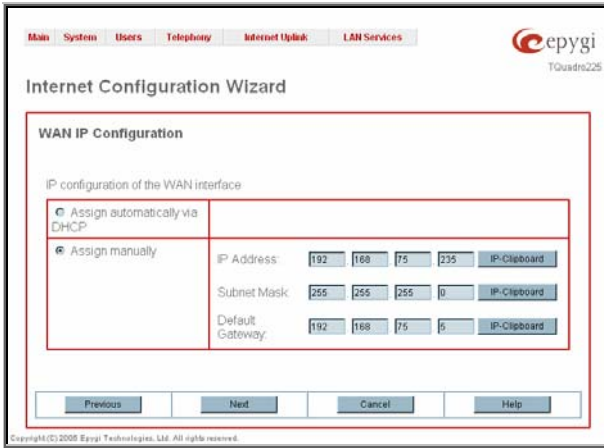


Fig. I-16: WAN IP Configuration page

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.

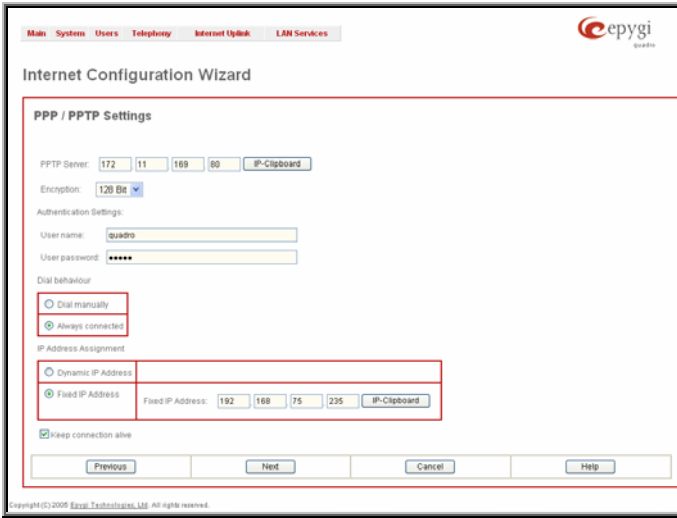


Fig. I-17: PPP Configuration page

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.

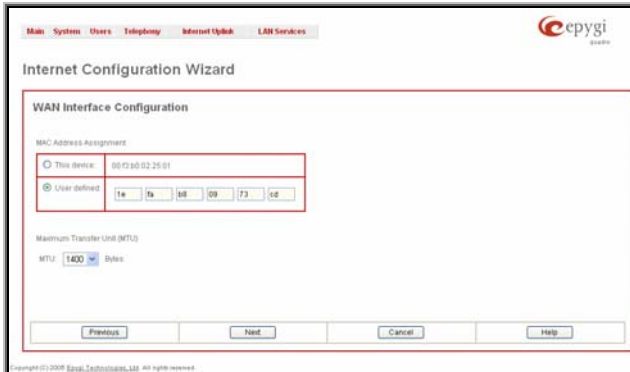


Fig. I-18: WAN Interface Configuration page

Use the **MTU** drop down list to select the maximum packet size on the Ethernet (in bytes).

Click **Next** to display the **DNS Settings** 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.

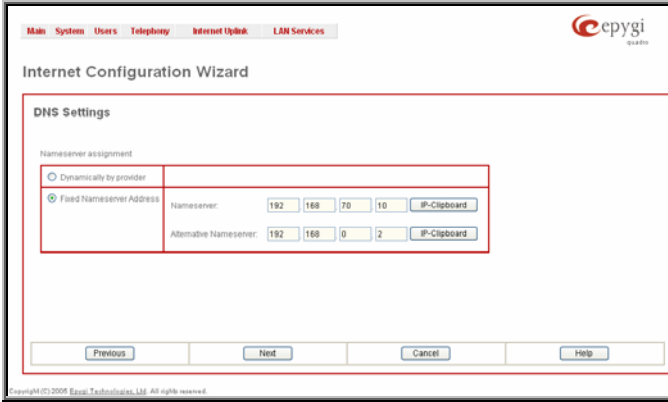


Fig. I-19: DNS Settings page

The Quadro will suggest the correct settings. If **Dynamically by Provider** is selected, the DNS server settings will be set automatically whenever a connection to the Internet is established.

If **Fixed Nameserver Address** is selected, manually enter the IP addresses provided by your ISP for the name server and the alternative name server.

Clicking **Next** shows the summary page of the Internet Configuration Wizard.

Finishing the Internet Configuration Wizard



Fig. I-20: 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 display the **Confirm Settings** page requesting confirmation of the changes. Press the **OK** button to confirm the settings.

Please Note: the settings should be confirmed within 20 minutes; otherwise, 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 QuadroE1/T1 is still within the specified IP address range. Otherwise, your PC might be unable to establish a connection to QuadroE1/T1.

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 QuadroE1/T1 on the new IP address you assigned to the QuadroE1/T1.

Your QuadroE1/T1 is now configured. If your QuadroE1/T1 has direct connectivity to the Internet, you may verify the functionality of IP calls now:

Dial **899#** and you will hear a voice message that confirms you successfully established an IP call. If this call is not successful, go to [Appendix: Checking the Connections](#) for troubleshooting tips.)

To enable PSTN calls continue with the second step (

Configuring the E1/T1 Settings) of the QuadroE1/T1 configuration and specify the E1/T1 Settings.

Configuring the Firewall

The configuration of the firewall is only required if the Quadro is managed through the WAN port.

To configure the firewall, open **Firewall Configuration** from the **Security** menu, select **Filtering Rules** and configure the rule **Management Access** accordingly.

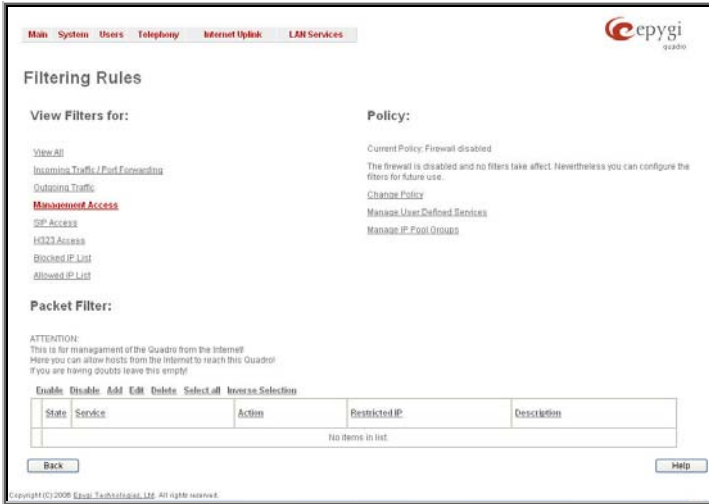


Fig. I-21: Filtering Rules page

Configuring the E1/T1 Settings

The QuadroE1/T1 can be connected to a PBX or to the PSTN via E1/T1 lines, using E1/T1 CAS/CCS signaling. The QuadroE1/T1 may be connected to act as a **User** (if connected to directly to the PSTN) or as a **Network** (if connected to a PBX).

Further, you are required to enter the E1/T1 settings your PSTN provider requires regarding framing, clocking, signaling used and so on. All these settings must be entered on the management page **Trunk Settings** that is displayed when you select **E1/T1 Settings** from the **Telephony** menu:



Fig. I-22: E1/T1 Trunk Settings page

The **Trunk Settings** page is used to configure the E1/T1 trunk and timeslots settings. The table lists the available E1/T1 trunks of Quadro and their settings (Trunk name, E1/T1 mode, interface and signaling type). Clicking on the trunk will open its **Signaling Settings** page (Trunk CAS Signaling Settings or the Trunk CCS Signaling Settings page depending on the selected signaling type). Selecting the corresponding trunk's checkbox and pressing **Edit** will open the **Trunk - Edit Entry** page. The **E1/T1 Stats** link is displayed for every active Quadro trunk and leads to the page where the E1/T1 trunk and the traffic statistics can be viewed.

Editing the E1/T1 Trunk

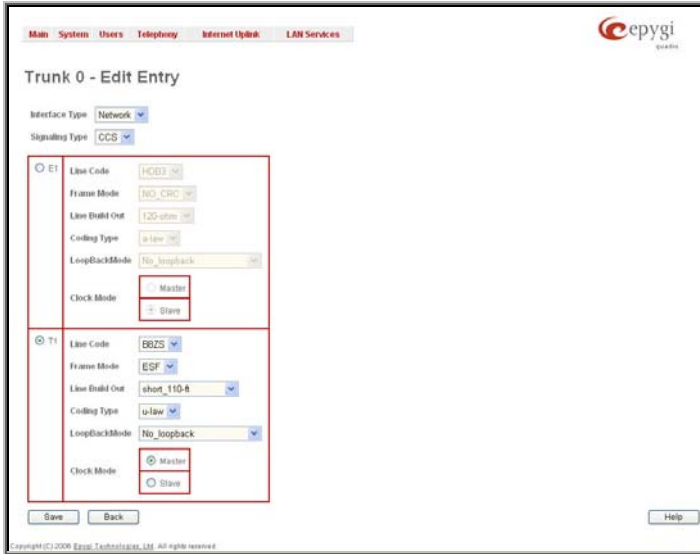


Fig. I-23: Trunk Edit page

Select **Network** as your **Interface Type** if your QuadroE1/T1 is connected to a PBX, otherwise choose **User**.

Next, you are required to enter the **Signaling type (CAS or CCS)**, adjust the correct interface type (**E1** or **T1**), and specify the requested settings of the selected interface type. The appropriate parameters should be requested from the service provider or in case of connecting to a PBX - according to the settings in the PBX manual.

CAS signaling allows using the same timeslot both for voice and data transmission. CCS signaling uses a single timeslot for signaling data transmission for the whole trunk, all other timeslots are used for voice transmission.

E1, the European system, enables 30 active timeslots (both for CAS and CCS) to be used; T1, the US system, enables 24 timeslots (if CAS is used) and 23 (if CSS is used).

Please Note: Modifying the E1/T1 trunk settings may lead to some broken routes in the Local Call Routing Table.

Signaling Type CCS

Fig. I-24: Trunk T1 Signaling Type CCS page

If you selected CCS as your Signaling Type, using the **Trunk** link will take you to the page shown above. Here you can specify the signaling settings in more detail. Further, this page allows selection of the timeslots for signaling data and voice.

The **Non Automat** checkbox switches to non-automatic Terminal Endpoint Identifier (TEI) searching and enables the **TEI Address** text field that requires a TEI number (digit values from 0 to 63) for connection establishment between CO and E1/T1 client. In automatic mode, an E1/T1 connection will be established on the first available TEI, while in non-automatic mode a specific TEI may be reserved for the connection. In this case both call partners need to specify the same TEI in their settings.

In the **Network Mode** (PBX connected) you need to specify the same TEI address on both sides (Quadro and PBX), if the **Non Automat** mode is selected. If the **Automat** mode is selected the user on the PBX side may set any mode related to TEI assignment in the PBX configuration.

In the **User Mode** (CO/PSTN connected) the TEI assignment depends on the CO/PSTN settings. So you have to enter the values you've got from your PSTN provider.

The **Alternative Disconnection Mode** checkbox should not be selected, if Quadro ought to disconnect the call as soon as disconnect message has been received from the peer, otherwise, when checkbox is selected, Quadro's user may hear a busy tone when peer has been disconnected.

In the **ISDN L2 Timers** area the **Excessive Ack. Delay T200** text field configures the period in milliseconds (digit values from 500 to 9999) between transmitted signaling packet and its acknowledgement received. The **Idle Timer T203** text field configures the period in milliseconds (digit values from 1000 to 99999) for E1/T1 client idle timeout. The Service Provider provides these settings.

In the **ISDN L3 Timers** area, the **T302 Timer** text field requires the value for the T302 timer in milliseconds (digit values from 0 to 15000) and indicates the time frame system is waiting for a digit to be dialed and when timer expires, it initiates the call. The timer is not applicable for DMS-100 switch types. The **T309 Timer** text field requires the value for the T309 timer in milliseconds (digit values from 0 to 90000) responsible for call steadiness during link disconnection within the period equal to this timer value. If the value in this field is 0, the T309 timer will be disabled. The **T310 Timer** text field requires the value for the T310 timer in milliseconds (digit values from 1000 to 120000) responsible for the outgoing call steadiness when CALL PROCEEDING is already received from the destination but call confirmation (ALERT, CONNECT, DISC or PROGRESS) is not yet arrived. The **No Answer Disconnect Timer** text field is only available in Network mode and requires the value for the No Answer Disconnect Timer (digit values from 0 to 200000). This timer is used in certain types of PBXs. The value 0 indicates that the timer is disabled. When time expires, Quadro will play a busy tone towards the PBX if the call has been disconnected by the peer.

The **D Channel Timeslot For Transmit/Receive** drop down list in offers all available timeslots to be selected for signaling data transmit/receive.

The link **B Channels** leads to the **Signaling Type CCS - B Channel Settings** page (see below) where available timeslots may be enabled or disabled for the voice transfer. The **Force Update** option can be optionally used to apply new settings immediately. This will force the timeslot(s) to be restarted and any active connection on the selected timeslot(s) will be interrupted. The **Restart** option can be used to bring timeslot(s) to the initial idle state on the both sides. Note, that when applying one of these options, any active traffic on the timeslot(s) will be terminated. **Edit** will display another page, where the signaling settings for the selected timeslots may be specified in detail.

Bearer Establishment Procedure allows you to select the session initiation method on the B channels. One of the following possibilities of the transmission path completion prior to receipt of a call acceptance indication can be selected:

- on channel negotiation at the destination interface;
- on progress indication with in-band information;
- on call acceptance.

Called Party Type of Number and **Calling Party Type of Number** fields indicate correspondingly the type of the called party's and of the calling party's number.

Called Party Numbering Plan and **Calling Party Numbering Plan** drop down lists indicates correspondingly the numbering plan of the called party's and calling party's number.

The **Route Incoming Call** to drop down list contains Attendant, routing agent with two kinds of call routing possibilities, and all extensions of Quadro and allows selecting the destination where incoming calls will be routed to. Choosing **Routing** will request the caller to pass the authentication (if enabled) and will invite him to dial the destination number to connect the user within the Quadro Network. Choosing **Routing with inbound destination number** will request the authentication (if enabled) and then will automatically use the initially dialed number to connect the destination without any additional dialing.

Attention: When Quadro acts in the Network mode with the Attendant as a destination to route the incoming calls to, digit forwarding should be disabled on the private PBX side otherwise incoming digits may be mistaken as a special calling codes on the Quadro's Attendant.

The value for **Switch Type** depends on the CO when acting in the User mode and the private PBX capabilities when acting in the Network mode.

Attention: A timeslot can be used either for voice or signaling data transfer. The configuration prevents the selection of a timeslot from the B channel list if it has already been selected from the **D Channel receive/transmit** drop down list.

Incoming Called Digits Size indicates the number of received digits (in a range from 0 to 255) required to establish a call. When field has 0 value, the system uses either the timeout defined in the T302 field or the **Sending Complete Information Element** messages to establish a call. Independent from the value in this field, **Sending Complete Information Element** and pound sign always cause call establishment.

The **Generate Progress tone on IP** checkbox selection will generate the progress tone to IP (H.323 or SIP).

Select the **Generate Progress Tone to PSTN/PBX** checkbox to make Quadro generate ring tones to incoming callers during E1/T1 call dialing. This feature is mainly applicable to 2-stage dialing mode.

Selecting the **Enable CLIR Service** checkbox enables the Calling Line Identification Restriction (CLIR) service which displays the incoming caller ID only if Presentation Indication is allowed on the remote side. Otherwise, if the CLIR service is disabled, the caller ID will be unconditionally displayed.

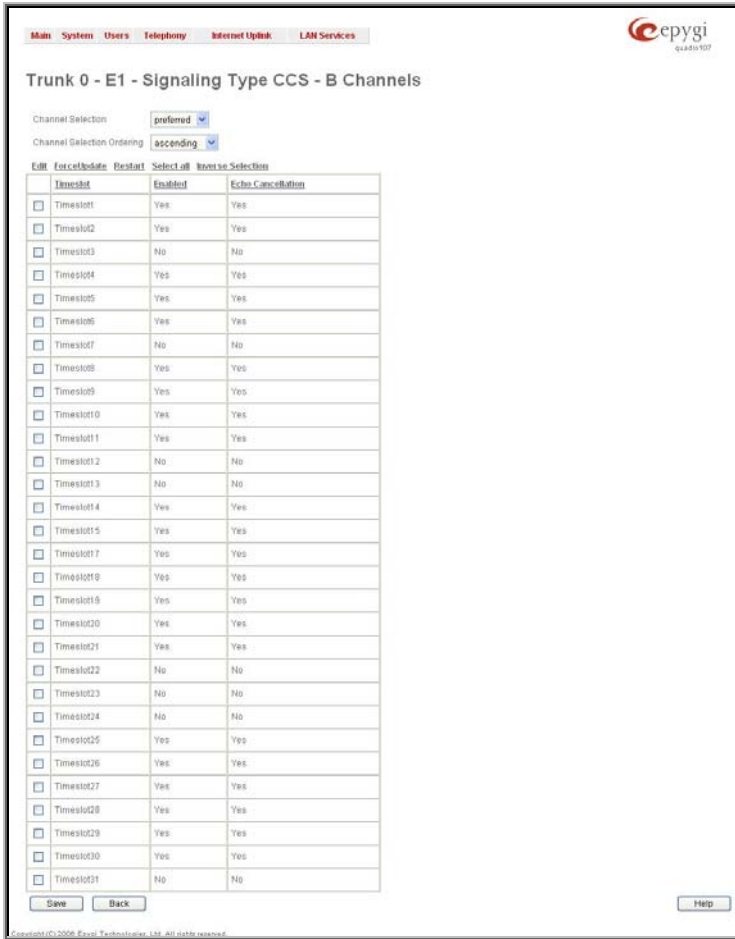


Fig. I-25: Trunk T1 Signaling Type CCS - B-Channels page

Channel Selection drop down list is used to select between the **Preferred** and **Exclusive** B channel selection methods. For **Preferred** channel selection, the CO answers to the call request by the first available timeslot, while for **Exclusive** channel selection CO should feedback only by the timeslot used for the call request.

Channel Selection Ordering drop down list is used to choose the B channels selection (Ascending or Descending). When **Ascending** selection is configured, B channels will be defined starting from B1 to B23/B30. For **Descending** selection, B channels will be defined from B23/30 to B1. If your CO/PBX has **Ascending** B channels selection configured, it is recommended to use **Descending** B channels selection and vice versa.

Please Note: A timeslot can be used either for voice or data transfer. The system prevents selecting a timeslot from the B channel list if it has already been selected from the D Channel receive/transmit drop down list.

Edit will display the first page of the CAS signaling Wizard page (see below) where the signaling settings for the selected timeslots may be enabled or disabled and the **Force Update Timeslot** service may be enabled to apply new settings immediately. This will force the timeslot(s) to be restarted and any active connection on the selected timeslot(s) will be interrupted.



Fig. I-26: Trunk T1 Signaling Type CCS - B-Channels Edit page

Signaling Type CAS

Trunk0 - E1 - Signaling Type CAS

Incoming Interdigit Service

Incoming Digits Timeout: (0 - 20000 ms)

Signaling Standard:

[Edit](#) [Reset/Restore](#) [Enable](#) [Disable](#) [Select all](#) [Intruse Selection](#)

Timeslot	Enabled	Signaling Type	DTI Enabled	Allowed Call Type	Route Incoming Call to	Cut Through	Automatic Ringback Down	Country
<input type="checkbox"/> Timeslot 1	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 2	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 3	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 4	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 5	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 6	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 7	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 8	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 9	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 10	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 11	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 12	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 13	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 14	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 15	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 17	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 18	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 19	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 20	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 21	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 22	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 23	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 24	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 25	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 26	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 27	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 28	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 29	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 30	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia
<input type="checkbox"/> Timeslot 31	Yes	R2 Compelled with ANI	No	Both incoming and outgoing calls	00	No	No	Colombia

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Fig. I-27: Trunk T1 Signaling Type CAS page

If you selected **CAS** as your **Signaling Type** on the **Trunk Settings - Edit Entry** page, you will get the page shown above using the **Trunk** link.

The **Incoming Interdigit Service** link leads to the page where the dial plan for incoming E1/T1 calls from CO/PBX to the Quadro can be configured. The **Incoming Interdigit Service** is used to configure E1/T1 dial plan for the incoming calls from CO/PBX to the Quadro. This service allows you to speed up the call establishment procedure by detecting the prefix. The calls will be speed up by the timeout defined in the **Incoming Digits Timeout** text field (see below). Consult with your CO before making changes in the E1/T1 dial plan.

In the **Incoming Digits Timeout** text field the time period may be specified, during which incoming digits from the destination party calling Quadro will be collected before being applied as an incoming called number. Values between 0 and 20000 (in milliseconds) are required.

The **Signaling Standard** drop down list is available only in E1 mode and allows selecting the connection signaling standard (ITU, ITU_T_2 or MELCAS).

In the table below, the page lists all timeslots. To configure the timeslots, select one or more records from the table and press **Edit** functional button. This will open **CAS Signaling Wizard** where timeslot settings might be configured.

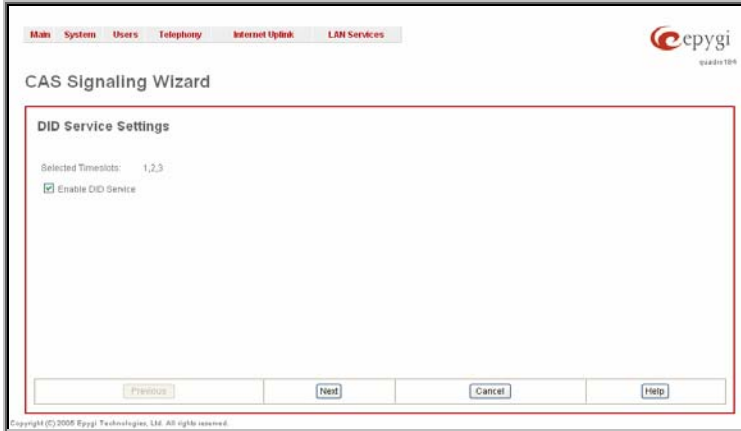


Fig. I-28: CAS Signaling Wizard - page 1

From the first page of the CAS Signaling Wizard, **DID (Direct Inward Dialing) Service** might be enabled on the timeslot(s).

In **User** mode, the Quadro cannot route incoming calls from the E1/T1 trunk to extensions if the timeslot in the trunk does not have DID service enabled. Incoming call routing takes place according to the received caller ID. If the DID service is enabled on some timeslot(s), an incoming call on these timeslots may be routed to the specified extension, the Attendant, or the routing client (depending on the configuration).

Please Note: The timeslot with DID service enabled cannot be used for outgoing calls.

In **Network** mode DID service does not limit the Quadro functionality but a timeslot with enabled DID service cannot be used for incoming calls.

Please Note: The CO/private PBX must support the DID service, if it is to be configured on the QuadroE1/T1.

Press **Next** to move to the second page of the **CAS Signaling Wizard**:

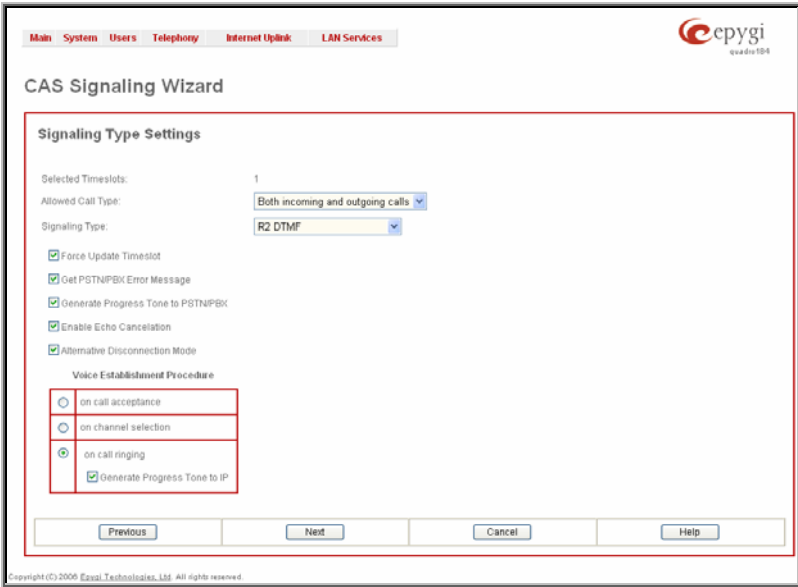


Fig. I-29: CAS Signaling Wizard - page 2

From this page, signaling type settings of the timeslot(s) might be configured:

Allowed Call Type is used to select the allowed call directions: incoming, outgoing or both.

Signaling Type allows selecting the CAS signaling type.

Please Note: R2 signaling (compelled and non-compelled) can only be used with an E1 interface in User mode. Independent on the selection in this drop down list, Quadro with the T1 interface in the CAS mode is unable to detect the busy tone on the destination side. For E1 interface in the CAS mode, busy tone will be detected only for R2 compelled and non-compelled (both with and without ANI) signaling types.

Force Update Timeslots checkbox can be optionally selected in order to apply new settings immediately. This will force the timeslot(s) to be restarted and any active connection on the selected timeslot(s) will be interrupted.

Please Note: Quadro does not support the **Forward Digit** selected on the CO when acting in the **User** mode with **CAS Loop Start** signaling type.

Get PSTN/PBX Error Message checkbox enables notification message in case of outgoing calls to unreachable, incorrect or non-existent destination.

When **Generate Progress Tone to PSTN/PBX** checkbox is selected, Quadro generates ring tones to incoming callers during E1/T1 call dialing. This feature is mainly applicable to 2-stage dialing mode.

Enable Echo Cancellation checkbox enables the echo cancellation mechanism on the selected timeslot(s).

When **Alternative Disconnection Mode** checkbox is selected, the Quadro will play a busy tone towards the PBX/CO if the call has been failed. After 60 second timeout, the Quadro will disconnect the call from PBX/CO and will stop playing the busy tone.

Voice Establishment Procedure manipulation radio buttons group is used to select a method of voice establishment on the trunk:

- **On call acceptance** – with this selection, voice will be established after call is being accepted.
- **On channel selection** - with this selection, call will be accepted during channel selection. This selection is not allowed for R2 signaling.
- **On call ringing** - with this selection, voice will be established after call is being ringing. Selection enables **Generate Progress Tone** checkbox which is used to enable the progress tone generation upon voice establishment.

Press **Next** to move to the third page of the **CAS Signaling Wizard**:

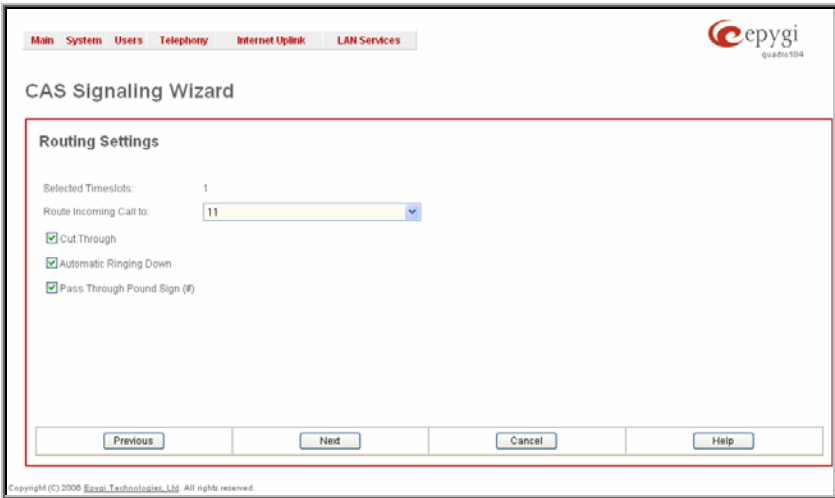


Fig. I-30: CAS Signaling Wizard - page 3

From this page, the destination for incoming calls to be routed to can be selected and other routing settings might be configured.

Route Incoming Call to drop down appears when **Both incoming and outgoing calls** or **Incoming calls only** is selected from the **Allowed Call Type** list and allows selecting the destination where incoming calls should be routed. The list contains all extensions of the Quadro, Attendant and Routing agent. The routing agent gives two kinds of call routing possibilities in user mode and one in network mode. Choosing the **Routing** selection (available in User mode only) will request the caller to pass the authentication (if enabled) and will invite the caller to dial the destination number to connect the user within the Quadro Network. Choosing the **Routing with inbound destination number** selection will automatically use the initially dialed number to connect the destination without any additional dialing.

When **DID service** is enabled (in User mode only), incoming calls can be only routed to the Routing agent with simple **Routing** and **Routing with inbound destination number** call routing possibilities.

Attention: When Quadro acts in the Network mode with the Attendant as a destination to route the incoming calls, digit forwarding should be disabled on the PBX side. Otherwise, incoming digits may be mistaken as special calling codes on the Quadro's Attendant.

Cut Through checkbox is available when signaling selected from the **Signaling Type** drop down list on the **CAS Signaling Wizard – Page 2** is different from R2 (all types) and is used to reconnect the call (terminated by some reason, e.g. user error, network problems, etc.) by going on-hook and off-hook again even if the call partner is off-hook and not involved in the call.

Automat Ringing Down checkbox is available when signaling selected from the **Signaling Type** drop down list on the **CAS Signaling Wizard – Page 2** is different from R2 (all types) and allows an E1/T1 device connected to the Quadro to establish a hot-line call (automatic call without any digits dialed).

Pass Through Pound Sign (#) checkbox is only available when signaling selected from the **Signaling Type** drop down list on the **CAS Signaling Wizard – Page 2** is different from E&M FGD or R2 (except for R2-DTMF). When this checkbox is selected, the pound sign (#) detected in the dialed number will be passed through and will be considered as a part of the dialed number. When this checkbox is not selected, the detected pound sign (#) will be considered as a call acceleration digit.

Press **Next** to move to the forth page of the **CAS Signaling Wizard**:

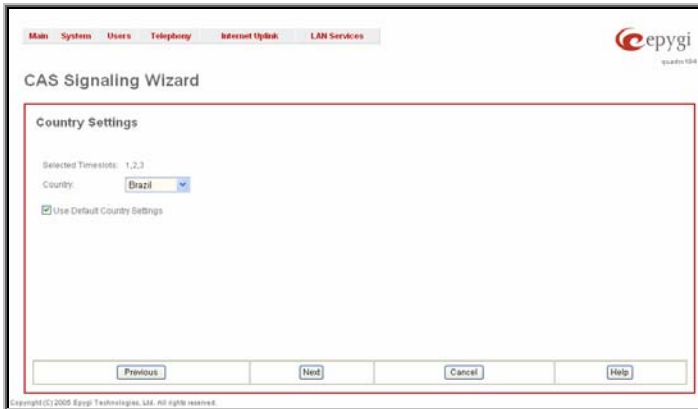


Fig. I-31: CAS Signaling Wizard - page 4

This page only appears in E1 User mode when signaling selected from **Signaling Type** drop down list on the **CAS Signaling Wizard – Page 2** is R2 (all types) and is used to configure country settings.

Country drop down list is used to set the location where Quadro is located to support the correct functionality of R2 signaling. For countries absent in this list, use **ITU** selection.

Use Default Country Settings checkbox restores default advanced settings for the selected country. When this checkbox is not selected, next page will provide a possibility to manually configure advanced country settings.

Press **Next** to move to the fifth page of the **CAS Signaling Wizard**:

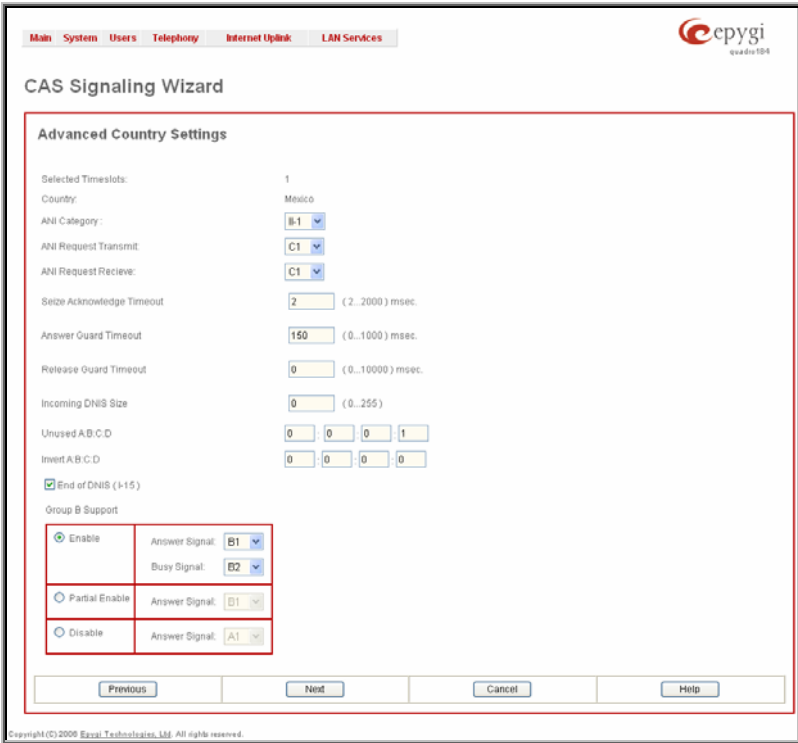


Fig. I-32: CAS Signaling Wizard - page 5

This page only appears when **Use Default Country Settings** checkbox is not selected on the previous page and is used to configure advanced country settings.

ANI Category drop down list appears only when **R2** signaling selected from **Signaling Type** drop down list on the **CAS Signaling Wizard – Page 2** is different from **R2 DTMF** and is used to select the calling party priority depending on the call originator's location specifics.

ANI Request Transmit and **ANI Request Receive** drop down lists allow to select the Caller ID request R2 tones for transmit and receive.

Seize Acknowledge Timeout text field is used to define a timeout (in a range from 2 to 2000 milliseconds) between incoming seize signal and the corresponding feedback.

Answer Guard Timeout text field is used to define a wait timeout (in a range from 0 to 1000 milliseconds) Group-B Answer Signal and Line Answer.

Release Guard Timeout text field is used to define an idle timeout (in a range from 0 to 10000 milliseconds) between the disconnect signal receipt and call disconnection.

Dialing Delay Timeout text field is used to define a timeout (in a range from 0 to 2000 milliseconds) before injecting dialed digits. Timeout specially refers to R2 DTMF signaling.

Incoming DNIS Size text field indicates the number of received digits (in a range from 0 to 255) required to establish a call. When the field has 0 value, the system uses either timeout defined in the **Incoming digits timeout** field or the **End of Address** messages to establish a call. Independent on the value in this field, the message **End of Address** always causes the call establishment.

Unused A:B:C:D text fields require to configure unused C and D bits of E1/T1 CAS signaling (A and B bits are predefined). Fields may have either 0 or 1 values.

Invert A:B:C:D text fields are used to invert the ABCD status bits in time-slot 16 before TX and after RX. If bit is set to 1, the router inverts it before transmission and after the receipt.

End of DNIS (I-15) checkbox is used to enable End of DNIS service.

Collect Call checkbox is only available when **Brazil** is selected in the **Country** drop down list on the previous page of the wizard and when the PBX attached to the Quadro supports this feature. When this checkbox is selected and in case of incoming calls, always the called destination will pay for the call. Option is particularly applicable when calling from the mobile phone. Checkbox should be selected when the appropriate feature is enabled on the PBX.

Group B Support manipulation radio button group is present only when **R2** signaling selected from **Signaling Type** drop down list on the previous page is different from **R2 DTMF** and is used to enable/disable the **Group B Support**. The **Group B Support** manipulation radio button group offers following selection:

- **Enable** – selection enables **Group B Support** (both answer and busy recognitions are performed) and requires defining **Answer Signal** and **Busy Signal** parameters.
- **Partial Enable** – selection partially enables **Group B Support** (only answer recognition is performed) and requires defining the **Answer Signal** parameter.
- **Disable** – selection disables **Group B Support** and requires defining the **Answer Signal** parameter.

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, SIP, H.323, PSTN or IP-PSTN).

The possibilities Call Routing offers are numerous. The following configuration just a single example used to explain setup of the QuadroE1/T1 as a gateway:

In this example, the QuadroE1/T1 is connected within a protected Private Data Network built of two other Quadro devices (-2x and -4x) where 6 extensions are connected. Each extension will be configured such that they all shall reach each other and the PSTN. The extensions also shall be reached by calls from the PSTN.

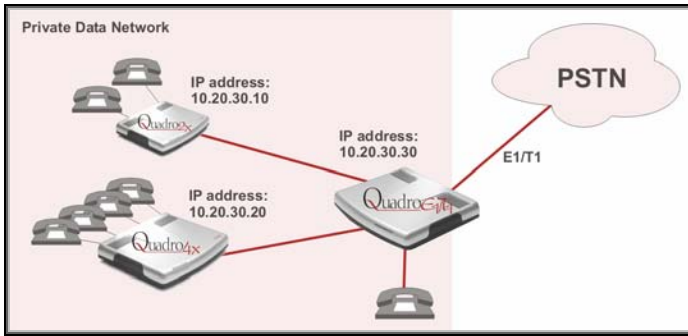


Fig. I-33: Call Routing example

Your PSTN Service Provider supplies you with a set of PSTN telephone numbers for your E1/T1 line. If you want to assign these numbers to the phones connected to the Quadro2x and Quadro4x within your Private Data Network, you have to create a dial plan to define **Call Routing paths** on the QuadroE1/T1 and on each of the other Quadro devices.

To illustrate the dial plan with an example, we will assume, you have the phone number set 854603-30 to 854603-59 and you assigned the numbers as follows:

Quadro 2x (IP: 10.20.30.10)		Quadro4x (IP: 10.20.30.20)		QuadroE1/T1 (IP: 10.20.30.30)	
Auto Attendant	854603-30	Auto Attendant	854603-40	Extension 1	854603-50
Extension 1	854603-31	Extension 1	854603-41	Auto Attendant: All numbers of the numbers set, that are not assigned to an extension are caught here	
Extension 2	854603-32	Extension 2	854603-42		
		Extension 3	854603-43		
		Extension 4	854603-44		

All unassigned numbers of the phone number set will lead to the Auto Attendant of QuadroE1/T where a message may inform the callers that the dialed number does not exist.

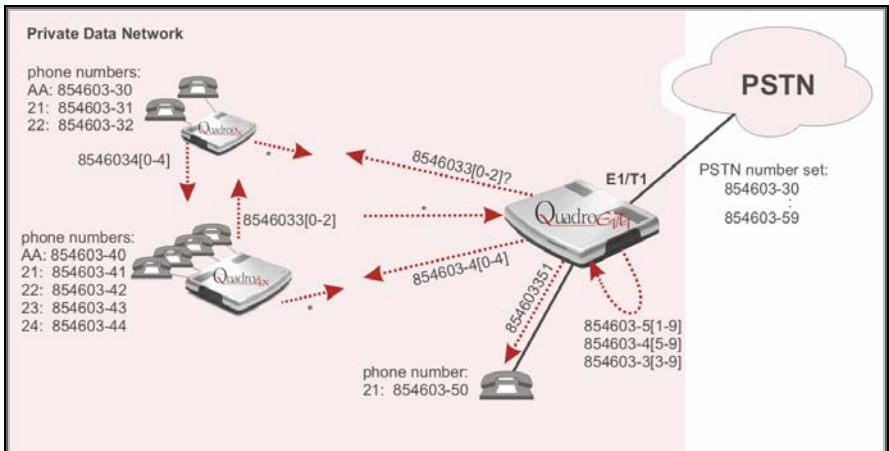
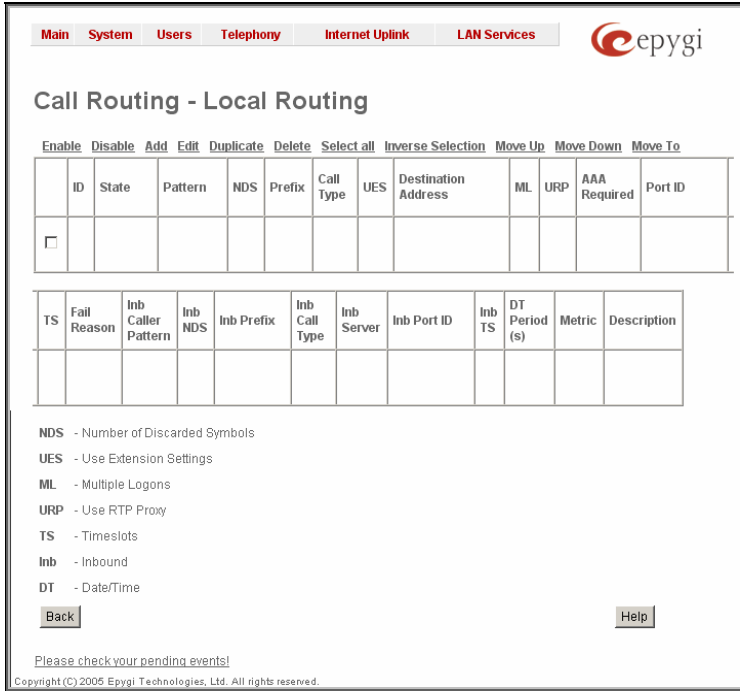



Fig. I-34: Call Routing example; dialing plan

To define the call routing paths needed on QuadroE1/T1 open **Call Routing** in the **Telephony** menu and select **Local Routing Table**. The **Call Routing - Local Routing** page will be displayed (it is a wide table, thus it is shown here in two parts):



Main System Users Telephony Internet Uplink LAN Services 

Call Routing - Local Routing

[Enable](#) [Disable](#) [Add](#) [Edit](#) [Duplicate](#) [Delete](#) [Select all](#) [Inverse Selection](#) [Move Up](#) [Move Down](#) [Move To](#)

	ID	State	Pattern	NDS	Prefix	Call Type	UES	Destination Address	ML	URP	AAA Required	Port ID
<input type="checkbox"/>												

TS	Fail Reason	Inb Caller Pattern	Inb NDS	Inb Prefix	Inb Call Type	Inb Server	Inb Port ID	Inb TS	DT Period (s)	Metric	Description

NDS - Number of Discarded Symbols
UES - Use Extension Settings
ML - Multiple Logons
URP - Use RTP Proxy
TS - Timeslots
Inb - Inbound
DT - Date/Time

[Back](#) [Help](#)

[Please check your pending events!](#)

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Fig. I-35: Call Routing - Local Routing page

Before you can start defining the local call routing paths, you have to select **Add** to define the first call routing path that leads the incoming PSTN calls 854603-30, -31 and -32 to the Quadro2x.

The screenshot shows the 'Local Call Routing Wizard' interface. At the top, there are navigation tabs: Main, System, Users, Telephony, Internet UpLink, and LAN Services. The 'Telephony' tab is active. The main title is 'Local Call Routing Wizard'. Below it is a red-bordered box titled 'Routing Call Type - Add Entry'. Inside this box, there are several input fields and options:

- Pattern:** A text box containing '8546033[0-2]' with a note '(wildcard supported)' to its right.
- Number of Discarded Symbols:** An empty text box.
- Prefix:** An empty text box.
- Suffix:** An empty text box.
- Call Type:** A dropdown menu with 'SIP' selected.
- Metric:** A text box containing '10'.
- Description:** A text box containing 'path to Quadro2x'.
- Filter on Caller / Call Type / Modify Caller ID
- Set Date/Time Period(s)

At the bottom of the red-bordered box are four buttons: 'Previous', 'Next', 'Cancel', and 'Help'. Below the box, there is a small note: 'Please check your pending events!' and a copyright notice: 'Copyright (C) 2009 River Technologies, Ltd. All rights reserved.'

Fig. I-36: Local Call Routing Wizard: Routing Call Type Add Entry page 1

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.
- '[', ']', ',' and '-' are used to define a range or a quantity of numbers, e.g. 8546033[0-2] means that the dialed number may be 8546033-0, -1 or -2 to match the specified pattern; for 2[3,7], the dialed number may be 23 or 27 to match the specified pattern.

Number of Discarded Symbols (NDS) specifies the number of digits 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, H.323, IP-PSTN or E1/T1). 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 you 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.

Please Note: This checkbox selection, as well as any Inbound Caller information inserted, won't be considered and will make the current routing pattern invalid, if the E1/T1 Settings are switched to CAS mode, Loop Start, Group Start, E&M, R2 DTMF or R2 Compelled/Non Compelled (without ANI) signaling types.

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**:

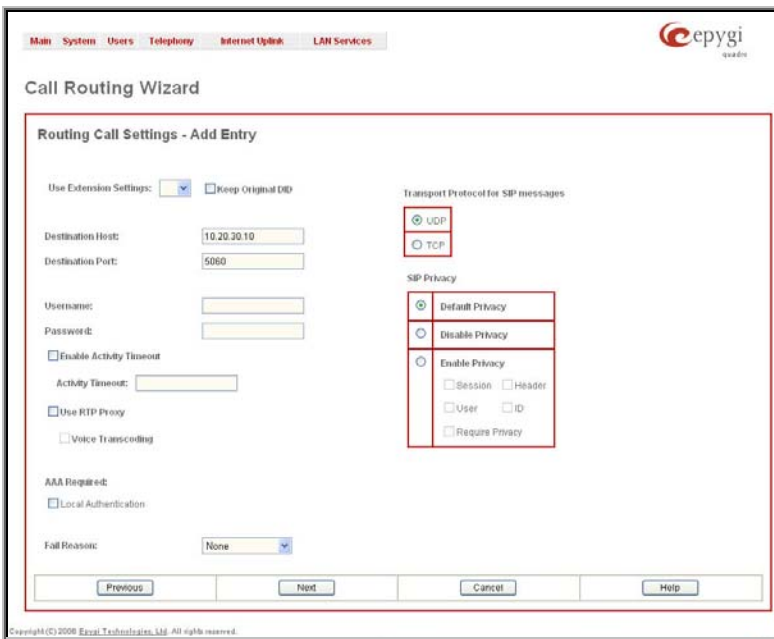


Fig. I-37: Local Call Routing Wizard: Routing Call Settings - Add Entry page 2

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 Host and **Destination Port** require the host name or the IP address and 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.

Enable Activity Timeout checkbox is used to limit time-to-live period of routing pattern (makes sense if accept or failure feedback arrives too late from the destination). Checkbox selection enables the **Activity Timeout** text field which is used to insert a routing pattern activity timeout (in the range from 1 to 180 seconds). When timeout is configured, the routing pattern will be active within the defined time frame and if no response has been received from the destination during that period, the pattern will be stopped and next routing rule might be optionally considered (depending on the **Fail Reason** configuration on the corresponding pattern).

Use RTP Proxy checkbox is available for SIP, H323 and IP-PSTN call types and is applicable only when route is used for calls through Quadro between peers both located outside the Quadro. When this checkbox is selected, RTP streams between external users will be routed through Quadro, otherwise, when checkbox is not selected, RTP packets will be moving directly between peers.

Voice Transcoding checkbox is available for **SIP, H323** and **IP-PSTN** call types and is meaningful when an extension is selected from the **Use Extension Settings** drop down list. Checkbox selection results the voice transcoding when performing IP calls through Quadro. Independent on the codecs supported by the caller, Quadro will use the codecs of the extension selected from the **Use Extension Settings** drop down list to establish a call with the Destination. If the Destination supports either of the codecs configured for the used extension, the call between the caller and the Destination will be established by the first preferred codec of the Destination. If the Destination does not support either of the codecs configured for the used extension, the call will be disconnected.

AAA Required selection is 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.

If the authentication is configured based on the caller's address, callers will pass the authentication automatically; otherwise they will be required to identify themselves by a username and a password.

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 or TCP) 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.

If the **Set Date/Time Period(s)** checkbox has been checked on the first page of the Local Call Routing Wizard, the following page is displayed to specify one or more time periods during which the path shall be valid:



Fig. I-38: Call Routing Wizard: Date/Time Rules - Add Entry page

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.

All the other paths have to be specified accordingly on Quadro E1/T1 and the other involved Quadro devices:

QuadroE1/T1

Pattern	NDS	Prefix	Call Type	Destination Address	Description
8546033[0-2]			SIP	10.20.30.10	path to Quadro2x
8546034[0-4]			SIP	10.20.30.20	path to Quadro4x
85460350			PBX		path to phone connected to QuadroE1/T1
8546033[3-9]	8	00	PBX		path to AA for not used numbers -3
8546034[5-9]	8	00	PBX		path to AA for not used numbers -4
8546035[1-9]	8	00	PBX		path to AA for not used numbers -5
*			E1/T1		path for all outgoing calls to PSTN

Quadro2x

Pattern	Call Type	Destination Address	Description
89546034[0-4]	SIP	10.20.30.20	path to Quadro4x
*	SIP	10.20.30.30	path for all outgoing calls via QuadroE1/T1 to PSTN

Quadro4x

Pattern	Call Type	Destination Address	Description
89546033[0-2]	SIP	10.20.30.10	path to Quadro2x
*	SIP	10.20.30.30	path for all outgoing calls via QuadroE1/T1 to PSTN

Registering on Epygi's Technical Support

It is recommended that you register your QuadroE1/T1 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 QuadroE1/T1, which you will find on QuadroE1/T1'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 QuadroE1/T1 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 username/password to access Epygi's online Support and the Epygi SIP Server.

The registration form is titled "Registration form" and includes a "* Required Information" indicator in the top right corner. It is divided into four main sections, each with a red header line and a question mark icon:

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

At the bottom right of the form are "SUBMIT" and "CANCEL" buttons.

Fig. I-39: Registration form

Appendix: PC DHCP Settings

The QuadroE1/T1 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 QuadroE1/T1 must meet the following conditions:

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

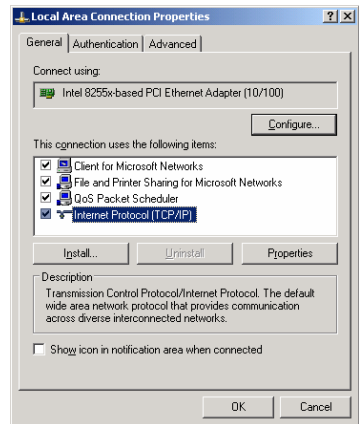
Please Note: If your PC is already configured for DHCP, then simply power it on. Verify the LAN LED is lit. If not, check the cable connections.

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

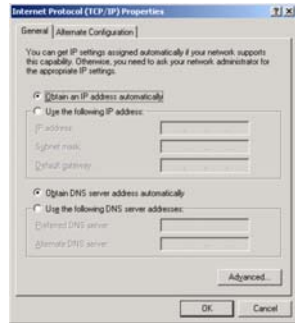
TCP/IP and DHCP under Windows 2000/Windows XP

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:

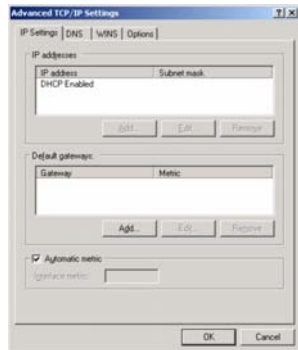
1. Click the **Start** button. Choose **Settings**, then **Control Panel**.
2. Double-click on the **Network Connection** icon to open the corresponding window. Select **Local Area Connection** with the right mouse button and select **Properties**.
3. Highlight **Internet Protocol (TCP/IP)** and click on **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 on **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 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**.

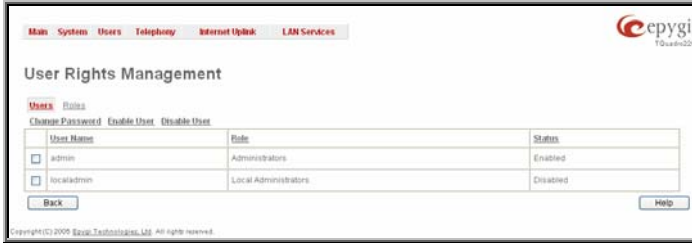


Fig. I-40: User Right Management page

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-41: 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. Leave **Store password in persistent area (Factory reset save)** disabled.

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 QuadroE1/T1 initiates and receives SIP calls from the network connected to the WAN port). In order to receive SIP calls, the QuadroE1/T1 must be able to receive packets from the SIP server or any other device that is trying to make an incoming call. If the QuadroE1/T1 is placed behind a router with NAT, like most basic routers on the market today, the QuadroE1/T1 will not be able to receive calls. To resolve this issue, either STUN must be enabled on the QuadroE1/T1 or SIP NAT traversal must be set up in the router and in the QuadroE1/T1 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 QuadroE1/T1 and the Internet, the same port forwarding setup must be configured on each router.

SIP NAT Traversal Setup

- Install the QuadroE1/T1 behind the router. If the QuadroE1/T1 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 QuadroE1/T1 in DHCP mode. Power up the QuadroE1/T1.
- Connect a PC or laptop to the QuadroE1/T1 LAN port and power it up.
- Verify the QuadroE1/T1 can connect to the Internet by opening a browser window and browsing to a familiar WEB site. If the QuadroE1/T1 can not reach the Internet, verify the LAN/WAN LEDs and the cabling. Verify the QuadroE1/T1 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 QuadroE1/T1. The router should forward that UDP (USP/TCP for SIP) ports to the IP address assigned to the QuadroE1/T1. You can see the IP address of the QuadroE1/T1 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 QuadroE1/T1.
- 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 **QuadroE1/T1 Management** menu go to the **SIP Settings** menu and check **Use Manual NAT Traversal for SIP**. For **NAT station IP**, enter the public Internet IP address found on the step above and the port numbers for SIP and RTP/RTCP. The default values are:
 - For Mapped Port for SIP 5060
 - For Min mapped RTP/RTCP port 6000

- For Max mapped RTP/RTCP port 6059
- Click the **Save** button to save the contents.

The QuadroE1/T1 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 **QuadroE1/T1 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**.

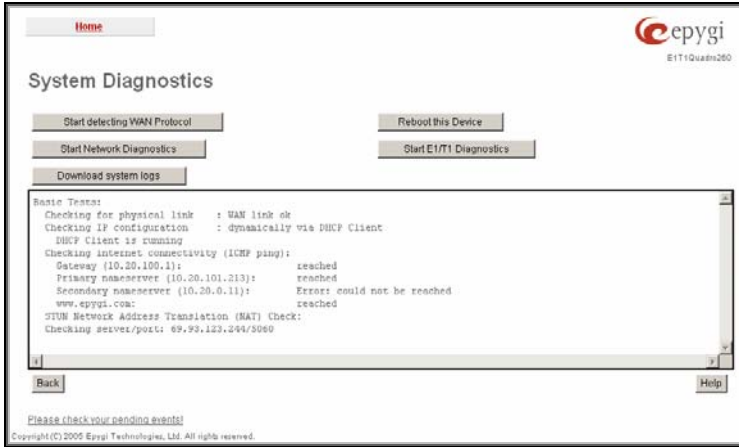


Fig. I-42: System Diagnostics page

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:

Appendix: Pin Assignment of E1/T1

Pin	Signal
1	RXRING
2	RXTIP
3	N.C.
4	TXRING
5	TXTIP
6	N.C.
7	N.C.
8	N.C.

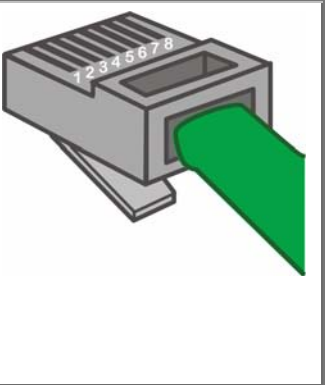
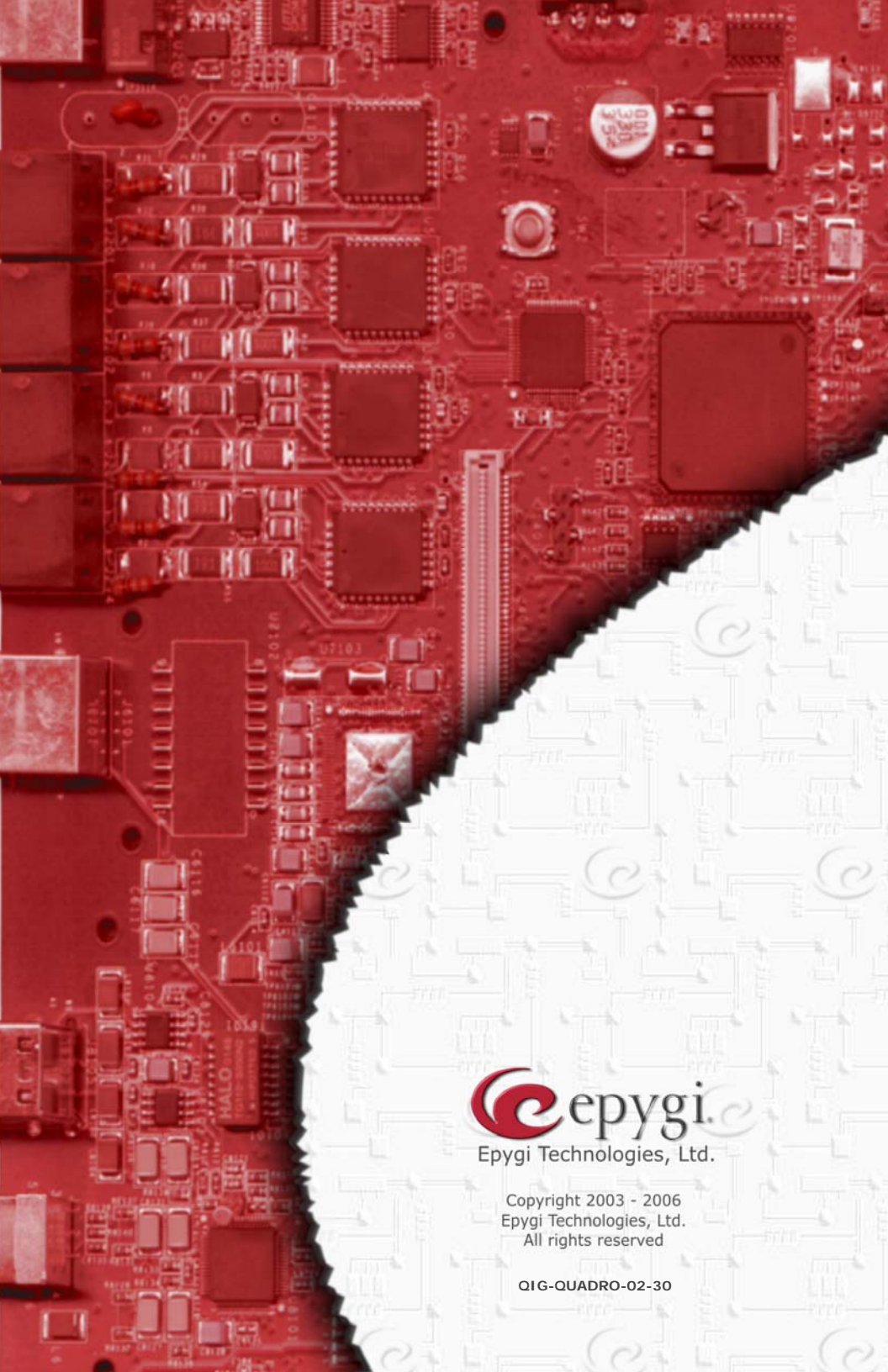


Fig. I-44: Pin Assignment of E1/T1



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QIG-QUADRO-02-30