Quadro E1/T1

The VoIP Gateway

epygi

Manual-I:
Installation Guide
for QuadroE1/T1, SW-Version 2.4.x

Limited Warranty

Epygi Technologies, Ltd. ('Epygi') warrants to the original end-user purchaser every QuadroE1/T1 to be free from physical defects in material and workmanship under normal use for a period of one (1) year from the date of purchase (proof of purchase required). If Epygi receives notice of such defects, Epygi will, at its discretion, either repair or replace products that prove to be defective.

This warranty shall not apply to defects caused by (i) failure to follow Epygi's installation, operation or maintenance instructions; (ii) external power sources such as a power line, telephone line, or connected equipment; (iii) Products that have been serviced or modified by a party other than Epygi or an authorized Epygi service center; (iv) Products that have had their original manufacturer's serial numbers altered, defaced, or deleted.

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Return Policy

If the product proves to be defective during this warranty period, contact the Epygi authorized reseller from whom you purchased the product to obtain a Return Material Authorization (RMA) Number. When returning a product, mark the Return Authorization Number clearly on the outside of the package and include your original proof of purchase. Return requests cannot be processed without proof of purchase. Customers are responsible for shipping and handling charges when shipping to Epygi.

Epygi or its service center will use commercially reasonable efforts to ship a replacement Product within ten (10) working days after receipt of the returned product. Actual delivery times may vary depending on Customer location.

Epygi reserves the right to revise or update its products, pricing, software, or documentation without obligation to notify any individual or entity. Please direct all inquiries to:

Epygi Technologies, Ltd., 5070 Addison Circle, Addison, Texas 75001

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FCC Statement (Part 15) Class B

QuadroE1/T12X and QuadroE1/T14X have been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential 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 tuning 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 on a circuit different to that which the receiver is connected
- 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.

FCC Statement (Part 15) Class A

QuadroE1/T1 and QuadroE1/T1 have 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 tuning 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 on a circuit different to that which the receiver is connected
- 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. On the back of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ###TXXXX, made out to HX7OT00BHX70100. If requested, this number must be provided to the telephone company.

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.

The Ringer Equivalence Number is an indication of the maximum number of devices allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirements that the sum of the RENs of all the devices does not exceed five. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming line. The REN for this product is part of the product identifier that has the format US:AAAEQ###TXXXX, made out to HX7OT00BHX70100. The digits represented by ### are the REN without a decimal point (in this case 00B is a REN of 0.0B).

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 an AC surge arrestor 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 are 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 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-I: Installation Guide

Manual-II: see Administrator's Guide

(Describes detailed the QuadroE1/T1 management menus and includes further all system default values at a glance)

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.

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 a RJ-45 connector to connect to the QuadroE1/T1 LAN port
- One PC with a 10Mbps or 10/100 Mbps 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.

Hardware Overview

QuadroE1/T1's Rear Panel
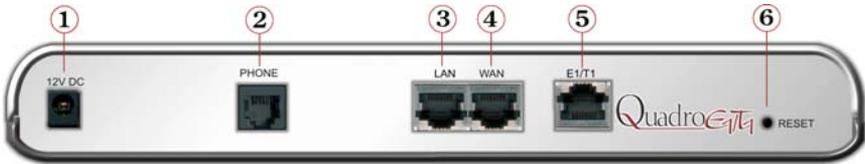
1 Power supply socket. **Use only the power adapter delivered with the QuadroE1/T1**.

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 admin password of 19

QuadroE1/T1's Front Panel LEDs
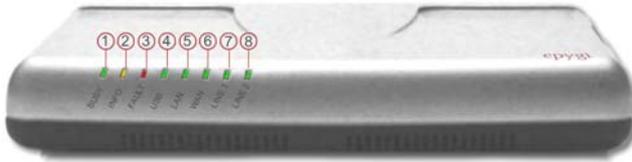
1	**BUSY** green (Status of the CPU)	**on:** device is booting **off**: No power **blinking**: activity
2	**INFO** yellow (System information)	**on**: device is booting **off**: no information **blinking**: event occurred that was specified in Event Mangement
3	**FAULT** red (System status)	**on** device is booting/ error **off**: no error **blinking**: system unusable
4	**SPARE** green	**off**: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 (not used)	**on:** no RED alarm indication **off**: RED alarm indication **flickering**: link is down

LEDs numbering on the Quadro is defined from left to right.

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 5 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 4 or 5 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.
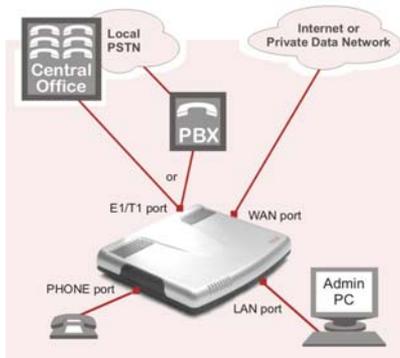
Every device within an IP network requires a unique IP address to identify itself. Since the QuadroE1/T1 connects to both the LAN (Admin PC) and the WAN (Private Data Network or Internet), it has to be part of both networks, and must have two IP addresses: one for the WAN side and one for the LAN side. 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/T2 can be configured with a static IP address on the WAN interface. You can also 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
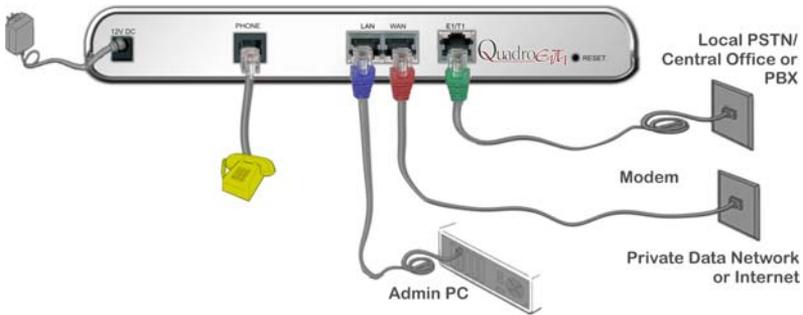
- Verify the product package contents are complete. Refer to the contents sheet included in the packaging to determine if all the items were shipped in the box.

- 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 A 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

Configuring the QuadroE1/T1 basically, three steps are needed:

> **Step1: Basic Configuration** using the Basic 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

Basic Configuration

The most important settings required 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** - to regulate the number of calls allowed by the QuadroE1/T1 to avoid degradation in low bandwidth conditions.

- **Time/Date** - to ensure the correct time and time zone is used for call records

- **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 settings, connect a PC to QuadroE1/T1's LAN port, log in and complete the **Simple Basic Configuration** as described in the following two 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)

The QuadroE1/T1 Web Management pages have three themes, each offering a different look-and-feel. The preferred theme may be selected on the login page. The **Plain** theme has a simple tree preview of QuadroE1/T1's management functions. The default **FastRed** theme displays all menu items statically, whereas the default theme **Dynamo** consists of pull down menus. The following screenshots are taken from a QuadroE1/T1 using the Dynamo theme.

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:

Run Basic Configuration Wizard

The basic configuration wizard is a user-friendly tool that allows the administrator to configure network services. It is strongly recommended that factory default settings are left unchanged if their meanings are not completely clear.

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

Getting Started

This first page of the 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 device. This is useful when many QuadroE1/T1'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.

Enter **WAN Interface Bandwidth** to ensure the quality of IP calls. If the 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 that the value specified for **Upstream Bandwidth**.

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

If **Ethernet** is the selected WAN Interface Protocol, clicking **Next** button shows the **WAN IP Configuration** page**.** If **PPPoE** is the selected WAN Interface Protocol**,** the next page will be **PPP Configuration.**

Please Note: If the IP address of the QuadroE1/T1 is changed, record the QuadroE1/T1 IP address and have it handy. You need it to re-access QuadroE1/T1 management.

WAN IP Configuration

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

- **Assign automatically via DHCP** - The parameters are set automatically by your DHCP server.
- **Assign Manually** requires the administrator to enter the external **IP Address**, the corresponding **Subnet Mask**, and the IP address of the **Standard Gateway**.

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

PPP Configuration

The **IP Address Assignment** field is used to specify the external IP address. As the QuadroE1/T1 requires a static WAN IP address, you will select Fixed IP Address in most cases.

In the case of using your PPPoE server that is configured to always deliver the same IP address, select Dynamic IP address

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**.**

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

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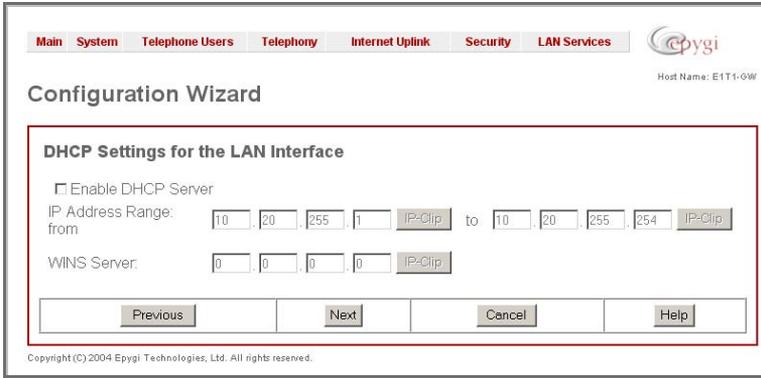
Click on **Next** to display the **DNS Settings** page.

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.
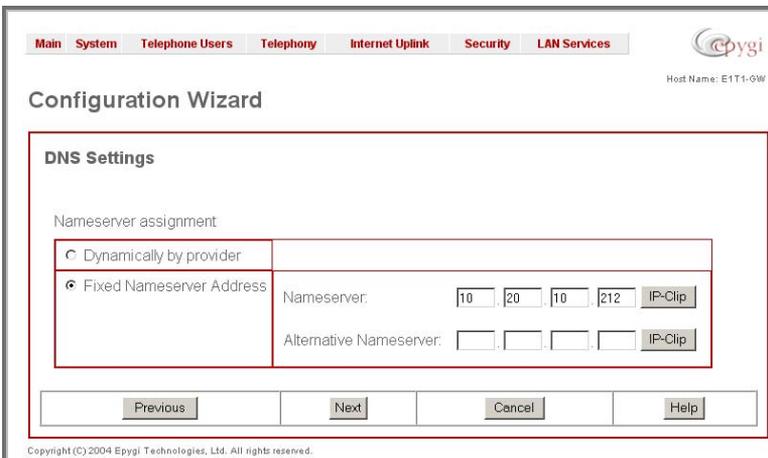
ISP Authentication Settings

This applies only if PPPoE is your **WAN Interface** protocol. Enter the authentication parameters provided by your Internet Service Provider (ISP). PAP is the most common authentication method. CHAP and MSCHAP are encrypted authentications.
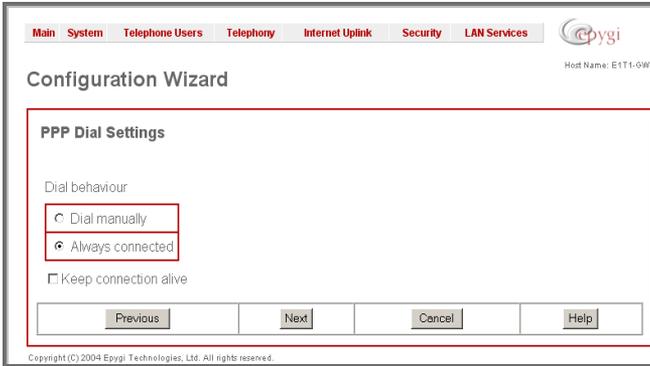
Please Note: Typically, the User name is your email account, and the password is a string of characters.
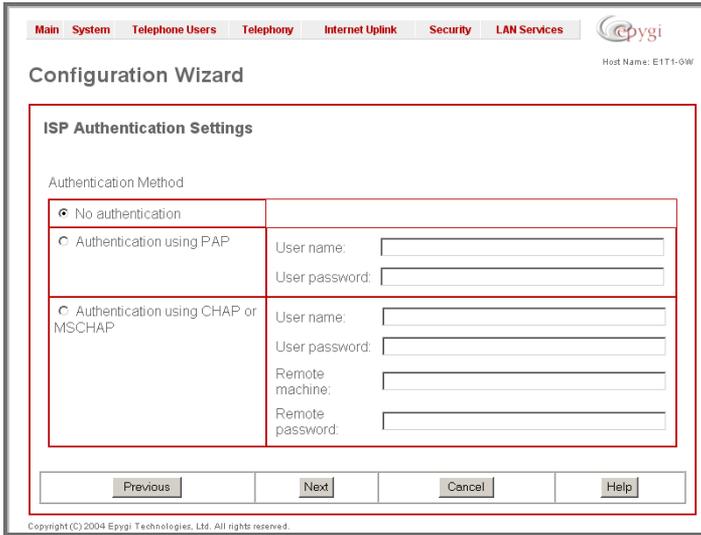
Click **Next** to show **PPP Dial Settings** page.

PPP Dial Settings

This section only applies if PPPoE is your **WAN Interface** protocol.

The default value is **Always connected**.

Dial Manually enables a button on the main **QuadroE1/T1 Management** page to open or close the Internet connection manually.

The **Keep connection alive** checkbox is used to create some traffic to the Internet. It is useful, if your ISP disconnects you when there is no traffic on the link.

Click **Next** to show the **Regional Settings** page.

Regional Settings

Proper configuration of Regional Settings is important to the functionality of the voice subsystem. 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 epygi.com.

Please Note: Registering on the Support section epygi.com is covered in Registering on Epygi's Technical Support.
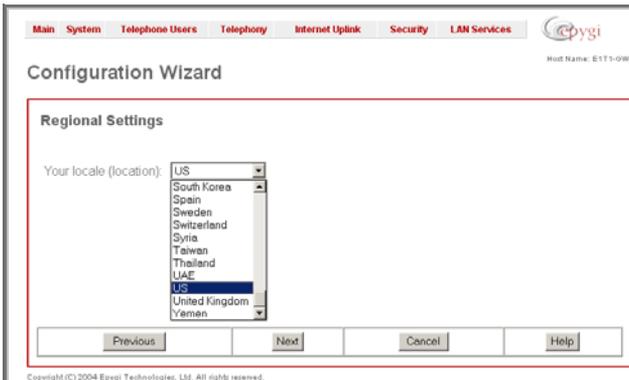
Click **Next** to show the **Time/Date Settings** page.

Time/Date Settings

The QuadroE1/T1 can correct its time settings 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 Basic Configuration Wizard

Click the **Finish** button to complete the Basic Configuration Wizard. The QuadroE1/T1 will then stop internal functions and apply the changes made in the Wizard. After this is complete, the QuadroE1/T1 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 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, you continue to the second step of the configuration of QuadroE1/T1 and specify the E1IT1 Settings.

Configuring the Firewall

Configuration of the firewall is only required when management of the Quadro will take place 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.

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:
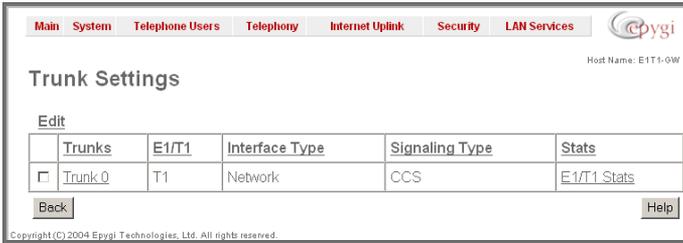
The **Trunk Settings** page is used to configure the E1/T1 trunk and timeslots settings. The table lists the available E1/T1 trunks of Quadro and their settings (Trunk name, E1/T1 mode, interface and signaling type). Clicking on the trunk will open its **Signaling Settings** page (Trunk CAS Signaling 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
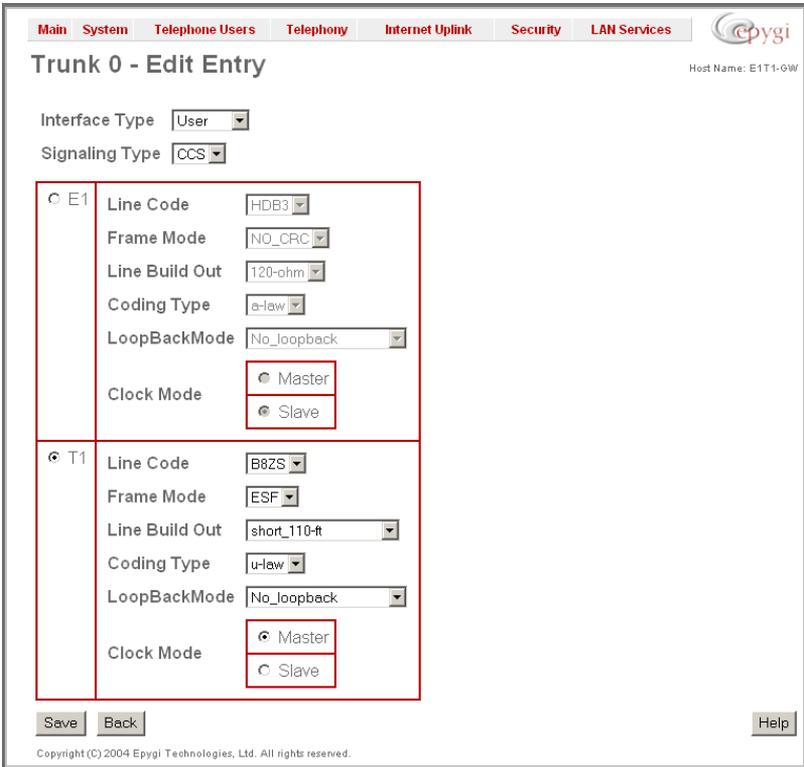
Select **Network** as your **Interface Type** if your QuadroE1/T1 is connected to a PBX, otherwise choose **User.**

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 use of 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 32 (if CAS is used) or 30 (if CSS is used) timeslots 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

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

The **Non Automat** checkbox switches to non-automatic channel searching and enables the **TEI Address** requires the TEI number (digit values from 0 to 63) for connection establishment between the CO/PSTN and the E1/T1 client.

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.

Excessive Ack. Delay T200 and requires the period in milliseconds (digit values from 500 to 9999) between two status checks. **Idle Timer T203** requires the period in milliseconds (digit values from 1000 to 99999) for the E1/T1 client idle timeout. These settings are both provided by the CO.

Route Incoming call to offers **Attendant**, **Routing**, **Routing with inbound destination number** and **21** (Quadro's FXS extension) to be selected.

Routing 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.

Routing with inbound destination number will automatically use the initially dialed number to connect to the destination without any additional dialing.

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.

The link **B Channels** leads to the **Signaling Type CCS - B Channel Settings** page (see below) where available timeslots may be enabled/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. Edit will display another page, where the signaling settings for the selected timeslots may be specified in detail.

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.

Edit will display another page (see below) where the signaling settings for the selected time-slots 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.

Signaling Type CAS

If you selected **CCS** as your **Signaling Type** on the **Trunk Settings - Edit Entry** page, you will get the page shown above using the **Trunk** link. The page lists all timeslots and allows editing of the signaling settings for each single timeslot:

Here you may **Enable** the timeslot by checkbox and select whether the **DID Service** (Direct Inward Dialing) shall be **disabled** or **enabled**.

In **User mode** QuadroE1/T1 needs no to have DID service enabled. Only when you want to connect all timeslots with the auto attendant does disabling the DID service may make sense.

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.

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 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.
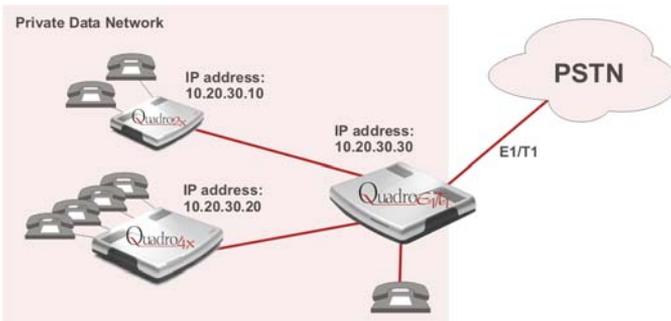
Your PSTN Service Provider supplies you with a set of PSTN telephone numbers for your E1/T1 line. If you want to assign these numbers to the phones connected to the Quadro2x and Quadro4x within your Private Data Network, you have to create a dial plan to define **Call Routing paths** on the QuadroE1/T1 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:	
Extension 2	854603-32	Extension 2	854603-42	All numbers of the numbers set, that are not assigned to an extension are caught here	
		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.
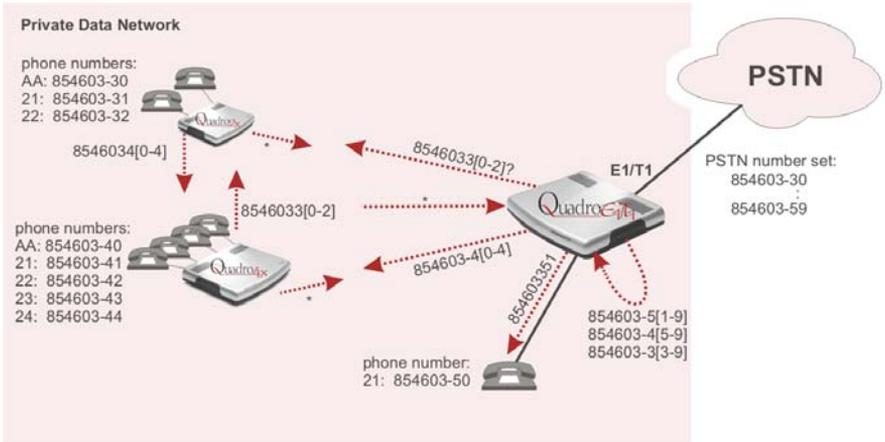
To define the call routing paths needed on QuadroE1/T1 open **Call Routing** in the **Telephony** menu and select **Local Routing Table**. The **Call Routing - Local Routing** page will be displayed.

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.

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 Digits (NDD) specifies the number of digits that that should be discarded from the beginning of the routing pattern. Leave the field empty if no digits need to be discarded.

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.

Call Type gives a possibility to select the routing call type (PBX, IP, IP-PSTN or E1/T1). For this example **IP** would 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.

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

Enter the IP address of the Quadro2x into the **Destination IP Address** text field.

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.

Call End Point defines whether the destination is the end point (specified user will ring) or if the remote destination Routing Table should be parsed for matching patterns to continue call routing. As the destination is the endpoint in this example, check this checkbox

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 third 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	NDD	Prefix	Call Type	Destination Address	CEP	Description
8546033[0-2]			IP	10.20.30.10	Yes	path to Quadro2x
8546034[0-4]			IP	10.20.30.20	Yes	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	CEP	Description
89546034[0-4]	IP	10.20.30.20	Yes	path to Quadro4x
*	IP	10.20.30.30		path for all outgoing calls via QuadroE1/T1 to PSTN

Quadro4x

Pattern	Call Type	Destination Address	CEP	Description
89546033[0-2]	IP	10.20.30.10	Yes	path to Quadro2x
*	IP	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 only access the support section 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.

Appendix: PC DHCP Settings

The QuadroE1/T1 LAN port has a DHCP server that provides DHCP IP addresses to de-vices 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 in order 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 config-ured 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 **Lo-cal Area Connection** with the right mouse but-ton and select **Properties**

3. Highlight **Internet Protocol (TCP/IP**) and click **Properties**. The corresponding window will be displayed.
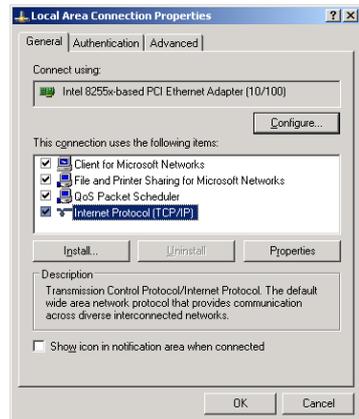
4.   Select **Obtain an IP address automatically,**
      then click on **Advanced**
                          .
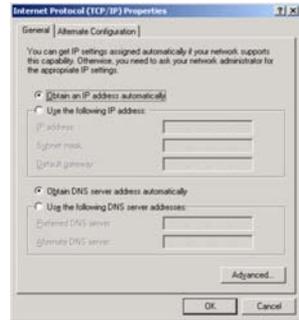
5.   You will see the entry **DHCP Enabled**
6.   Click **OK** three times to close all windows.

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 **Con-figuration** 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.

Under the **Telephone Users** menu, select **Change Password.**
The **Change Password** page will be displayed

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.

Save the password in a secure place. If the password is lost, a factory reset will need to be performed on the unit (see Administrator's Manual, 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) 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 **Basic Configuration Wizard** explained on Step 3 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 <u>UDP</u> ports <u>5000-5060</u> 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.
- For **Mapped Port for SIP** enter 5060
- For **Min mapped RTP/RTCP port** enter 6000
- For **Max mapped RTP/RTCP port** enter 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.**
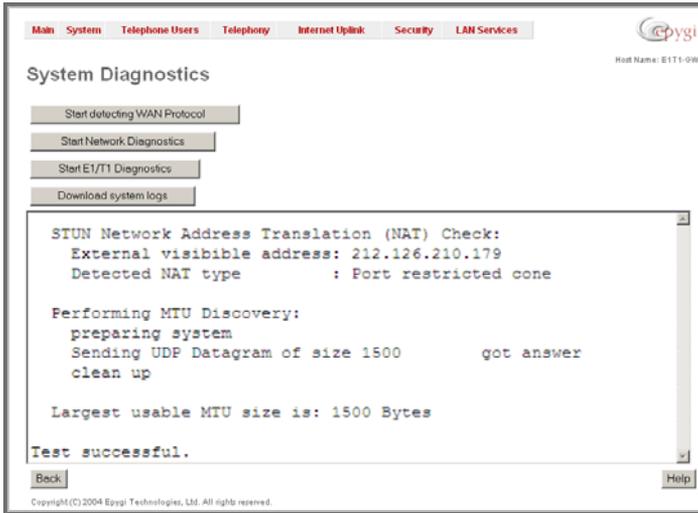
In the case of a successful test, the output of the system looks as follows:

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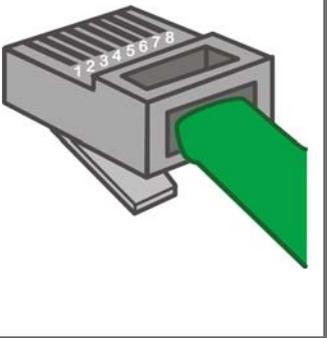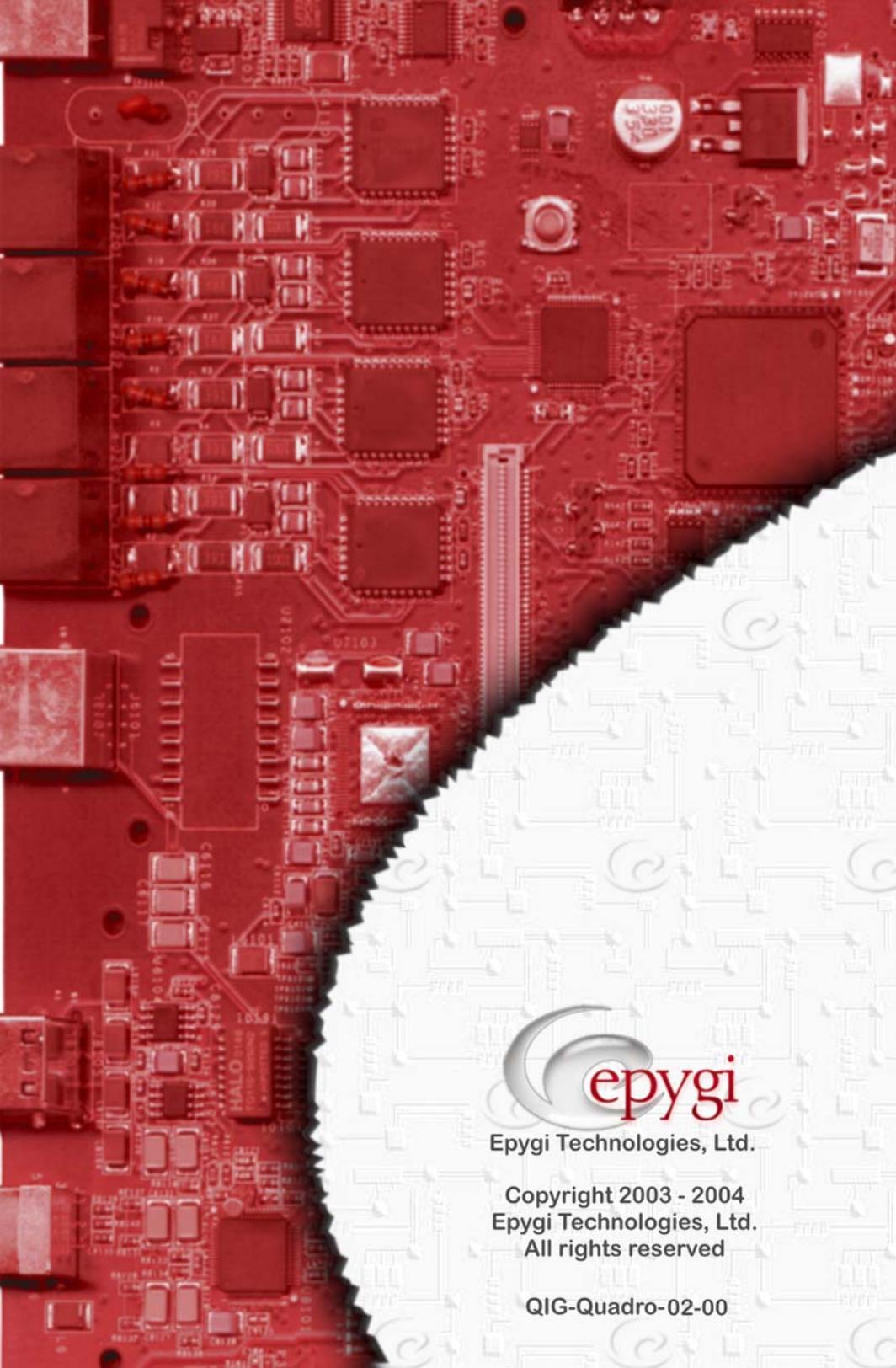
Depending on where the test is failing, the diagnostic can give some advise to solve the problem. See the example below of a failed test:

```
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 QuadroE1/T1 management **System** menu item **Status**. If QuadroE1/T1 is placed behind a NAT router, the detected NAT type and the IP address of this router's WAN port is displayed.

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, QuadroE1/T1 cannot work behind your router. You must either connect the QuadroE1/T1 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**.

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.

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QIG-Quadro-02-00