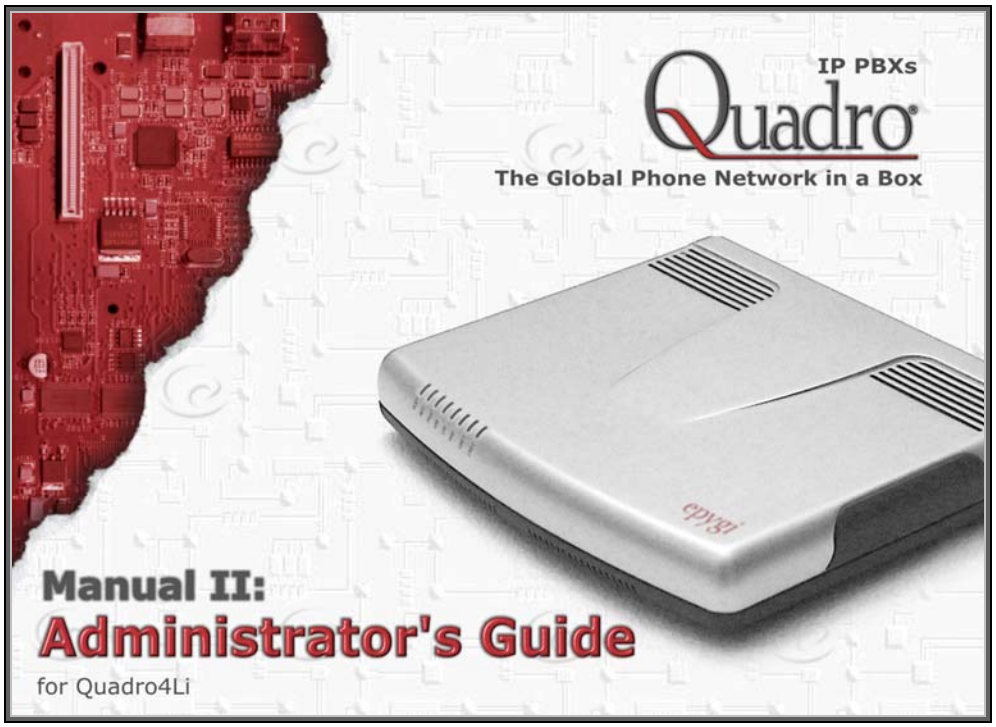


Edition 1, Jan 2011

SW Release 5.2.25 and higher

Table of Contents

Manual I: see Installation Guide

Step-by-step guide to install and configure Quadro basically.

Manual II: Administrator's Guide

Manual III: see Extension User's Guide

Describes detailed the menus available for extension users and includes further all call codes at a glance.

About this Administrator's Guide

The Quadro Manual is divided into three parts:

- **Manual-I: Installation Guide**
  gives step-by-step instructions to provision the Quadro IP PBX and configure the phone extensions with the Epygi SIP Server. After successfully configuring the Quadro IP PBX, users will be able to make SIP phone calls to remote Quadro devices, make local calls to the PSTN and access the Internet from devices connected to the LAN.
- **Manual-II: Administrator's Guide** explains all Quadro management menus available for administrators only. It includes a list of all System Default Values.
- **Manual-III: Extension User's Guide** explains all Quadro management menus available for extension users. A list of all call codes can be found there, too.

This guide contains many example screen illustrations. Since Quadro IP PBXs offer a wide variety of features and functionality, the example screens shown may not appear exactly the same for your particular Quadro IP PBX as they appear in this manual. The example screens are for illustrative and explanatory purposes, and should not be construed to represent your own unique environment.

Quadro's Graphical Interface describes to the Quadro's graphical user interface and explains all recurrent buttons.

Administrator's Menus explains the Administrator's management pages according to the menu structure shown on the main page of the Quadro management.

Administrator's Additional Features explains some input-options for administrators only that may be selected from the extension user's main page.

PBX Services for Quadro's Administrator explains PBX features for administrator accessible from the handset.

Appendix: Extension User's Welcome Page includes a form that allows the administrator to inform his extension user with all individually needed addresses and phone numbers.

Appendix: System Default Values lists all factory defaults.

Appendix: Software License Agreement includes the contract for using Quadro's hardware and software.

Quadro's Graphical Interface

Administrator's Main Page

When the administrator logs in, the **Quadro Management** page is displayed with a table of active calls (including information about call peers, call duration and start time) at the startup. The button **Terminate** next to each active call is used to terminate the corresponding call. Here the administrator may access the following settings and perform the actions:

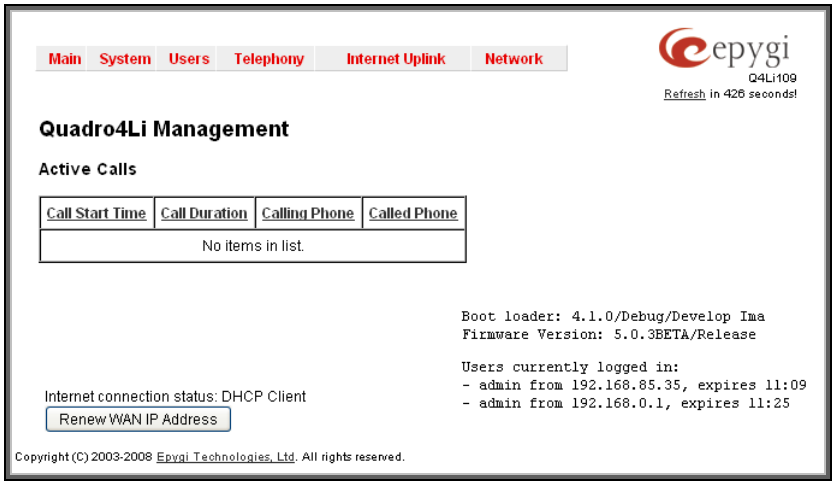


Fig. II-1: Quadro4Li Management

By clicking on **System, Users, Telephony, Internet Uplink** or **Network** the administrator may access the following settings in each respective category and perform actions specific to each category.

System Menu

- System Configuration Wizard
- Internet Configuration Wizard
- System Security Management
- Status
- IP Routing Configuration
- Configuration Management
- Events
- Time/Date Settings
- Mail Settings
- SMS Settings
- Firmware Update
- Networking Tools
- SNMP Settings
- Diagnostics
- Features
- Upload Language Pack
- User Rights Management

Telephony Menu

- Call Statistics
- SIP Settings
- RTP Settings
- NAT Traversal Settings
- Line Settings
- ISDN Settings
- Gain Control
- SIP Tunnel Settings
- Call Routing
- VoIP Carrier Wizard
- RADIUS Client Settings
- Voice Mail Recording
- Dial Plan Settings
- 3PCC Settings
- Key System Emulation
- RTP Streaming Channels

Internet Uplink Menu

- PPP/ PPTP Settings
- VPN Configuration
- Dynamic DNS Settings
- Firewall and NAT
- Filtering Rules
- IDS Log

Users Menu

- Extensions Management
- Receptionist Management
- Extensions Directory
- Authorized Phones Database

Network Menu

- DNS Settings
- DNS Server Settings
- DHCP Settings for the LAN Interface
- DHCP Settings for the VLAN Interface

Registration Form
(in menu tree only)

Logout

The functional button **Renew Wan IP Address** appears on the administrator's main **Quadro Management** page if the Quadro device acts as a DHCP client. The **Renew WAN IP Address** button is used to obtain a new WAN IP address in case, e.g., the Quadro moves to another network.

The functional button **Establish Your Internet Connection Now** respectively **Terminate Your Internet Connection Now** occurs on the Quadro Management page if PPPoE is used as WAN interface protocol.

The link **Please Check Your Pending Events** will be displayed on the administrator **Main Menu** page if new system events exist. The link leads to the **Events** page that can be also accessed from the System menu.

The list of **Users currently logged into the system** is seen in the lower right corner of the Administrator's Main Menu. Information about IP address user accessed Quadro GUI from, the username user is logged in and the time until the next automatically logout is provided herein. The current version of the Quadro's firmware and of its boot loader is also available here. The idle session timeout is set to 20 minutes. If no action is performed during that time, user will be automatically moved to the Login page and will be requested to login again.

Recurrent Buttons

Throughout this guide, you will see a variety of recurrent buttons. Below is a description of these buttons.

Button	Description
Previous	This button leads back to the previous page of a fixed sequence of pages (used mainly in wizards).
Next	This button leads forward to the next page of a fixed sequence of pages (used mainly in wizards).
Cancel	This button discards the latest not yet confirmed entries.
Finish	This is the last button of a fixed sequence of pages that completes and saves the entries of an entire sequence.
Help	This button opens the help page belonging to the currently active Quadro management page.
IP-Clipboard	This button opens a window where the last inserted IP addresses are listed. It allows the user to make a quick selection of an IP address that has been previously used. This will avoid the user needing type it again. The clipboard can hold up to 10 IP addresses and a new IP address will replace the oldest one from the list.

Button	Description
Back	This button returns you to the page you were previously on.
Ok	This button confirms an operation you started before.
Yes	This button confirms an operation you chose before.
No	This button discards an operation you chose before.
Save	This button saves the settings modified on the currently active management page.
SIP-Clipboard	This button opens a window where the last inserted SIP addresses are listed. It allows the user to make a quick selection of an IP address that has been previously used. This will avoid the user needing type it again. The clipboard can hold up to 10 SIP addresses and a new SIP address will replace the oldest one from the list.

Recurrent Functional Buttons

In connection with the tables, the following are the few buttons you will see:

Functional Button	Description
Add	Allows adding a new record to the displayed table. A new page will be displayed to enter any new settings.
Edit	Allows modifying the settings of the record selected by a checkbox. Normally only one (1) record may be selected. A new page will be displayed to enter the modified settings.
Delete	Deletes the selected entry(s) of a table. A warning message will ask for confirmation before deleting an existing entry.
Select All	Selects all table entry(s) for example for further deletion.
Inverse Selection	Inverses (opposites) an existing selection of table entry(s). If no entries are selected, clicking the button will select all records.
Refresh in...	May be shown in the upper right corner of a page. It displays the number of seconds remaining until the next refresh of the page will occur. It may be used to reload the page manually.

Most of the tables offer the option to sort the entries in ascending or descending order by clicking the headings of the columns. A small arrow next to the column heading indicates the direction of sorting - upward or downward. The entries of the table can be selected by using the corresponding checkboxes in order to edit or delete them.

Entering SIP Addresses Correctly

Calls over IP are implemented based on Session Initiating Protocol (SIP) on the Quadro. When making a call to a destination that is somewhere on the Internet, a SIP address must be provided.

SIP addresses needs to be specified in one of the following formats:

"display name" <username@ipaddress:port>
"display name" <username@ipaddress>
username@ipaddress:port
username@ipaddress
username

For your convenience, the following combinations can be used:

- *@ipaddress - any user from the specified SIP server
- username@* - a specified user from any SIP server
- *@* - any user from any SIP server

The display name and the port number are optional parameters in the SIP address. If a port is not specified, 5060 will be set up as the default one. The range of valid ports is between 1024 and 65536.

A flexible structure of wildcards is allowed. In comparison with a wildcard, the "?" character stands for only one unknown digit and the "*" character stands for any number of any digits.

Please Note: Wildcards are available for caller addresses only. No wildcard characters are allowed for called party addresses. Exceptions are addresses in the **Supplementary Addresses** table that are used by **Outgoing Call Blocking** and **Hiding Caller Information Settings** services. To use "*" and "?" alone (as non wildcard characters), use "*" and "\?" correspondingly.

Administrator's Menus

System Menu

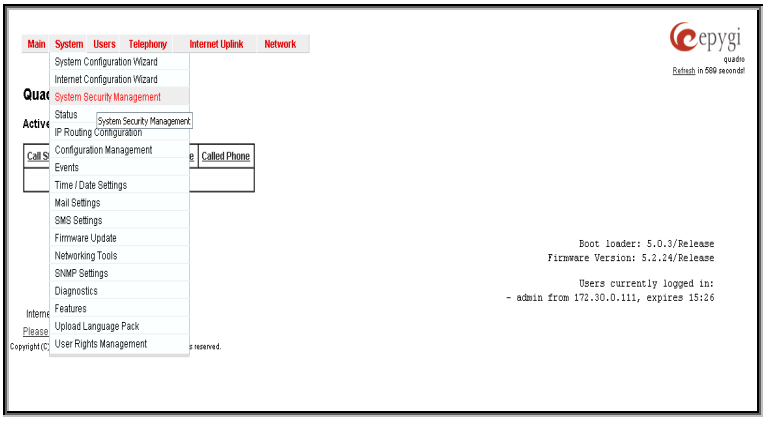


Fig. II-1: System Menu in Dynamo theme

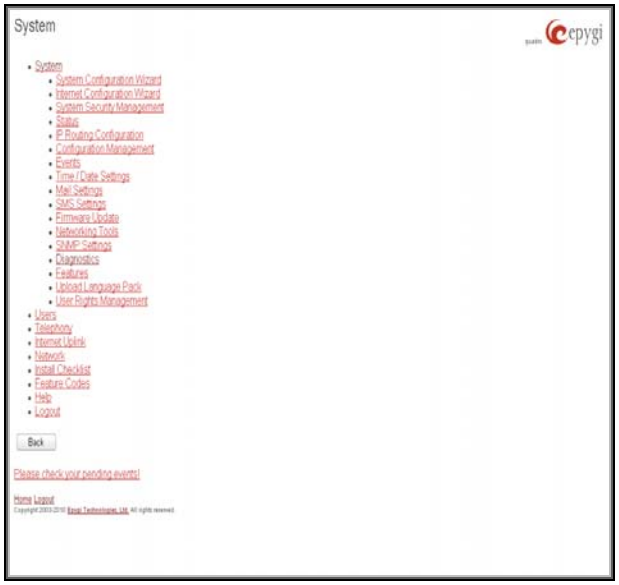


Fig. II-2: System Menu in Plain theme

System Configuration Wizard

The **System Configuration Wizard** allows the administrator to define the Quadro's Local Area Network settings and to specify regional configuration settings to make Quadro operational in its LAN. The **System Configuration Wizard MUST be run upon Quadro's first startup** to make sure that it works properly in its network environment. The Wizard allows navigating through the following basic configuration parameters and settings:

- System Configuration (see below)
- DHCP Settings for the LAN Interface
- Regional Settings and Preferences (see below)
- Emergency Codes and PSTN Access Codes Settings (see below)

Fig. II-3: System Configuration Wizard - Start page

DHCP Settings for the LAN are described in the chapters below. The LAN configuration and regional settings will be described later in this chapter.

Please Note: It is strongly recommended to leave the factory default settings if their meanings are not fully clear to the administrator.

The **System Configuration** page contains the host name, IP address and Subnet Mask information about the Quadro LAN interface. These settings make Quadro available to the internal network.

The **System Configuration** page offers the following input options:

Host Name requires a host name for the Quadro device.

Domain Name requires the LAN side domain name which the Quadro belongs to.

IP Address requires the Quadro host address for the LAN interface.

Subnet Mask requires the Quadro hosts' Subnet Mask.

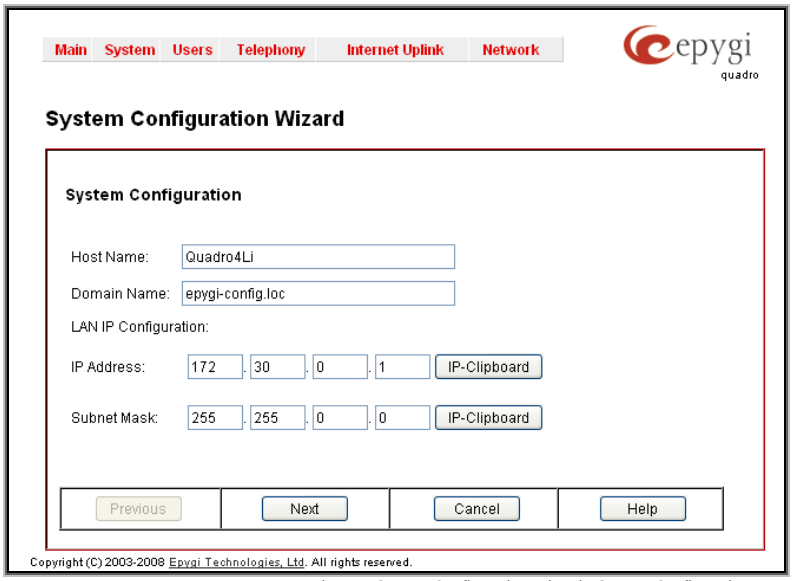


Fig. II-4: System Configuration Wizard - System Configuration page

The **Regional Settings and Preferences** are used to select settings specific to the location of the Quadro. This is important for the functionality of the voice subsystem.

The **Regional Settings and Preferences** page has two drop down lists to select the **Location** (country) and a corresponding **Timezone**. Quadro will support Daylight Savings (DST) correction if it is available for the selected time zone.

This page also has a manipulation radio button group to choose:

System Language – selection is available only when the custom Language Pack has been uploaded and it is used to enable custom language for system voice messages or returning back to the default language English.

GUI Theme - selection used to select the GUI theme style of the web based configuration pages.

The **Choose Theme on Login** checkbox indicates whether the GUI theme selection radio buttons should be displayed on the Quadro Login page. Selecting the checkbox will allow users to choose the GUI theme before logging into the Quadro. Leaving the checkbox unselected will require the administrator to run the System Configuration Wizard to change the theme.

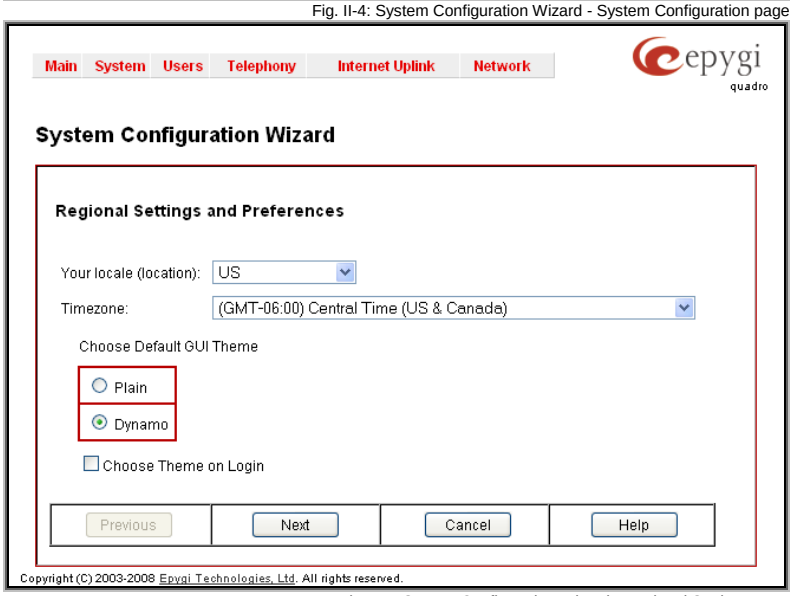


Fig. II-5: System Configuration Wizard - Regional Settings page

The **Emergency Codes** and **PSTN Access Codes Settings** are used to configure the emergency dial plan.

The **Emergency Codes** text field requires the PSTN numbers of the emergency or lifeline services. Multiple emergency codes, separated by commas, can be inserted in this field. For each emergency code, a routing pattern will be generated in the Call Routing Table, which will allow faster and easier calls to emergency destinations.

The **PSTN Access Code** drop down list allows you to select the prefix code for accessing the PSTN line in the routing mode. Dialing the digits inserted in this text field will provide the PSTN dial tone when dialed from the handset.

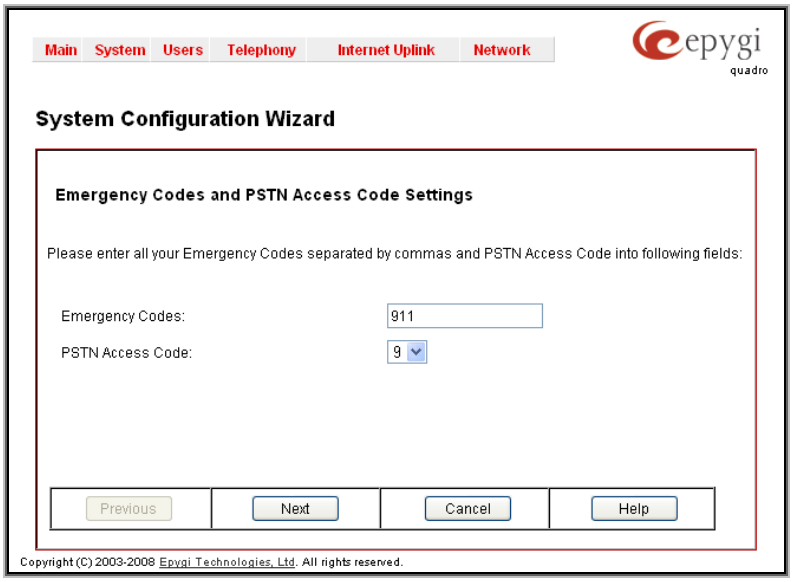


Fig. II-6: System Configuration Wizard - Emergency Codes and PSTN Codes Settings page

Internet Configuration Wizard

The **Internet Configuration Wizard** allows the administrator to configure the WAN interface settings and to adjust Quadro's connectivity with an external network. The **Internet Configuration Wizard MUST be run for Quadro to be connected to the Internet**.

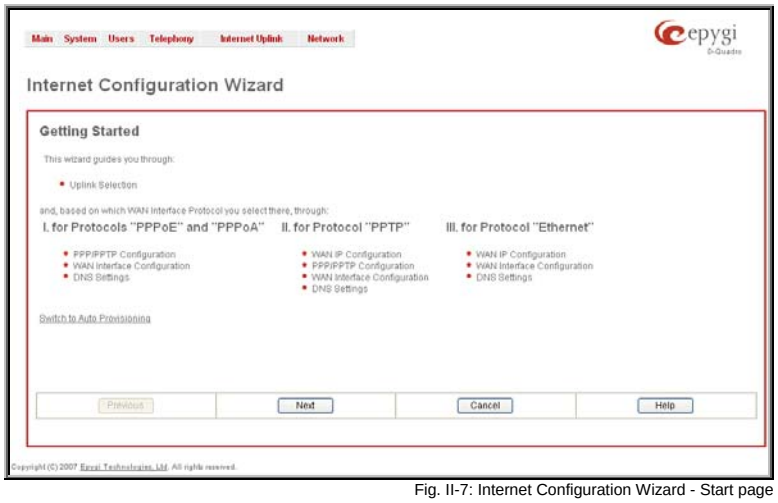


Fig. II-7: Internet Configuration Wizard - Start page

All the settings of the **Internet Configuration Wizard** are described in the chapters below except those for the IP settings, which will be described in this chapter.

Please Note: It is strongly recommended not to change the factory default settings if their meanings are not fully clear to an administrator.

The Wizard allows navigating through the following basic configuration parameters and settings:

- Uplink configuration (see below)

For WAN Interface protocol **PPPoE**:

- PPP/ PPTP Settings
- WAN Interface Configuration (see below)
- DNS Settings

For WAN Interface protocol **PPTP**:

- WAN IP Configuration (see below)
- PPP/ PPTP Settings
- WAN Interface Configuration (see below)
- DNS Settings

For WAN Interface protocol **Ethernet**:

- WAN IP Configuration
- WAN Interface Configuration (see below)
- DNS Settings

The **Switch to Auto Provisioning** link moves you to the Automatic Provisioning page where Quadro can be configured automatically.

The **Uplink Configuration** page allows you to select the Quadro's WAN interface connection type and its bandwidth settings. These settings will make Quadro available to the external network.

Depending on the Uplink Interface Protocol selection, the page following the **Uplink Configuration** page is different. Thus if **PPPoE** is selected, the next page will be **PPP Configuration**, while selecting **Ethernet** will bring up the **WAN IP Configuration** page.

The **Uplink Configuration** page offers the following components:

The **WAN Interface Protocol** radio buttons are used to choose the protocol depending on the requirements of the ISP (Internet Service Provider):

PPPoE - turns on the PPP over an Ethernet connection.

PPTP – turns on the Point to Point Tunneling Protocol (**PPTP**) interface used for the connection between Quadro and ADSL modem. A fixed IP address configuration is needed in this case.

Ethernet - turns on the Ethernet connection.

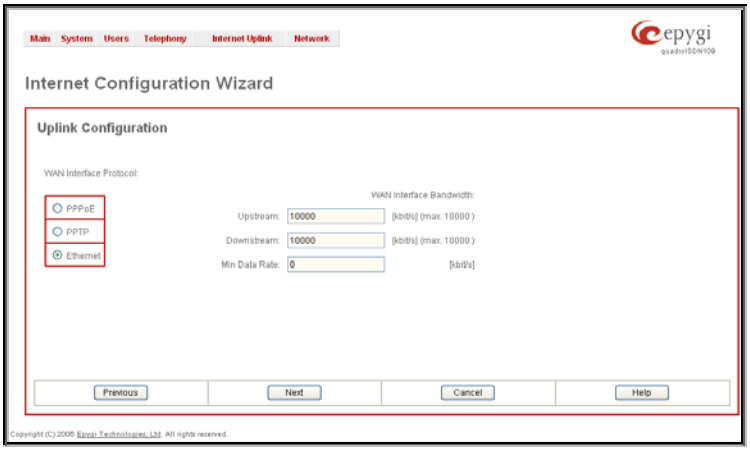


Fig. II-8: Internet Configuration Wizard - Uplink Configuration page

The **WAN Interface Bandwidth** settings allow the specification of the upstream and downstream speeds in kbit/s, helping to assure the quality of IP calls. An IP call looses the voice quality if there is no available bandwidth. When approaching the limits of bandwidth capacity, another IP call will be declined.

The bandwidth provided by the ISP has to be specified in the text fields **Upstream Speed** and **Downstream Speed**. The default entry in both fields is 10000, the maximum bandwidth of a 10 MB Ethernet.

The bandwidth required by an IP call depends on the codecs used and these specifications are listed in the tables below:

Required Bandwidth for Standard Packets:

Packet Size in msec.	Needed bandwidth in kbit/s using the Codecs:						
	G.711u/G.711a	G.726-16	G.726-24	G.726-32	G.726-40	G.729a	iLBC-13.33
10	105	58	66	74	82	50	-
20	84	37	45	53	61	29	-
30	76	30	38	45	53	22	27
40	74	27	34	42	50	19	-
50	71	25	32	40	48	17	-
60	67	22	30	37	45	15	20

Required Bandwidth for Encrypted Packets when a VPN is used:

Packet Size in msec.	Needed bandwidth in kbit/s using the Codecs:						
	G.711u/G.711a	G.726-16	G.726-24	G.726-32	G.726-40	G.729a	iLBC-13.33
10	148	98	105	118	124	92	-
20	105	59	65	74	81	49	-
30	90	43	52	60	66	35	41
40	85	38	45	53	61	30	-
50	80	34	41	48	56	26	-
60	74	29	37	45	52	22	26

The **Min Data Rate** text field requires the amount of upstream bandwidth that ought to remain for data applications even if voice applications use the entire available upstream bandwidth. The value selected here needs to be smaller than the upstream bandwidth and is measured in kbit/s.

The **WAN IP Configuration** page is only displayed if **Ethernet** or **PPTP** has been selected to be the uplink protocol. It offers the following components:

The **Assign automatically via DHCP** radio-button selection switches to automatic retrieval of the WAN IP address from a DHCP server at the ISP/uplink.

Please Note: DHCP referred to here is the one that runs on the provider's side and not the Quadro's personal DHCP server.

The **Assign Manually** radio-button switches to the manual adjustment of IP settings. This selection requests the following parameters:

IP Address requires the IP address for the Quadro WAN interface.

Subnet Mask requires the subnet mask for the Quadro device WAN interface.

Default Gateway requires the IP address of the router where all packets are to be sent to, for example, to the router of the provider.

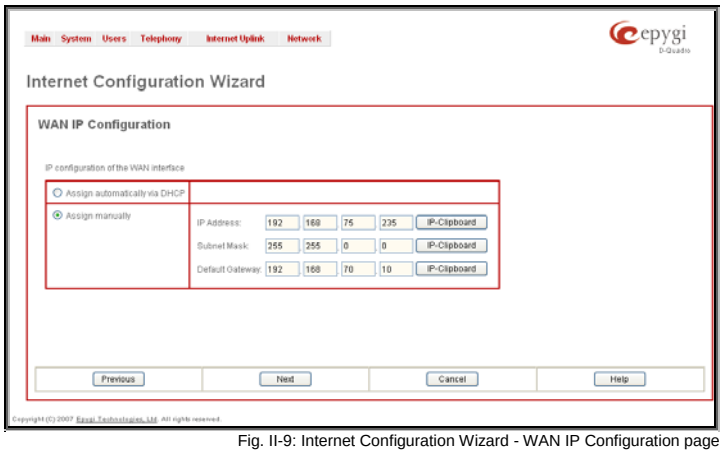


Fig. II-9: Internet Configuration Wizard - WAN IP Configuration page

The **WAN Interface Configuration** page may be used to modify the MAC address of the Quadro. This might be necessary if the ISP (Internet Service Provider) requires a specified MAC address, for example, for authentication. This page offers the following components:

MAC Address Assignment manipulation radio-buttons:

- **This Device** turns to the default MAC address of the Quadro.
- **User Defined** requires user defined MAC Address.

The **MTU** drop down list allows you to select the maximum packet size on the Ethernet (in bytes). MTU is used to fragment the packets before transmitting them to the network. The MTU preferred value is dependent on the Ethernet connection. The default MTU size is 1500 Bytes for Ethernet and 1400 Bytes for PPPoE.

Please consult with your ISP administrator to get the corresponding settings.

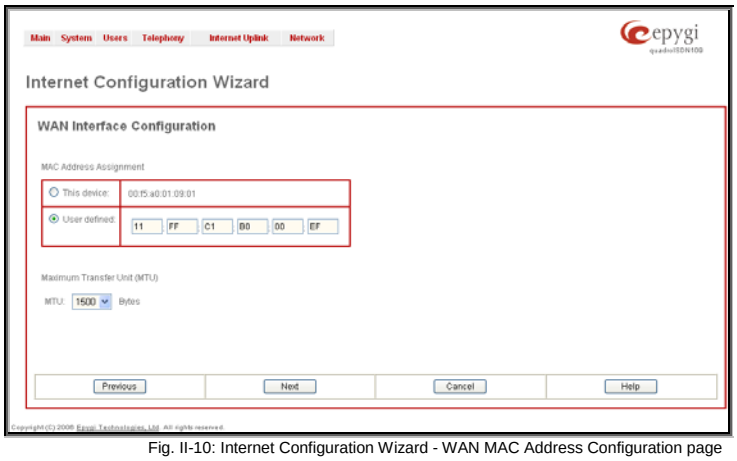


Fig. II-10: Internet Configuration Wizard - WAN MAC Address Configuration page

System Security Management

The **System Security Management** offers a possibility of managing the global security levels, running the system security diagnostics program and receiving complete reports on the Quadro configuration security. It includes two pages- the **System Security Settings** page and the **System Security Diagnostics** page.

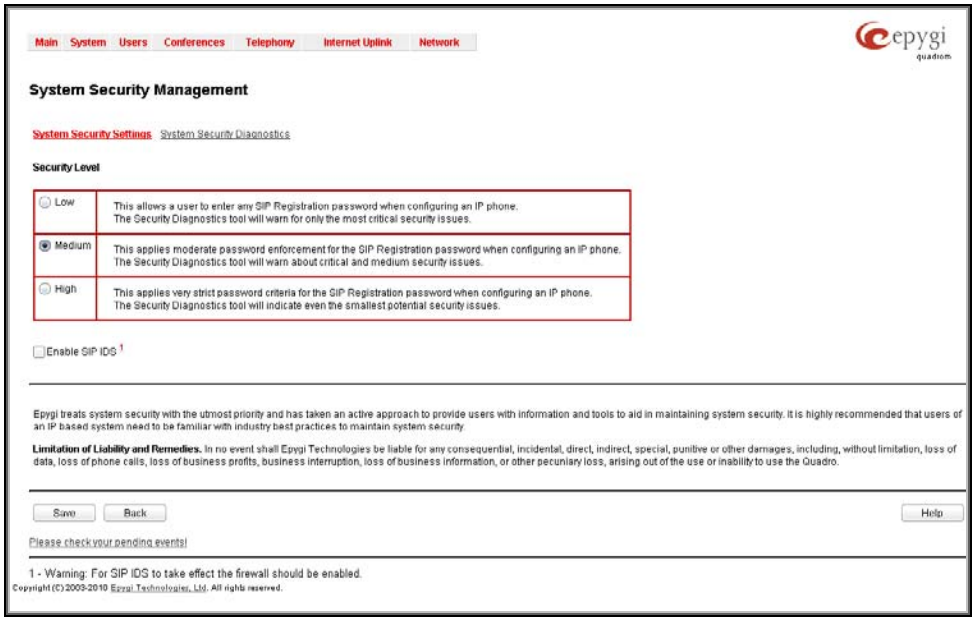


Fig. II-11: Quadro System Security Management page

The **System Security Settings** page includes the following components:

The **Security Level table** - allows selecting the Security Level defining requirements to the IP Lines' password strength and the Security Report granularity. The security levels are as follows:

- **Low** - There are no specific restrictions on the strength of the saved password. Only the critical warnings on the Call Routing Rules to PSTN and IP-PSTN, disabled Firewall and IDS will be generated in Security Report.
- **Medium** - The minimum strength of the IP Line passwords should be "good". The Security Report will generate warnings on all unsecured Call Routing rules, IP Line passwords, Firewall level (if it is set to lower than "Medium") and disabled IDS.
- **High** - The minimum strength of the IP Line passwords should be "strong". The Security Report will generate warnings on the IP Line passwords, disabled IDS, unsecured SIP, and unsecured Routing Rules to SIP, PSTN and IP-PSTN and also regarding the Firewall level if it is set to lower than "High".

The Enable SIP IDS checkbox- allows to prevent the SIP attacks.

The **System Security Diagnostics** page allows running the security audit and getting the security reports. The Start Security Audit functional button is used for running the security audit. The Quadro Security Audit is a security reporting system, which generates the warnings regarding the Quadro's weaknesses relative to the selected Security Level. The warnings may vary depending on the selected global Security Level. The Security Audit will detect the security related configuration issues in Firewall, IDS, IP Line passwords, Call Routing and extension settings.

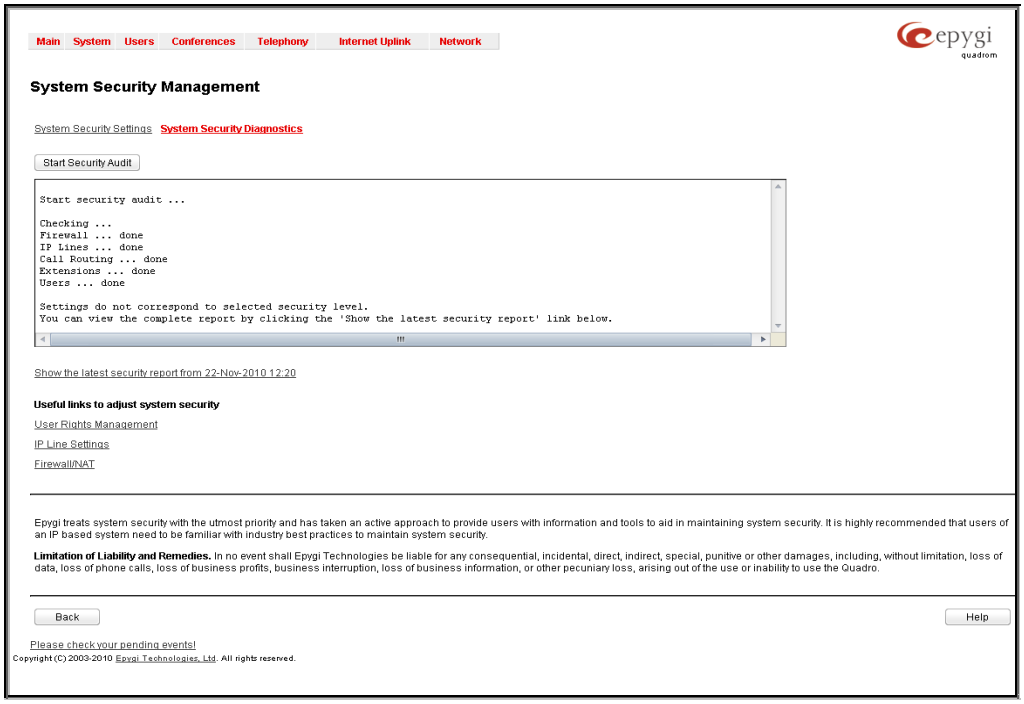


Fig. II-12: Quadro System Security Diagnostics page

The output of Security Audit may look as follows:

Start security audit ...

Checking ...

Firewall ... done

IP Lines ... done

Call Routing ... done

Extensions ... done

Users ... done

Settings do not correspond to selected security level.

You can view the complete report by clicking the 'Show the latest security report' link below.

The **Show the latest security report** link allows to display the last security audit report. This page also contains the following useful links to adjust the system security

- User Rights Management.
- IP Line Settings .
- Firewall/NAT .

Please note: Refer to the Quadro admin guide regarding the security related configuration options on the Quadro.

Status

The system status window displays non-editable tables providing extensive system status information about Quadro: General Information, Network Status, Lines Status, Memory Status, Hardware Status, SIP Registration Status, IP Lines Registration Status and License Status. The links on this page lead to device Transfer Statistics, user mailboxes and supplementary services configuration pages.

The **System Status** page has several tables providing system information.

General Information

The **General Information** page includes the following information:

Uptime duration - Period Quadro is on since last reboot.
Device hostname - Quadro device host name.
Quadro Operating System - Quadro operating system version.
Application Software - Software and file system versions of the Quadro.
Boot Loader - Quadro boot loader version.
DSP Software - Quadro DSP software version and the date of build.
Language Pack – this field is present only when the custom language pack is uploaded and it indicates the version.

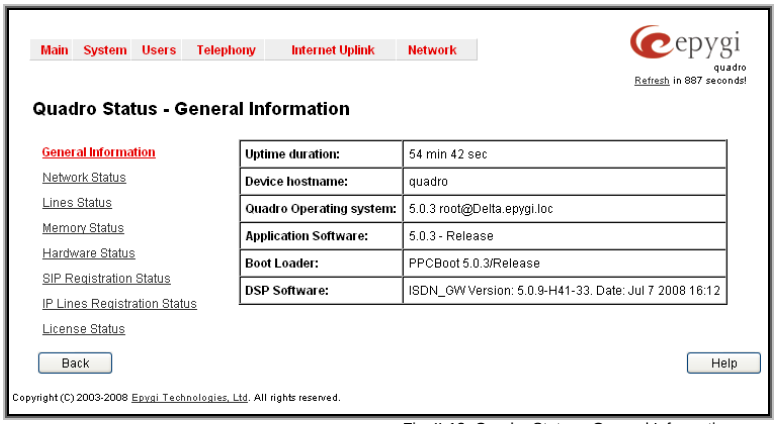


Fig. II-13: Quadro Status - General Information page

Network Status

The **Network Status** page includes the following information about **Interfaces**:

Interface Name lists the Network interfaces available on the Quadro (LAN, WAN, IPSec and a number of PPPs, depending on the number of active PPP connections).

IP Address lists the IP addresses corresponding to each network interface.

Subnet Mask lists the subnet masks corresponding to each network interface.

Properties will list either the MAC address corresponding to each network interface on the Quadro or the PPTP, L2TP and IPSec peer IP address if an active VPN (IPSec or PPP) interface exists.

Monitor includes links to survey LAN, WAN, IPSec and PPP traffic correspondingly. The VPN traffic link will be displayed only if a VPN has been configured. The selection of these links will open a new window with a table of network traffic statistics on the following selected interfaces:

- Received Bytes
- Received Packets
- Received Errors
- Received Drop Errors
- Received Overrun Errors
- Received MultiCast Packets
- Transmitted Bytes
- Transmitted Packets
- Transmitted Errors
- Transmitted Drop Errors
- Transmitted Carrier Errors
- Transmitted Collisions

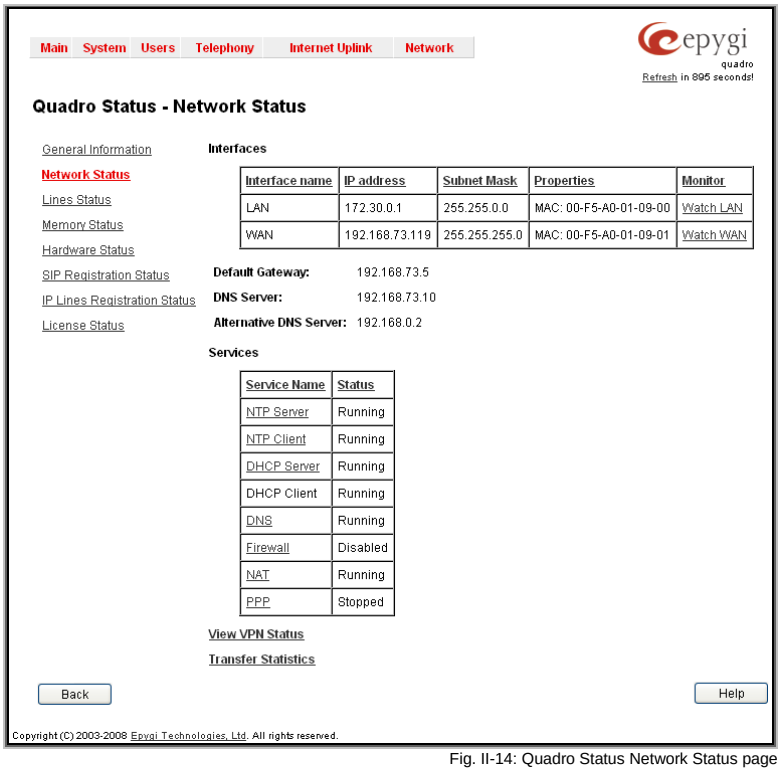


Fig. II-14: Quadro Status Network Status page

When opening the corresponding interface statistics window, no traffic values are displayed at first. After opening the window, the tables will serve as a counter and traffic statistics will be updated every minute.

DNS Server, **Alternative DNS Server** and **Default Gateway** - these display the Quadro settings corresponding to what has been configured with the System Configuration Wizard.

Services (NTP Server and Client, DHCP Server and Client, DNS, Firewall, NAT, PPP, IDS) statuses: shows if they have **stopped** or if they are still **running**.

The **View VPN Status** link refers to the VPN Configuration page where all VPN (IPSec, PPTP and L2TP) connections can be viewed and edited.

Transfer Statistics - link to the Transfer Statistics page.

The **Transfer Statistics** page shows a user-defined statistics table with the transmit/receive value (criteria), interface type and time period. It contains the following components:

Time range of statistic table - the drop down list includes the period (in days) statistics data that is to be collected and the corresponding diagram charts that are to be built.

Interface - the drop-down list offer the values:

WAN - Wide Area Network (WAN) events only
LAN - Local Area Network (LAN) events only

When **Show also as readable values** checkbox is selected, an additional table with statistics values will be displayed on the next page.

The area **Receive Values** provides the following:

Receive Bytes - number of received bytes.
Receive Packets - number of received Ethernet packets.
Receive Errors - number of received packets containing errors.
Receive Drop Errors - number of received packets that have been discarded.
Receive Overrun Errors - number of received overrun errors that occur when the receive buffer is not large enough to hold all incoming packets. This error usually appears due to a slow receiving system.
Receive MultiCast Packets - number of received broadcast packets.

The area **Transmit Values** provides the following:

Transmit Bytes - number of transmitted bytes
Transmit Packets - number of transmitted Ethernet packets.
Transmit Errors - number of transmitted packets containing errors.
Transmit Drop Errors - number of transmitted packets that have been discarded.
Transmit Carrier Errors - number of transmit carrier errors that occur due to a defective or lost connection on the Ethernet link.
Transmit Collisions - number of transfer errors that occurred during a simultaneous packet transmission from both sides.

To see the **Transfer Statistics Diagram Charts**, select the desired criteria and click **Show** to generate the corresponding chart and the table showing the transfer statistics values (if enabled). The letters **M** (millions) and **K** (thousands) used in the legend of the displayed diagrams show the total number of specified criteria. The **Reset Statistics** button is used to reset the chart and the table (if enabled).

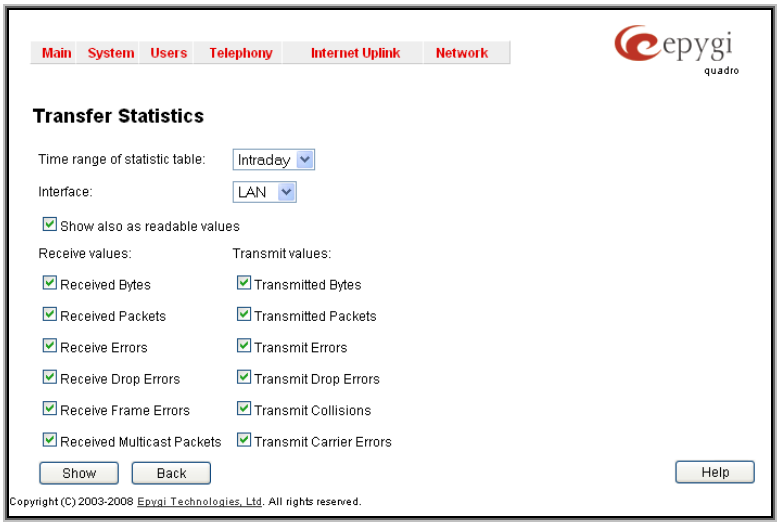


Fig. II-15: Transfer Statistics page

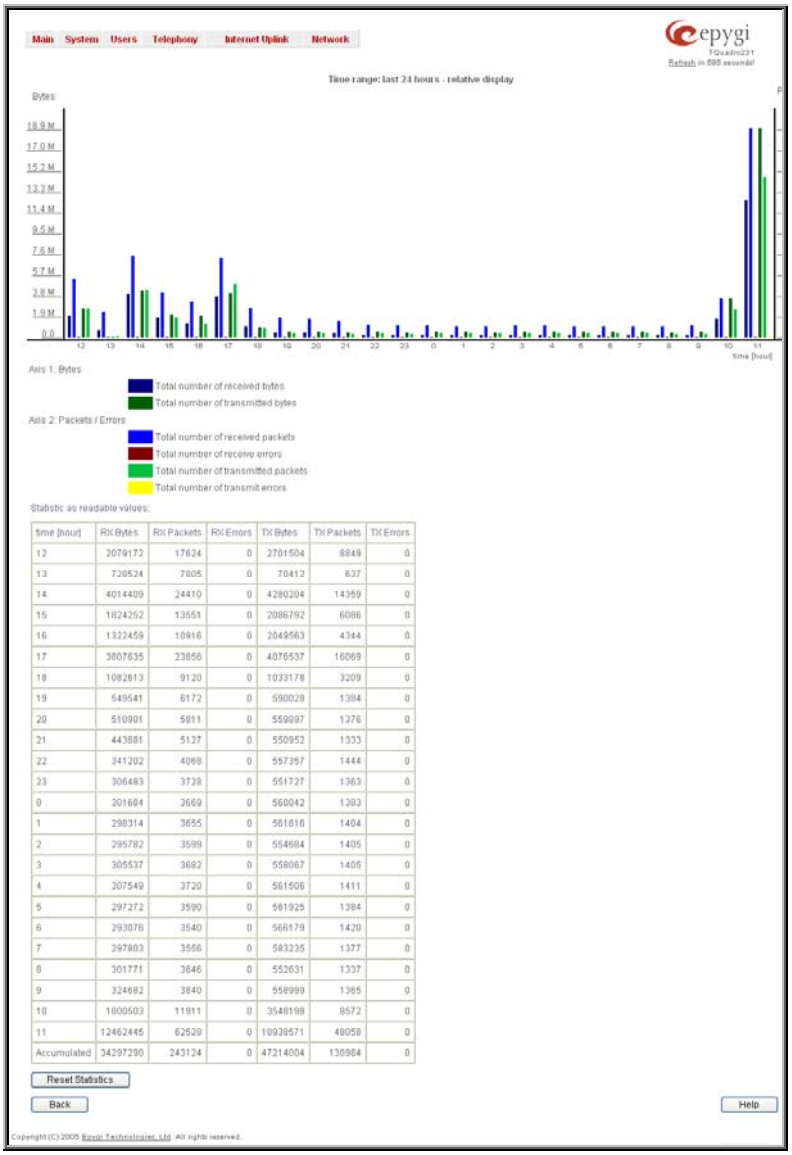


Fig. II-16: Transfer Statistics Diagram Chart

Lines Status

The table **Lines Status** shows the current status of each IP line and ISDN trunk with all details of active calls. Since only one line information is displayed at a time, the **IP Line** and **ISDN Trunk** functional buttons are used to navigate through the other IP lines' or ISDN trunks' information.

The **Lines Status** table displayed for **IP** lines includes a group of static and dynamic parameters. Static parameters are always displayed. Dynamic parameters only appear when an event takes place on the extension.

Static Parameters:

Extension shows the extension number of the selected telephone line.

Display Name shows the corresponding name.

Phone State may have the value **On Hook** or **Off Hook**. For IP Line Status, this field may additionally have **Not Configured** and **Temporary Offline** values.

Number of Active Calls shows the number of calls that are currently present on the phone.

Dynamic Parameters:

Registration:

Username shows the IP phone's client name registered on the Quadro.

Last Registered shows the date and time, the corresponding IP phone has been last registered on the Quadro.

Expires In shows when the last registration of the IP phone will expire.

Binding IP Address shows the IP address of the IP phone within the Quadro's LAN network.

Calls:

Call State shows the current state of the extension (in voice mail, in call, waiting, busy, call out, ring in, etc.).

Caller Party appears when a call is received and indicates the caller extension and the IP address or a phone number, depending on type of call.

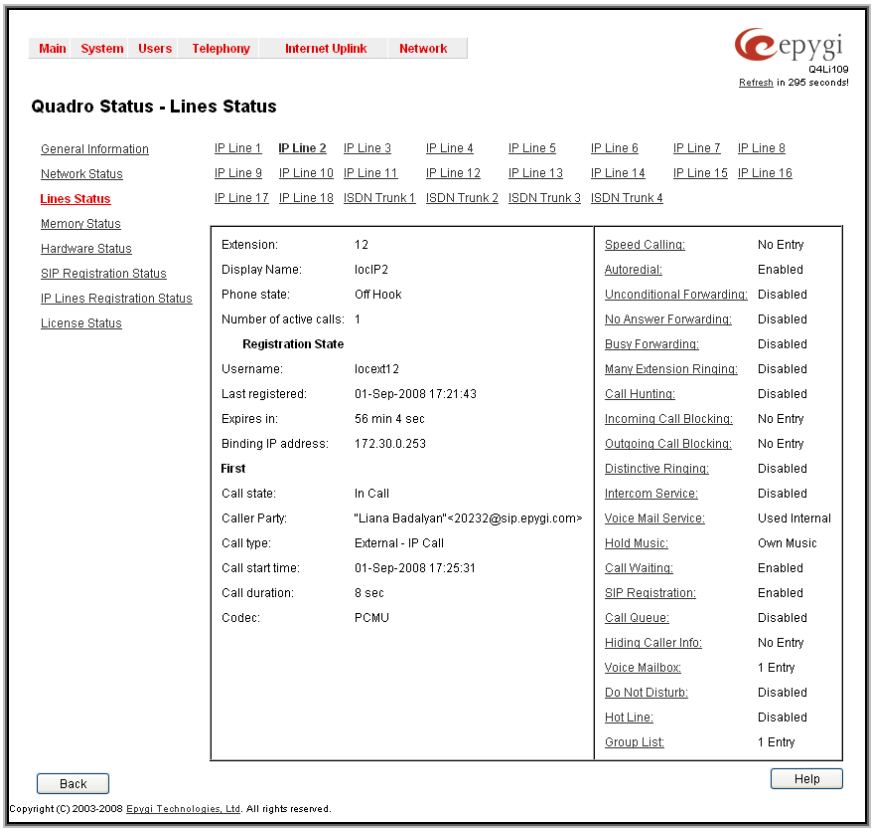


Fig. II-17: Lines Status - Lines Status page upon established call

Called Party appears when a call is placed and indicates the destination extension and the IP address or a phone number, depending on type of call.

Call Type shows whether the call is **Internal** or **External** and whether it is a **PSTN** call, **PBX** call or **IP** call.

Call Start Time shows the call start date and time.

Call Duration shows the current call duration.

RX Codec shows the codec used to encrypt the incoming packets. **TX Codec** shows the codec used to encrypt the outgoing packets. If RX and TX codecs are the same, only one **Codec** field will be displayed.

The list of supplementary services provides the following additional status information for each telephone line: **Enabled** or **Disabled**.

For **Incoming** and **Outgoing Call Blocking**, **Speed Calling, Hiding Caller Info**, **Voice Mailbox** and **Group List** services, the number of **Entries** will be displayed in the corresponding service table. For **Voice Mail Service**, the voice mailbox configuration mode is displayed here.

This allows administrator to view the status and to be notified about services running on Quadro for every line. The services are designed as links that guide the administrator to the corresponding service page of the selected user.

The **Line Status** for **ISDN Trunk** displays the state of the B1 and B2 channels and the information about the active calls on them. Page includes a group of static and dynamic parameters. Static parameters are always displayed. Dynamic parameters appear only whenever an event takes place on the channel.

Static Parameters:

B channel - the state of the channel (enabled or disabled)

State - the current state of the channel (free, busy or N/A)

Dynamic Parameters:

Caller Party - this parameter appears when a call is received and indicates the caller address

Called Party - this parameter appears when a call is placed and indicates the destination address

Call Duration - current call duration (in seconds)

The **ISDN Channel Usage Statistics** link is only present for local ISDN trunks (this option is not available for shared ISDN trunks) and leads to the **ISDN Channel Usage Statistics** page where diagram chart of ISDN channels usage can be viewed.

The **ISDN Channel Usage Statistics** offers ISDN Channel Usage Statistic tables depending on the criterion and time period selected.

The **Trunk** checkboxes are only present when there is more than one ISDN trunks present on the Quadro. These checkboxes are used to select the ISDN trunk number(s) over which the ISDN traffic chart will be built. At least one **Trunk** checkbox should be selected, otherwise error message appears.

The **Time Range of Statistic Table** drop down list includes the period (in days) statistics data that is to be collected and the corresponding diagram chart that is to be built.

A group of checkboxes allows to specify information to be displayed (multiple checkboxes may be selected at the time):

- **Incoming Calls** - number of incoming ISDN calls
- **Outgoing Calls** - number of outgoing ISDN calls
- **Maximum Active Calls** - number of maximum active ISDN calls

At least one of these checkboxes should be selected, otherwise error message appears.

The button **Show** generates a **ISDN Channel Usage Statistics** diagram over the selected criteria. The letters **M** and **K** used in the legend of the displayed diagrams show the total number of specified criteria: **K** means thousands and **M** millions.

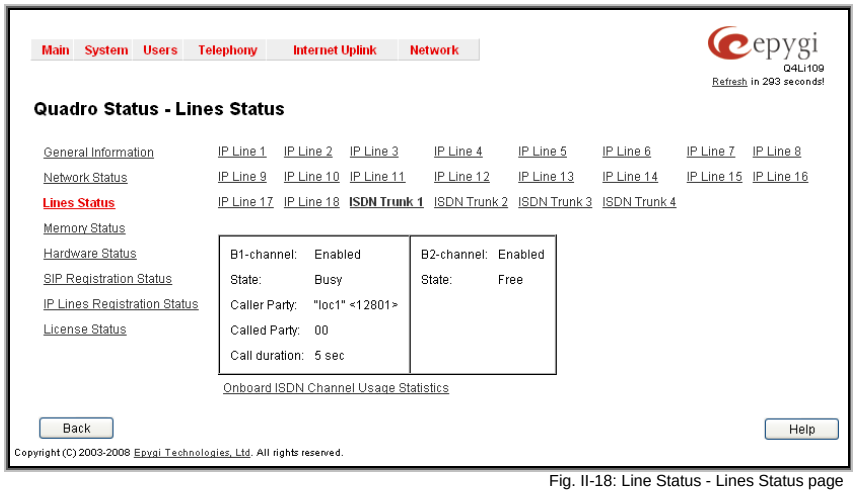


Fig. II-18: Line Status - Lines Status page

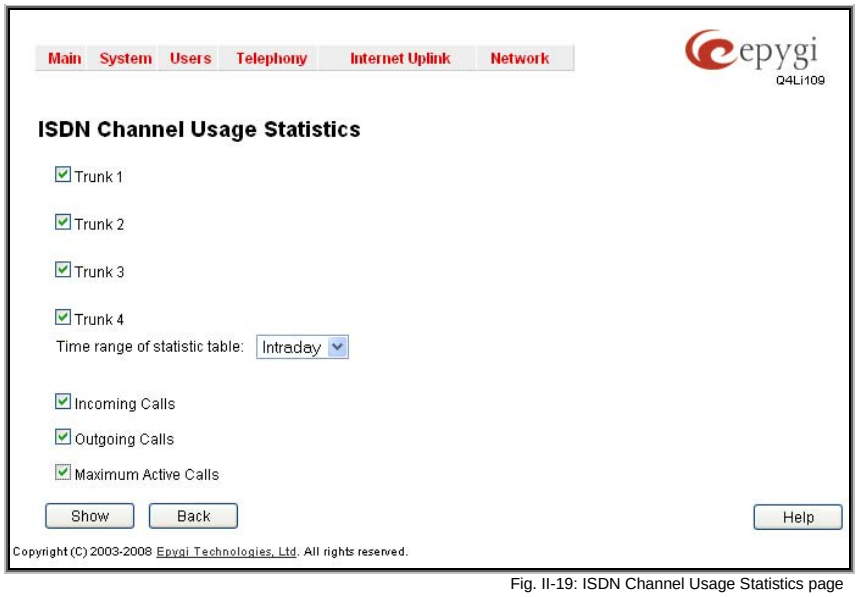


Fig. II-19: ISDN Channel Usage Statistics page

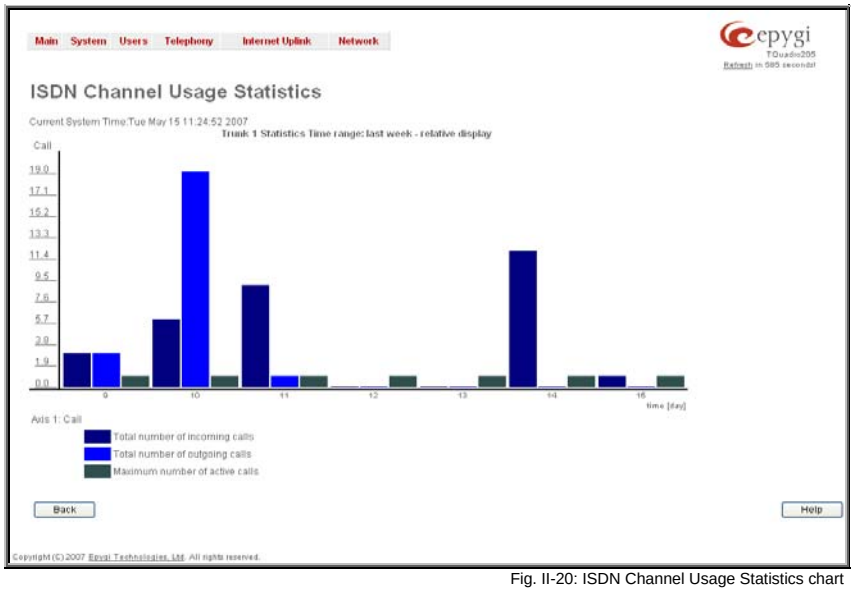


Fig. II-20: ISDN Channel Usage Statistics chart

Memory Status

The **Memory Status** page includes tables with the available **User Space** information for each extension. These tables display the space used by the voice mailbox and uploaded/recorded system greetings. It shows the free and total space (counted in minutes/seconds) for every extension. This page includes the following information:

Memory Size shows total memory space (counted in minutes/seconds) available on the Quadro and assigned to all extensions.

The table's links lead the administrator to the extension settings page where **User Space** may be altered.

The **System Memory** row indicates the space occupied by the universal extension recordings. Link refers to the Upload Universal Extension Recordings page where universal extension system messages may be uploaded.

Call Statistics shows the current number of calls with recorded statistic entries.

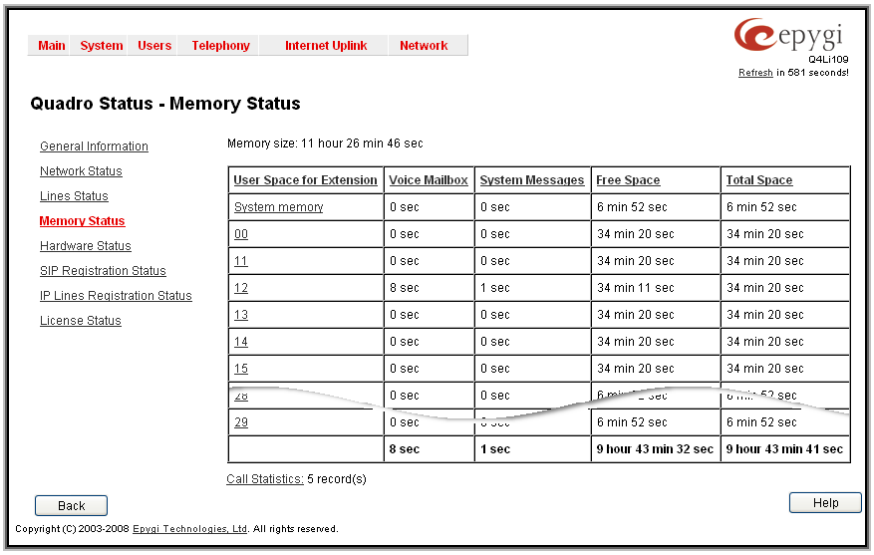


Fig. II-21: Memory Status page

Hardware Status

The **Hardware Status** table displays a list of the hardware devices present and currently available on the Quadro board. The hardware device version number and additional comments about its state are indicated here.

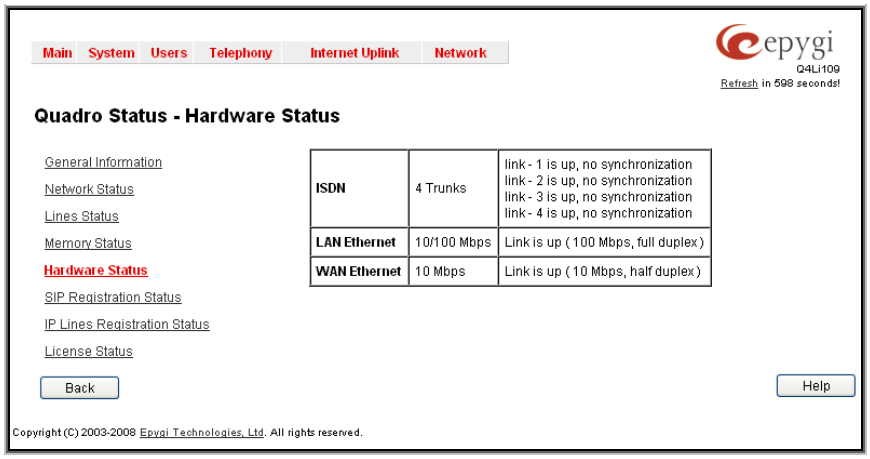


Fig. II-22: Hardware Status page

SIP Registration Status

The **SIP Registration Status** table includes the following information that may be sorted in ascending or descending order clicking the columns' headlines:

- **Extension** - the two-digit number of the extensions on the Quadro. The extension numbers are created as links that lead to the page Extensions Management – General Settings where the details about the SIP registration of the correspondent extension can be found. This column also lists SIP registrations of the SLA lines. The links on the SLA line number leads to the Key System Emulation page for the configuration details.
- **Reg. Name** - the registration name used on the SIP server.
- **Server** - the name of the SIP server, where the correspondent extension is registered.
- **Registered** - this column has to display the value Yes. Not registered extension can't be part of this table.
- **Registration Time** - time of registration. The values in this column will be refreshed automatically from time to time.

The links inside the table will link you to the Extensions Management page where the SIP registration settings may be altered.

The **Detected Connection Type** field displays the connection type Quadro currently is acting in (direct connection or behind NAT). If Quadro is acting behind NAT, the NAT machine IP address is also displayed.

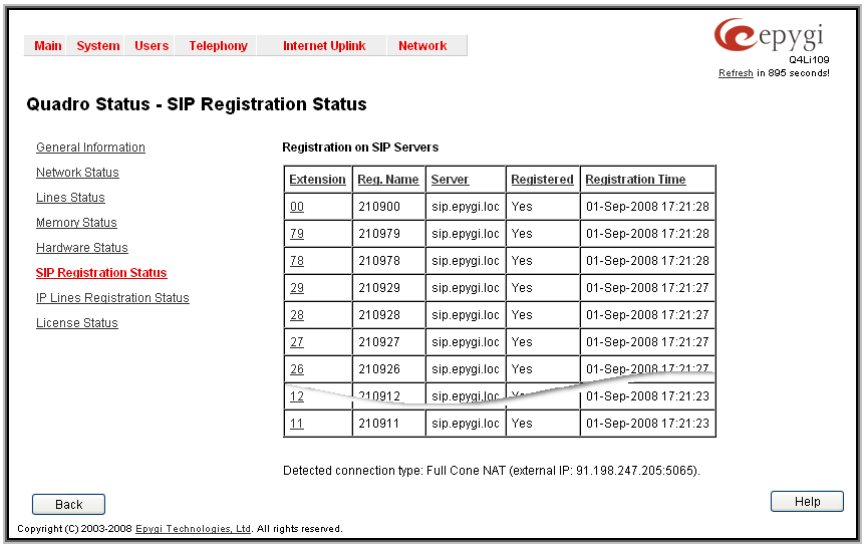


Fig. II-23: SIP Registration Status page

The **SIP Tunnels to Slave Devices** and **SIP Tunnels to Master Devices** tables list the SIP tunnels between local and the remote Quadros (see SIP Tunnel Settings). The **SIP Tunnels to Slave Devices** table lists those tunnels where local Quadro acts as a master. The **SIP Tunnels to Master Devices** table lists those tunnels where local Quadro acts as a slave.

IP Lines Registration Status

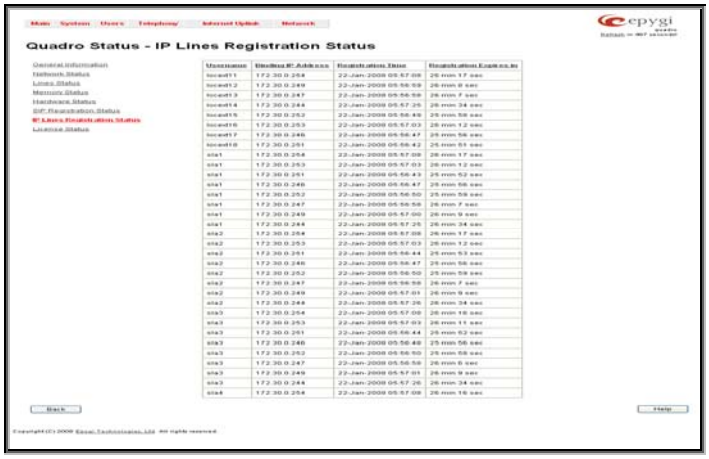


Fig. II-24: IP Lines Registration Status page

The **IP Line Registration Status** table includes the following information that may be sorted in ascending or descending order clicking the columns' headlines: The **IP Lines Registration Status** displays a table with the IP Lines registration information on the Quadro.

The **Registered IP Lines** table lists the IP lines and remote extensions registered on the Quadro, as well as all SLA lines registered from each IP phone. The table indicates the actual IP addresses of the remote devices, the usernames by which the devices have been registered on the Quadro, as well as the registration status information.

License Status

The **License Status** page displays a table with all available licenses on the Quadro and the corresponding settings for each license. (Currently only QCM license status is displayed.)

This page includes the following information:

Type indicates the type of the license available on the Quadro.

Count indicates the number of the corresponding licenses available on the Quadro.

In Use indicates the number of used licensed from the total available licenses.

Extension lists the extensions that are using the corresponding license. Links in this column move to the corresponding service configuration page for the extension.

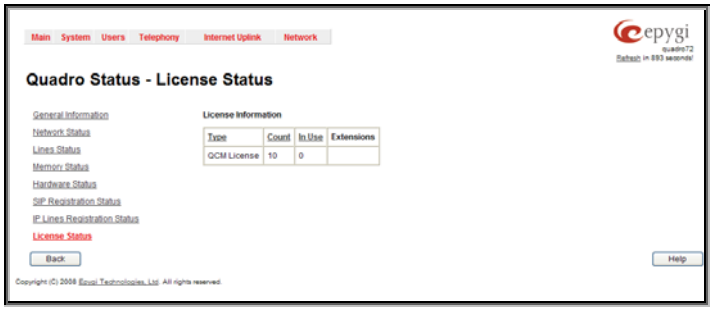


Fig. II-25: License Status page

IP Routing Configuration

Routing is used to relay information across the Internet from a source to a destination. Along the way, at least one intermediate node is typically encountered. Routing is different than bridging. The main difference between bridging and routing is that bridging operates at the OSI Data Link Layer (Level Two Media Access Control Layer) and routing operates at OSI Network Layer (Level Three).

Quadro's **IP Routing** service allows you to route IP packets from one destination to another (or to a specified router) through Quadro or a Quadro VPN.

The **IP Routing Configuration** page is used to make IP Static, IP Policy and VPN routes for IP packets routing. This page consists of three tables. Entries in the tables are color coded according to the state of the route. For example, yellow indicates disabled routes, green indicates successful routes and red indicates routes with an error.

IP Static Routes are used to forward IP packets from the Network, where the Quadro is connected, to the specified destination.

The **IP Static Routes** table displays all established IP static routes with their parameters: **Target State** for the state of the route (enabled or disabled), **Actual State** for the state of the route connection (up, down or erroneous), **Route To** for the subnet where the incoming packets should be routed to and **Via IP Address** for the router IP address where incoming packets should be routed through.

Add opens the **Add IP Static Route** page where a new static route can be established.

Enable/Disable is used to activate and deactivate a selected route(s). At least one route should be selected in order to use these functions, otherwise the following error message will appear: "No record(s) selected."

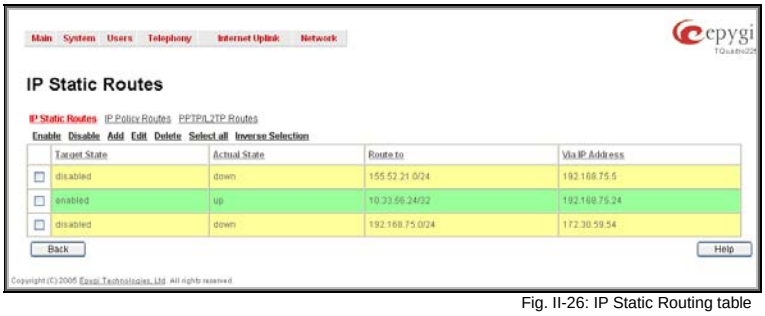


Fig. II-26: IP Static Routing table

The **Add IP Static Route** page offers the following components:

Route To requires the IP address and subnet mask for the destination the IP packet should be forwarded to.

Via IP Address requires the IP address of the subsequent router for IP packet forwarding to the specified destination.

Attention: The rule with the longest subnet (smallest IP range) will take effect when having two or more IP Static routing rules with the coinciding subnets.

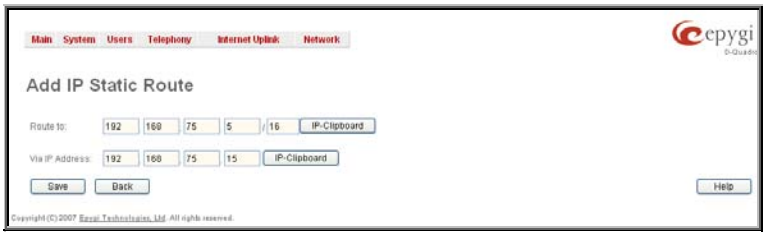


Fig. II-27: Add IP Static Routing page

IP Policy Routes allow IP packets forwarding to the specified router depending on the source IP address as well as defining the priority for the current routing rule.

The **IP Policy Routes** table displays all specified IP policy routes with their parameters: **Target State** for the state of the route (enabled or disabled), **Actual State** for the state of the route connection (up, down or erroneous), **Priority** for the route priority, **Route From** is where the subnet, routed packets come from and **Via IP Address** is where the router IP address incoming packets should be routed through.

Add opens the **Add IP Policy Route** page to establish a new policy route.

Enable and **Disable** are used to activate or to deactivate the selected route(s).

Raise Priority and **Lower Priority** are used to increase or decrease the priority of the selected policy route(s) by one. At least one route should be selected to use these functions, otherwise the error message "No record(s) selected" will appear.

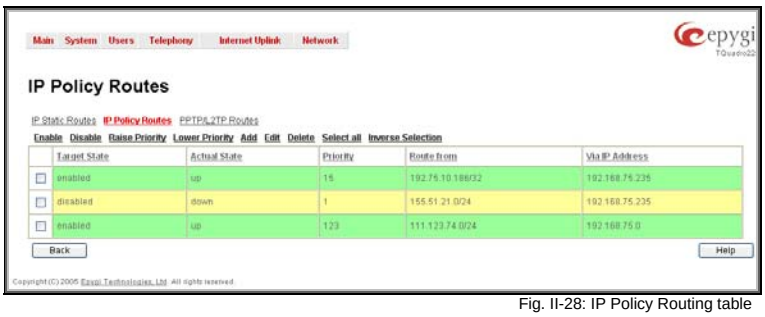


Fig. II-28: IP Policy Routing table

The **Add IP Policy Route** page offers the following input options:

Priority requires a numeric value (from 1 to 252) to define the priority of the routing rule. The lower the number, the sooner the routing rule will take effect (higher priority).

From requires the packet source IP address and subnet mask of the specified destination to match with the rule.

Via IP address requires the IP address of the subsequent router for IP packet forwarding.

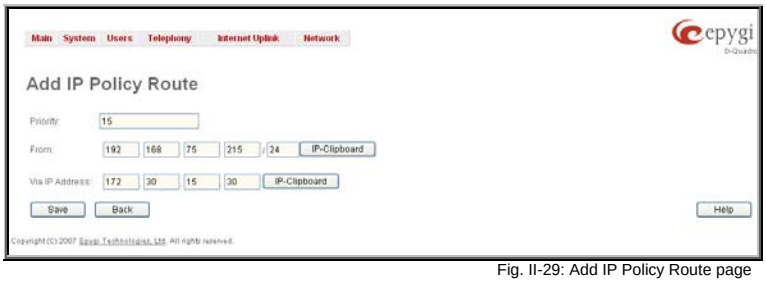


Fig. II-29: Add IP Policy Route page

The **PPTP/L2TP Routes** allow IP packets forwarding through the PPTP and L2TP tunnels of the Quadro. If PPTP/L2TP connections do not exist on Quadro, VPN routes cannot be generated.

The **PPTP/L2TP Routes** table displays all generated VPN routes with their parameters: **Target State** for the state of the route (enabled or disabled), **Actual State** for the state of the route connection (up, down or erroneous), **Route To** for the subnet where the incoming packets should be routed, **Via Tunnel** for the VPN tunnel incoming packets should be routed through and **Tunnel State** for the actual state of the route tunnel (up or down).

The **Add** button opens the **Add VPN Route** page where a new VPN route can be generated.

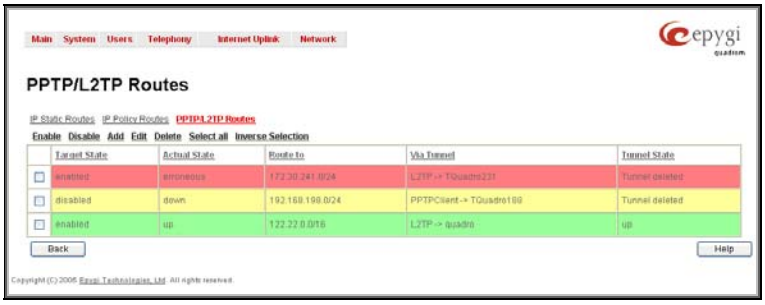


Fig. II-30: VPN Routing table

The **Add VPN Route** page offers the following components:

Route Via contains the available PPTP and L2TP connections on the Quadro. A connection selected from this list will be used to route the IP packet from the Quadro's LAN to the peer behind the PPTP/L2TP tunnel.

Route To requires the IP address range of the possible peers behind the PPTP/L2TP tunnel whereto the IP packets should be routed.

Fig. II-31: Add VPN Route page

The **Enable** and **Disable** functional buttons are used to activate or to deactivate the selected route(s). At least one route should be selected to use these functions, otherwise the error message "No record(s) selected" will appear.

To Add an IP Static Route

1. Select the **IP Static Routes** link on the **Routing Configuration** page.
2. Press the **Add** button on the **IP Static Routes** page. The **Add Entry** page will appear in the browser window.
3. Enter the destination IP address and subnet mask in the **Route To** text fields. Use the **IP-Clip** button to select a previously entered IP address.
4. Enter the router IP address into the **Via IP Address** text fields.
5. Press the **Save** button to make the static route with these settings.

To Add an IP Policy Route

1. Select the **IP Policy Route**s link on the **Routing Configuration** page.
2. Press the **Add** button on the **IP Policy Routes** page. The **Add Entry** page will appear in the browser window.
3. Specify the policy routing rule priority in the **Priority** text field.
4. Enter the packet source IP address and subnet mask in the **From** text fields. Use the **IP-Clip** button to select a previously entered IP address.
5. Enter the router IP address into the **Via IP Address To** text fields.
6. Press the **Save** button to make the policy route with these settings.

To Add a VPN Route

1. Select the **VPN Routes** link on the **Routing Configuration** page.
2. Press the **Add** button on the **VPN Routes** page. The **Add Entry** page will appear in the browser window.
3. Choose the VPN connection from the **Route Via** drop down list.
4. Enter the destination IP address and the subnet mask into the **Route To** text fields.
5. Press the **Save** button to make the VPN route with these settings.

Configuration Management

The **Configuration Management** page assists the administrator with managing the system configuration settings and voice data. For example, the administrator is able to backup and download the settings to a PC and then upload and restore them back to the Quadro. Additionally, this page provides the possibility of restoring the factory default configuration settings.

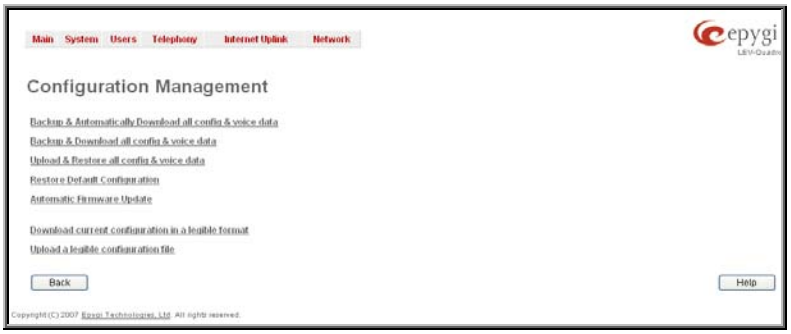


Fig. II-32: Configuration Management page

The **Backup & Automatically Download all config & voice data** link leads to the **Automatically Backup Configuration Settings** page where the automatic backup of the system configuration and the voice data can be configured. The service allows you to setup Quadro so it will automatically backup the system configuration and the voice data and store it in the specified location.

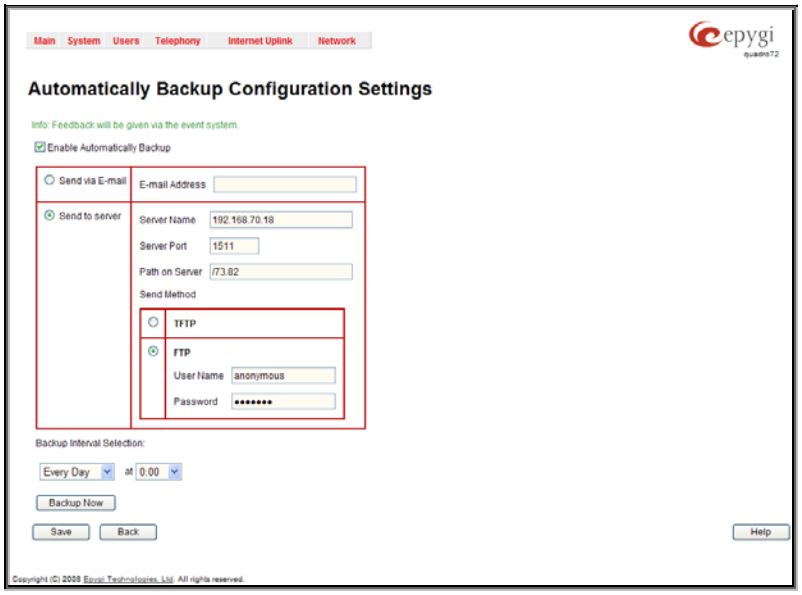


Fig. II-33: Configuration Management page

The **Automatically Backup Configuration** Settings page allows you to enable the automatic backup of the system configuration and the voice data on the Quadro. With this service, Quadro will automatically backup the system configuration and the voice data and store it in the specified location.

This page contains the following components:

The **Enable Automatically Backup** checkbox enables automatic backup mechanism on the Quadro.

The following group of manipulation radio buttons allows you to select whether the backup files will be delivered by email or stored in some location:

The **Send via Email** radio button is used to send the automatically backed up files via email. The selection enables **Email Address** text field that requires the email address of the administrating person to receive the automatically backup files.

The **Send to Server** radio button is used to store the automatically backup files on a remote server. This selection enables the following fields to be inserted:

The **Server Name** requires the IP address or the host name of the remote server.

The **Server Port** requires the port number of the remote server.

The **Path on Server** requires the path on the server to store the backup files in.

The **Send Method** manipulation radio buttons allow you to select the remote server type: TFTP or FTP. In case of FTP selection, the authentication username and the password need to be inserted. In case these fields are left empty, anonymous authentication will be used.

The **Backup Interval Selection** drop down lists are used to select the frequency and the time when the automatic backup of the Quadro's system configuration and the voice data will take place.

Backup Now button is used to perform a manually immediate backup of the system configuration and the voice data.

The **Backup & Download all config & voice data** link generates a backup file with all configuration settings and user uploaded greeting messages. It opens a file chooser window for immediate download to the users PC.

The **Upload & Restore all config & voice data** link opens a page that has a **Browse** button, (which opens a file chooser to select a backed-up file) and a **Configuration to Upload** field requiring the file path to upload and to restore it immediately. Pressing **Save** will restore the selected backup file, and delete all current user defined greetings and replace configuration settings.

The **Restore Default Configuration** functional button resets all configuration settings and restores the board's factory default configuration. By restoring the default configuration you will replace your current configuration, lose all voice mails and reboot the device. You will not be automatically redirected to the GUI start page. After the successful reboot you will need to enter into the management page and login again to access the Quadro's configuration. A warning message will ask you to confirm your selection before restoring the default configuration.

Please Note: Unlike the factory default settings restore procedure initialized from the Reset button on the Quadro board, this link will keep the following data:

- Call Statistics
- Transfer Statistics

- System Events
- Feature Keys
- Device Registration state

The Automatic Firmware Update link leads you to the page where the automatic update of the Quadro's firmware (software image) can be configured.

The **Download current configuration in a legible format** and **Upload a legible configuration file** links leads you to the Legible Configuration Management page where legible configuration can be downloaded and uploaded back after the required edits.

Automatic Firmware Update

The **Automatic Firmware Update** page allows you to configure an automatic update of the Quadro's firmware (software image) as it becomes available on the server. When this service is enabled, on the configured day and time Quadro will automatically check for a new available firmware on the server and will either notify the administrator or update the firmware right away, depending on the configured settings.

The server configuration can be done manually or through the DHCP server. In case of DHCP server replying configuration, the corresponding adjustments should be done on the DHCP server to automatically point the Quadro to the destination where the firmware is stored.

Please Note: Independent on the selected server type, there should be an "**auto-update**" folder in the root directory of the server. Quadro will check for any new firmware in that specific folder only. Besides the firmware *.bin file, the "**auto-update**" folder should contain supplementary file(s) to point to the correct firmware file.

The detailed instructions on the functionality of automatic firmware update as well as server configuration are described in the "**Automatic Firmware Update"** document which you can find at the Epygi Web support portal.

This page consists of the following components:

The **Enable Automatically Firmware Update** checkbox selection enables the automatic firmware update service on the Quadro.

Attention: When the older firmware is installed on the Quadro, the system configuration will be lost and the device will be factory reset.

The first manipulation buttons group on this page allows you to choose between the manually configured firmware server and the server defined by the DHCP server.

- **Assign manually** – this selection is used to manually configure the firmware server settings. The **Server Name** (the IP address or hostname), the **Server Port** and the **Update Method** should be defined. The **Update Method** drop down list provides a possibility to choose among TFTP, FTP, HTTP or HTTPS methods. For some of these selections, authentication **Username** and **Password** can be entered.
- **Assign automatically via DHCP** - choose this selection if the Quadro acts as a DHCP client in its WAN interface. In this case the firmware server's configuration will be automatically obtained from the DHCP server. This selection requires previous configuration on the firmware server and will work only if the "**auto-update**" directory is created on the TFTP server. The DHCP server should also be configured to provide the "TFTP server name" parameter (option 66) to the Quadro.

The second manipulation buttons group on this page allows you to select the frequency of checking for a new update.

- **Check and notify** – choose this selection if you only wish to be notified about the new available firmware on the server. With this selection, on the indicated weekday and time, on daily or weekly basis, the Quadro will check for a new firmware available on the server. The way of notification is configured from the Events page.
- **Check and update** – choose this selection to check and automatically install the new firmware on the Quadro as it becomes available on the server. With this selection, on the indicated weekday and time, on daily or weekly basis, the Quadro will check for a new firmware available on the server, will automatically download and install it on the Quadro.

The **Check/Update Now** button is used to manually initiate **Check and notify** or **Check and update** actions. The action to be executed depends on the radio button selected above

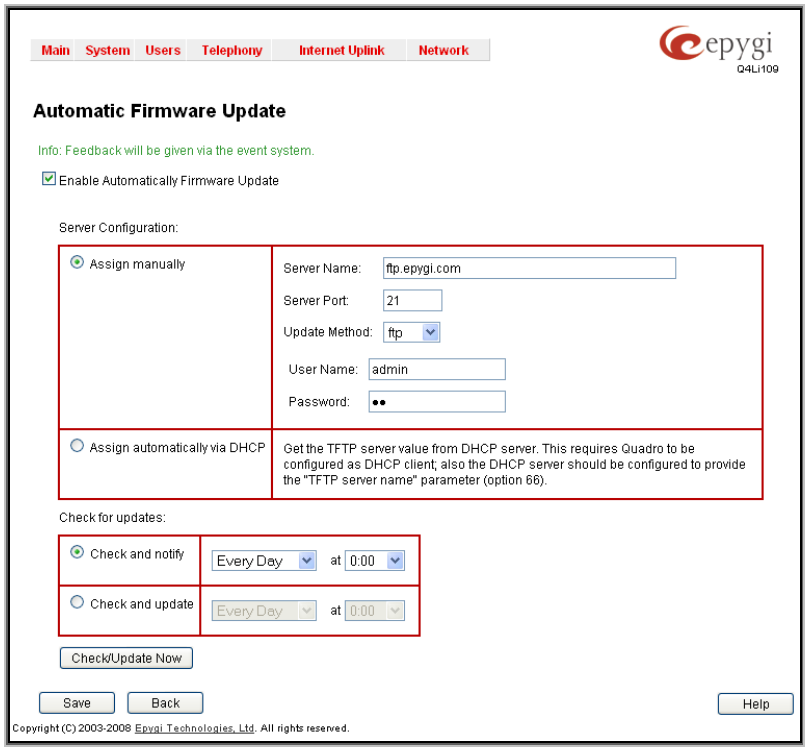


Fig. II-34: Upload Configuration page

Legible Configuration Management

The **Legible Configuration Management** is used to manually manage the configuration on the Quadro. This will allow you to download a piece of configuration from the Quadro in the way of legible file, to make necessary changes in that file and to upload it back to the same or different Quadro(s). With this service, some pieces of configuration (like extension settings, NAT settings, etc.) of one Quadro can be used on another Quadro. This also helps to apply the same group of settings to the several instances (for example, to apply the same SIP settings to multiple extensions on the Quadro) on the same or different Quadros avoiding manual configuration of each of those instances (i.e. extension) from the web management on each of the Quadros. The Quadro reseller, distributor, ISP or carrier usually uses this service.

The **Download current configuration in a legible format** link refers to the **Configuration Summary** page where a partial or complete configuration can be defined and downloaded or viewed.

The **Configuration Summary** page is used to generate a piece of legible configuration and to download it to a PC or to view it directly in the browser. This page consists of the following components:

The **CGI Description** drop down list includes a list of Web management pages for which the legible configuration can be manually managed. For example, selecting "RTP Settings" Web management page will generate a legible configuration file with parameters present on the RTP Settings page.

The **Generate for Extension** drop down list allows you to limit the settings in the generated legible configuration file to one specific extension. For example, each of the extensions on the Quadro have own SIP settings or Codecs. To download the settings for a particular extension only, you need to choose the corresponding extension from the list. The drop down may also have a blank selection. In that case the legible configuration file will contain the parameter of all available extensions on the Quadro (if the selected parameter applies to the extension and not to the overall system, like RTP settings).

The **Start generate a legible configuration file** button start parsing the configuration structure of the device for the defined parameters. The progress will be displayed in the area below.

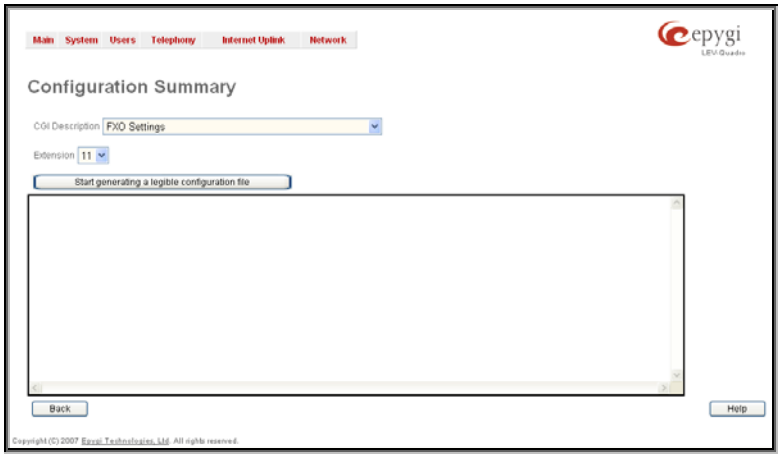


Fig. II-35: Configuration Summary – Parameters page

The **Cancel generation process** button appears when the configuration generation procedure starts and it is used to stop it.

The **Download generated configuration** button becomes available when the legible configuration generation is finished. It is used to download the generated file to the PC in a plain text format. Necessary changes can be made in the downloaded configuration file and then uploaded back to the system.

Attention: Make sure the changes you have done in the downloaded legible configuration file are valid and will not corrupt the system when being uploaded back to device.

The **View generated configuration** button becomes available when the legible configuration generation is finished. It is used to view the generated file directly in the browser.

The **Restart generation!** button becomes available when the legible configuration generation is finished. It is used to cancel the generated configuration file and to start over.

Fig. II-36: Configuration Summary Preview page

The **Upload Legible Configuration** page is used to upload a configuration file in a text format. The **Browse** button in the opened page is used to browse certain legible configuration file to be uploaded and updated into the system. The configuration files to be uploaded should be in the *.txt format, otherwise a system error occurs. Configuration file upload progress will be displayed in the area below.

Events

The **Events** page has two tables. All system events that have occurred will be displayed in one table and event settings will be displayed in the other.

The **System Events** page may be accessed through the **Events** link from the main menu. It lists information about system events that have occurred on Quadro. When a new event takes place, a record is added to the System Event table. For failure events (priority 2 and 3, see below), the warning “Please check your pending events!” will appear at the bottom of all management pages.

The system events and the warning message are visible only for the administrator. The warning link, (which leads directly to the **System Events** page) will disappear from the management pages if the administrator has marked all new events as “read”.

Fig. II-37: Event Warning on the Main Menu page

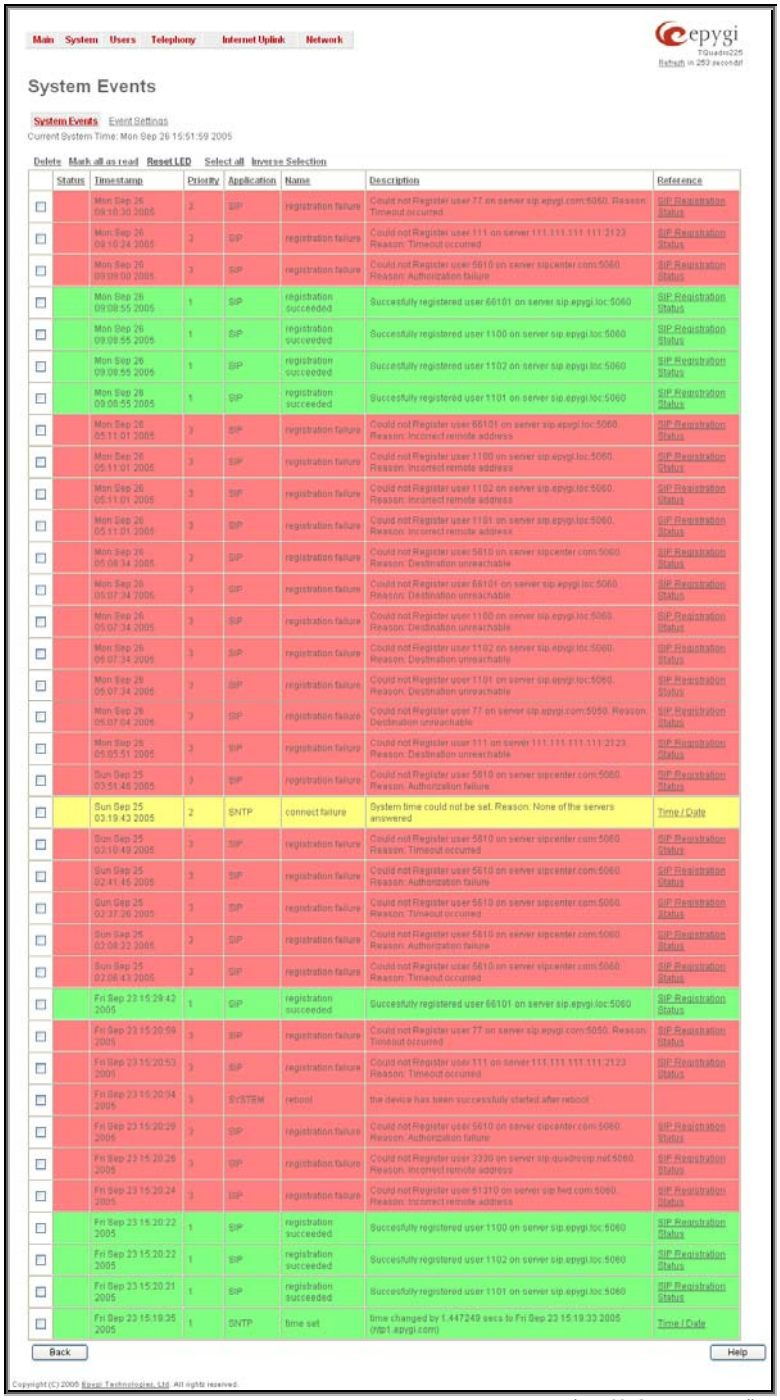


Fig. II-38: System Events list

The **System Events** table is the list of new and read system events. System events have corresponding coloring depending on the nature of the event: success (priority 1, color green), low importance failure (priority 2, color yellow), critical failure (priority 3, color red).

The table shows the **Status** of the event (new or read) as well as the name of the application the event refers to, event description, and the date when the event was received. For example, if the event was caused by the IDS service, the **Check IDS** link appears in the reference row that will lead to the IDS Log page, or if the event has occurred due to incorrect mail sending or SIP registration, the corresponding links will be seen in the **Reference** column of the table. The administrator can view the detailed log for each event that has occurred.

The **System Events** page offers the following components:

Current System Time displays the local date and time on Quadro.

Mark all as read marks newly occurred events as "read".

Reset LED switches off the flashing LED (if applicable) on the board. An LED notification may appear (depending on the notification type given) in the page Events page when a new event occurs.

Fig. II-39: Event Configuration Settings page

Numerous circumstances may cause a certain application on Quadro to flag an event.

The **Event Settings** page lists all possible events on the Quadro and allows controlling notification (action) when an event takes place.

Each entry in the events' table has a checkbox assigned to each row. By selecting the corresponding checkboxes, operations such as **Edit** may be done for one or more events.

Edit opens the **Edit Event Settings** page to modify the event action.

The **Edit Event Settings** page offers the following input options:

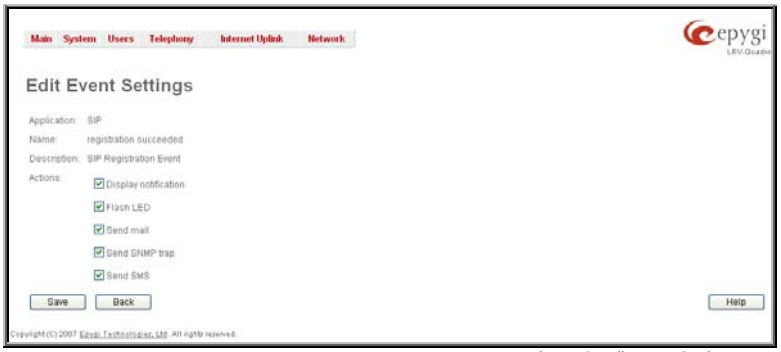


Fig. II-40: Edit Event Settings page

Application displays the application the event refers to. **Multiple** is shown here if more than one event has been selected for the action assignment.

Name displays the name of the event. **Multiple** is shown here if more than one event has been selected for the action assignment.

Description displays additional information about the event. **Multiple** is shown here if more than one event has been selected for the action assignment.

Action offers radio buttons to choose one of the actions to notify the Quadro administrator when an event(s) takes place. The following actions can be available:

- **Display Notification** - A notification link will be displayed on the bottom of all pages and a record is added into the Events table. The notification is executed as a link "Please Check you pending events!". The link leads to the System Events page. This action also will take place if Flash LED or Send Mail has been selected, even if not specifically selected.
- **Flash LED** - The second LED (yellow) will blink every second and a notification will be displayed on the bottom of all pages. For some events the LED will start flashing after a delay.
- **Send Mail** – an e-mail notification about the new event on the Quadro will be sent to the e-mail address specified in the Mail Settings page.
- **Send SNMP Trap** – an SNMP notification will be sent to the traphost(s) listed in the SNMP Trap Settings table (see SNMP Settings).
- **Send SMS** – an SMS notification about the new event on the Quadro will be sent to the mobile phone specified in the SMS Settings page.

Actions that are not allowed for the selected event (like mail notification if the PPP link is down or the mail server has been configured improperly) are hidden. For multiple events editing, actions that are not appropriate for least one of the selected events will also be hidden.

Please Note: In case of an IDS (Intrusion Detection System) intrusion alert, only the first possible intrusion in each 10 minute period will initiate an event. This helps to avoid flooding the System Events table, and flooding the user with various intrusion alerts that result from each possible Denial of Service attack. When these events are displayed in the System Events table, the user can receive detailed information about the intrusions through a link to the IDS log list.

If Quadro cannot receive an IP address from the DHCP or PPP servers, or cannot register an extension on the SIP or Routing servers, or cannot reach an NTP server, it raises only one event for the entire period the action has failed, but will continue to try. When the required action is successful Quadro raises an appropriate message.

To Assign an Action to the Event

1. Select the checkbox of one or more events to assign an action to them.
2. Press the **Edit** button. The **Edit Event Settings** page appears.
3. Select an action type from the **Action** radio buttons to notify the administrator about the event.
4. Press the **Save** button to submit the changes or use **Back** to abort the selected action.

Time/Date Settings

The **Time and Date Settings** page provides information about the current system time and date. The settings may be updated through the international time and date servers.

Time is used to set the local time (hour, minute).

Date is used to set the date (month, day, year).

Timezone provides a selection of world time zones and is used to select the local country time zone. Timezones are specified by GMT (Greenwich Mean Time) and by specific timezones for the United States and Canada.

Enable Simple Network Time Protocol Server enables the SNTP (Simple Network Time Protocol) server on Quadro, thus Quadro becomes the timeserver for its LAN.

Enable Simple Network Time Protocol Client enables the SNTP client on the Quadro, thus Quadro becomes a client to an external timeserver. A checkbox disables Date and Time drop down lists and enables the following parameters:

The **SNTP Servers** table lists all defined NTP Servers.

The **Add** functional button opens an **Add NTP Server** page where a new NTP server can be defined. This page offers the **NTP Server** radio buttons that are used to choose between a manual and a predefined NTP server.

> **Manual** requires the NTP server's FQDN (Full Qualified Domain Name) or its IP address.
>
> **Predefined** is used to select the NTP server's host address from the drop down list, where the most common NTP servers are listed.

The **Move Up** and **Move Down** functional buttons are used to sort NTP servers in the order they need to be accessed. If the NTP server in the first position of the **SNTP Servers** table does not answer, NTP server in the next position will try to be reached.

Please Note: You can add another NTP server to the list if the defined NTP servers are not functional (for example, Quadro's date/time is not being updated automatically).

Polling Interval indicates the time interval for the periodical synchronization between the timeserver and Quadro. It counts in hours.

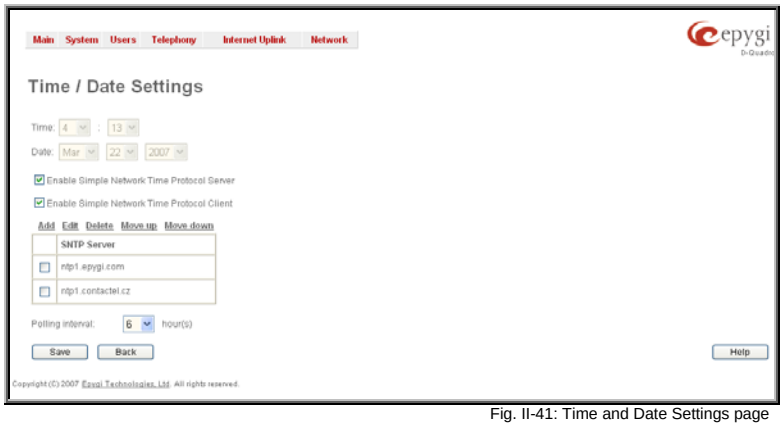


Fig. II-41: Time and Date Settings page

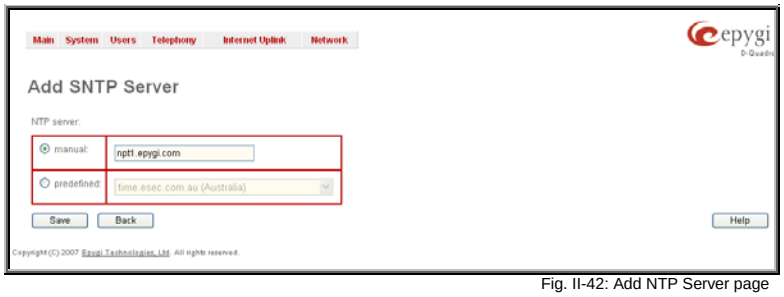


Fig. II-42: Add NTP Server page

Attention: Time and Date Settings will be reset if Quadro has lost power.

Mail Settings

The **System Mail Settings** page allows you to send warnings automatically about the board status or problems to the administrator. System events that require email notification are selected on the Events page. System mail must be enabled and the SMTP server needs to be configured for voice message transmission to the extension user's mailing account.

Enable enables system mail sending and voice messages transmission to the extension user's mailbox.

SMTP Host requires the SMTP host IP address or domain name. The SMTP host needs to be configured to enable voice message transmission.

SMTP Port requires the SMTP host port number.

Mail Sender Address text field requires the source address for the Quadro notification emails. The email address defined here should be an existing valid e-mail address registered on the selected SMTP server or it should have permission to use that particular SMTP server for e-mail transmission.

Mail Recipient Address text field requires an active e-mail address where system emails will be delivered. The e-mail recipient here can be a Quadro administrator or someone responsible for network and system problems.

Mail Recipient Address (CC) text field requires an active email address where a carbon copy (CC) of the system emails will be delivered.

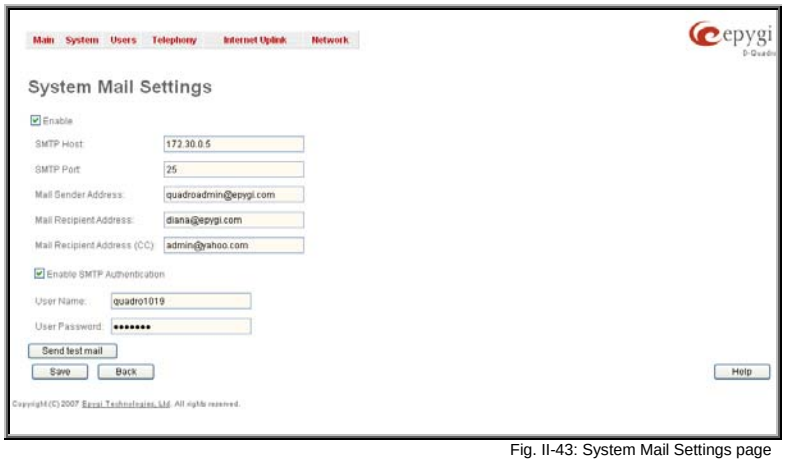


Fig. II-43: System Mail Settings page

Enable SMTP Authentication must be selected if the specified SMTP server requires authentication. In this case, authentication **User Name** and **Password** configured on the SMTP server should be defined in the corresponding text fields.

Attention: The following symbols are not allowed for the **Password** field: '$', '(', ')','/', '`', '&', '\', '"'.

Send Test Mail is used to initiate a test e-mail transmission. This button will be enabled if correct values have been submitted and saved on this page.

To configure the System Mail

1. Enable the system mail sending by the **Enable** checkbox selection.
2. Update or set the SMTP host in the **SMTP Host** text field.
3. Update or set the e-mail sender address in the **Mail Sender Address** text field.
4. Update or set the e-mail address in the **Mail Recipient Address** text field.
5. Enable **SMTP Authentication** if it is required on the server.
6. Insert into the corresponding text fields an authentication **User Name** and **User Password** defined by your SMTP server.
7. Press the **Save** button to submit these settings.
8. Use the **Send Test Mail** button to send a test e-mail with the configured settings.

SMS Settings

The **SMS Settings** are used to configure the SMS parameters that will allow Quadro to send the voice mail notifications or event notifications via SMS to the extension user's mobile phone. Every extension user can enable voice mail notifications when a new voice mail is received and they can to define their own mobile numbers from the Voice Mail Settings or to set the certain Events notification to be delivered per SMS. However, for Quadro to deliver SMS notifications, the SMS service should be enabled and SMS settings should be configured from this page.

Enable SMS Service enables the SMS service on the Quadro.

User Name and **Password** text fields require the authentication settings of the SMS server.

SMS Sender Address requires the source address for the Quadro notification SMS. The address defined in this field will be seen in the "From" field of the SMS delivered to the mobile phone.

SMS Recipient Address requires a destination mobile number for a test SMS.

SMS Gateway manipulation radio buttons allow to selected between pre-defined Clickatell SMS gateway and the custom defined SMS gateways.

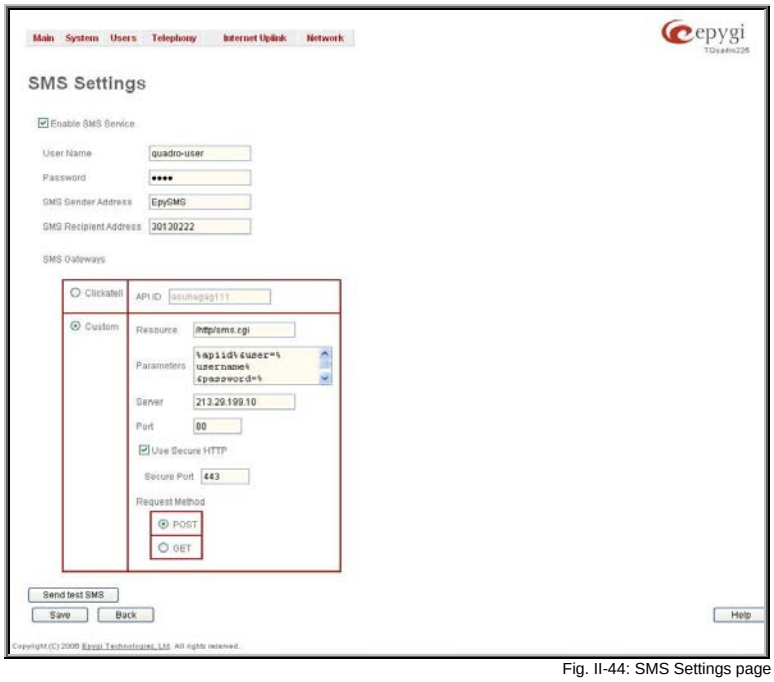


Fig. II-44: SMS Settings page

- **Clickatell** – this selection allows to use a pre-defined SMS gateway. Selection enables the **API ID** text field which indicates a Clicatell specific parameter obtained from the server and should match on both sides.
- **Custom** – this selection allows to use a custom SMS gateway. Selection requires following parameters to be inserted:

  Resource text field requires the HTTP resource name on the SMS gateway, for example: /http/sms.cgi.

  Parameters text field requires the parameters to be submitted to the resource address. The value of this field represents a string with tokens (separated by percent (%) symbols) inside. Each token indicates a value of the certain field on this page. The value is dependent on the SMS gateway requirements. For example:

  user=%username%&password=%password%&to=%to%&from=%from%&text=%text%

  The tokens are the strings that have the following dependencies from the field in this page:

  %username% – indicates the username defined in the field **Username**
  %password% – indicates the password defined in the field **Password**
  %to% - indicates the password defined in the field **SMS Recipient Address**
  %from% - indicates the password defined in the field **SMS Sender Address**
  %text% - indicates the SMS text generated by Quadro (voice mail notification, event notification, etc.)

  Server text field requires the IP address or the host name of the SMS gateway.

  Port text field requires the port number of the SMS gateway.

  Use Secure HTTP checkbox enables access to SMS server via HTTPS. Checkbox selection enables a **Secure Port** text field that requires the port number for HTTPS traffic.

  Request Method manipulation radio buttons allow to select the HTTP request method used by Quadro the access the SMS gateway: **POST** or **GET**.

Send Test SMS is used to send a test SMS to the defined SMS Recipient Address. This button will be enabled if correct values have been submitted and saved on this page.

Firmware Update

This window allows updating the software of Quadro by installing new firmware (image). Users registered at Epygi will receive a notice when new firmware is available and will be able to download it from the Epygi Technical Support WEB page.

Updating new firmware requires a working power supply. Quadro is provided with a battery (accumulator). If the battery is low or simply absent the "There is no battery or voltage is low" warning is displayed.

Please Note: Installing new firmware will take about 15 minutes. During this time, Quadro, telephony and Internet access will be disabled.
The firmware update will cause the loss of the following data:

- All internally stored voice mails and custom voice messages

Please Note: If you do not wish to lose your voice data, have it downloaded from Configuration Management page prior to starting the Firmware Update.

- DHCP leases
- Transfer statistics
- Call statistics

Please Note: If you consider the Call Statistics entries in the displayed tables to be important, it is recommended to download them from the corresponding page prior to starting the Firmware Update.

Fig. II-45: Firmware Update page 1

- All pending events
- User specific GUI states

The following main processes will be stopped during the firmware update and will be restarted after the installation is completed:

- Voice Software
- Network Time Protocol Daemon
- Network Interface Statistic Daemon
- Dynamic DNS Daemon

Next will move you to the second page of Firmware Update where the image file should be selected.

Attention: Pressing the **Next** button will stop some vital processes on the Quadro, therefore you will need to reboot your device manually even if you have cancelled the firmware update procedure on the following steps.

The second page of **Firmware update** has a **Browse** button used to browse the image file, and the **Specify Image** text field that will display the selected image filename.

Pressing **Save** will start uploading the image file to the board and the next page will display results and verification of the image being burned.

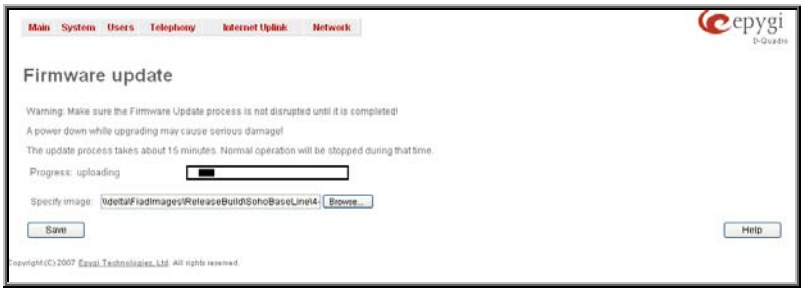


Fig. II-46: Firmware Update page 2

This page displays non-editable information about the image validity. The **Image Check** field will display "invalid" if the image does not correspond to the hardware version.

The **Current Software Version** field shows the old software version. The **New Software Version** field shows the new version of the software image.

This page needs to be confirmed in order to continue image updating. If you are sure that the image version is appropriate for your device press **Save**.

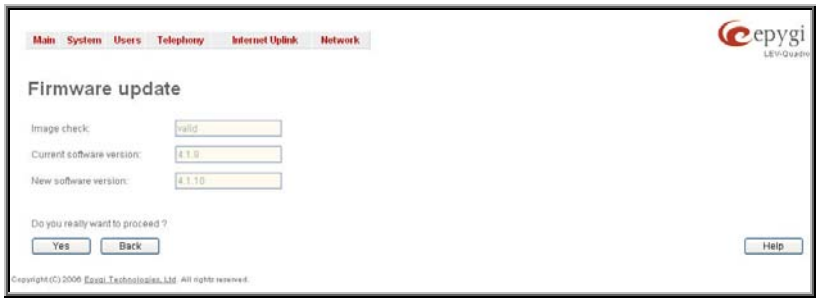


Fig. II-47: Firmware Check page

If you have confirmed the firmware version, a new page with firmware update progress will be displayed next. There are no functions available on this page, just information about the firmware update procedure. At some point the connection with the device is being lost and you need to wait until the firmware will be burned on the Quadro.

You will not be automatically redirected to the Login page. To access the Quadro's Web GUI, you need to connect Quadro again and login.

Attention: After the firmware update, all IP phones attached to the Quadro should be restarted.

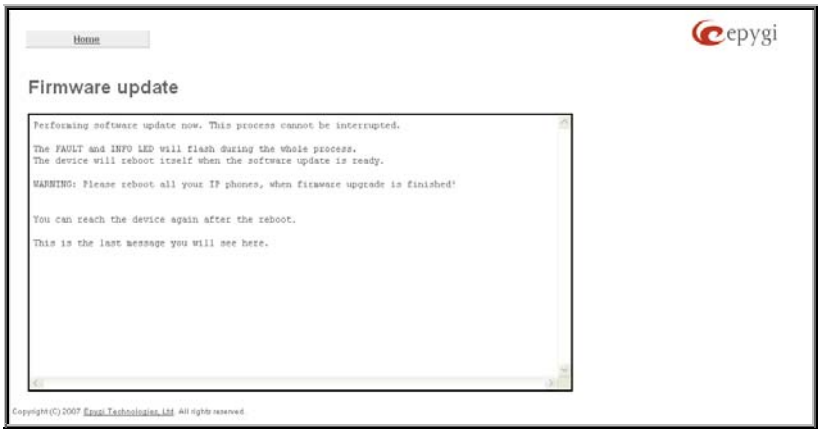


Fig. II-48: Firmware Update page

Networking Tools

The **Networking Tools** page provides the possibility to check the Internet connection.

Ping sends four ICMP (Internet Control Message Protocol) requests with a default size of 64 bytes to the destination (IP address or host name) specified in the text field **Ping Target**. The response times are logged, and the round trip time (the time required from being sent until being received again) is measured. The minimum and maximum round trip time and its average as well as the percentage of lost and of received frames results are displayed in the lower area of the page.

Traceroute checks the Internet connection by triggering the routers (hops) that are passed to reach the destination specified in the **Traceroute Target** text field. Trace routing gives feedback on the routers passed by packets on the way toward the destination and the round trip delay of packets to these routers.

Attention: No **Traceroute** is possible if a high priority Firewall has been enabled (see chapter Firewall and NAT).

Fig. II-49: Networking Tools page

For the purpose of tracerouting, several IP packets are sent out. UDP (User Datagram Protocol) is used to send packets and ICMP (Internet Control Message Protocol) is used to receive information about the routers. In their headers, the TTL (Time To Live) value increases from 1 to 30. When the first IP frame is received by the first router, its IP address will be returned in its acknowledgement.

The second frame delivers the IP address of the second router and so on and so forth. The results of **Traceroute** are displayed on the lower area of the page.

Ping Target requires the destination (IP address or host name) for the ICMP request.

The **Ping** button starts pinging the specified ping target.

Traceroute Target is used to enter the IP address or host name of the destination to be trace routed.

The **Traceroute** button is used to process the router triggering to check the Internet connection.

In the field below these, the output of the Ping or Traceroute procedure is shown.

To Check the Internet connection

1. Specify the destination address for the ICMP request in the **Ping Target** text field.
2. Press the **Ping** button to process the ICMP request.
3. Specify the destination address to trace the route.
4. Press the **Traceroute** button to process the router triggering.

SNMP Settings

The **Simple Network Management Protocol** (SNMP) is an application layer protocol that facilitates the exchange of management information between network devices and is used by network administrators to manage network performance, find and solve network problems, and plan for network growth.

On Quadro, SNMP agent is running to allow administrators to remotely manage Quadro's network and the device's configuration. Remote administration is being performed by means of special SNMP monitoring programs (SNMP Manager), which can automatically feedback by the certainly configured actions on some events on the Quadro or remotely modify Quadro's settings.

SNMP Settings page is divided into two pages: **Global SNMP Settings** and **SNMP Trap Settings**.

Global SNMP Settings are used to enable the SNMP agent on the Quadro, to select the SNMP protocol version for communication with the administrating application and to define the community for administrating application to connect the Quadro.

Enable SNMP checkbox is used to enable SNMP agent on the Quadro.

System Location text field requires optional information to describe the network where SNMP management is performed.

System Contact text field requires optional information about the contact person responsible for the SNMP management in the defined network. Field may indicate the point person's name, email address, phone number or other contact information.

Enable SNMP v1 / 2c checkbox is used to enable SNMP v1/2c protocol version for the messaging between Quadro's SNMP agent and the administrating application. If this checkbox is not selected, **SNMP v1** will be implied.

SNMP v1 / v2c Read-Only Community text field is used to insert the community description (public, private, etc.) for the read-only management (like gathering information (events, statistics, etc.) about Quadro's). Field may contain some kind of password which should be matching both on Quadro and on the administrating application for successful SNMP management.

Enable SNMP v1 / 2c Read-Write Access checkbox additionally enables a read-write access on the Quadro for the SNMP monitoring application. With this checkbox enabled, administrator will be able to remotely configure the Quadro via SNMP administrating program.

SNMP v1 / v2c Read-Write Community text field is used to insert the community description (public, private, etc.) for the read-write management (like gathering information (events, statistics, etc.) about Quadro's and remotely changing Quadro's configuration). Field may contain some kind of password which should be matching both on Quadro and on the administrating application for successful SNMP management.

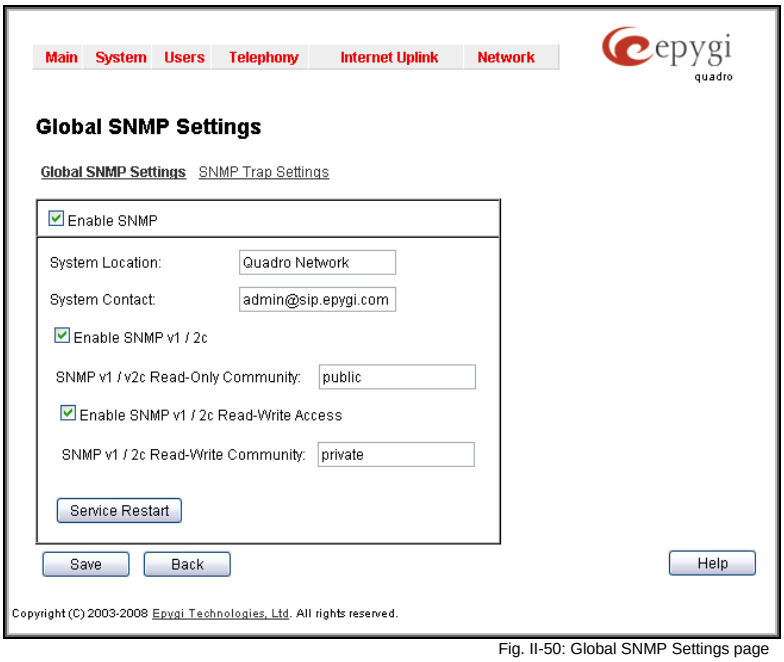


Fig. II-50: Global SNMP Settings page

The **Service Restart** button restarts the SNMP sub-system on the Quadro. Restarting the SNMP sub-system is recommended if it does not respond to a SNMP manager's requests.

SNMP Trap Settings are used to define the traphosts that should be informed when certain events occur on the Quadro. For the listed traphosts to be informed about the events on the Quadro, **Send SNMP Trap** action should be configured for the corresponding event(s) from the Events page.

SNMP Trap Settings page contains a list of all configured traphosts with the referring information.

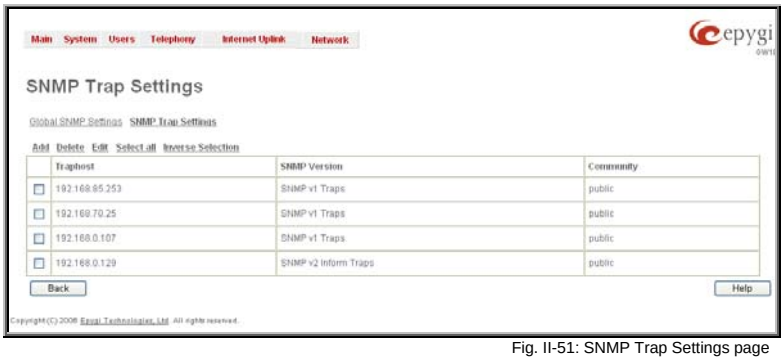


Fig. II-51: SNMP Trap Settings page

Add functional button is used to add a new traphost to the table and opens **Add SNMP Traphost** page where the new traphost might be defined. Page consists of the following components:

Traphost text field requires an IP address or the host name of the traphost. Administrating application's host address should be inserted here.

Community text field requires community description (public, private, etc.) for the administrating application to accept the notifications about the certain events on the Quadro. Field may contain some kind of password which should be the same both on Quadro and on the administrating application for successful SNMP management.

A group of radio buttons is used to select the SNMP protocol version used for events notifications delivered by the Quadro to the administrating application.

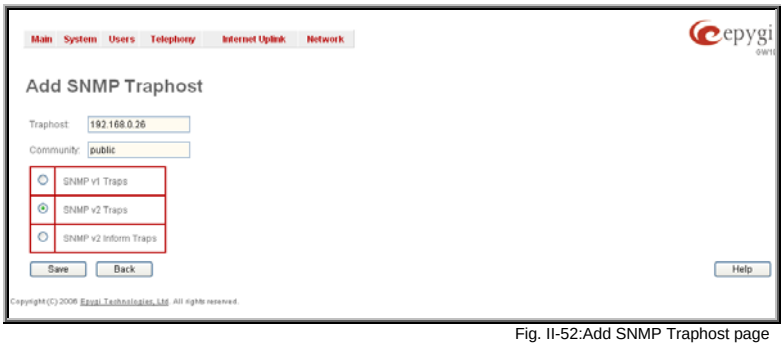


Fig. II-52:Add SNMP Traphost page

Diagnostics

The **Diagnostics** page gives a possibility of running Network and WAN protocol diagnostics to verify Quadro's connectivity and to download all system logs for possible problems recovery.

The **Start detecting WAN Protocol** button is used to initiate WAN diagnostics that will detect the WAN IP configurations: static or through DHCP and PPP servers. For static WAN IP configuration, gateway availability is checked. When acting as a client, DHCP and PPP servers' accessibilities are being verified.

The **Start Network Diagnostics** button is used to initiate network diagnostics, i.e to check the WAN link and IP configuration, to verify gateway, DNS primary and secondary (if configured) servers' accessibilities.

The **Download system logs** button is used to download all logs to the local PC as a *.tar archive file. Logs can be used by Epygi Technical Support Office to determine the problem occurred on your Quadro.

The **Reboot this Device** button is used to reboot the Quadro. Please note that the session with the Quadro will be closed, i.e. Quadro GUI should be newly opened and new login will be required afterwards.

The **Start ISDN Diagnostics** button is used to initiate ISDN BRI low level diagnostic. With these tests the ISDN physical link is checked and the Frame Synchronization is verified.

The field below will display the diagnostics results and the connectivity conditions. System should be reconfigured if problems occur during the diagnostics.

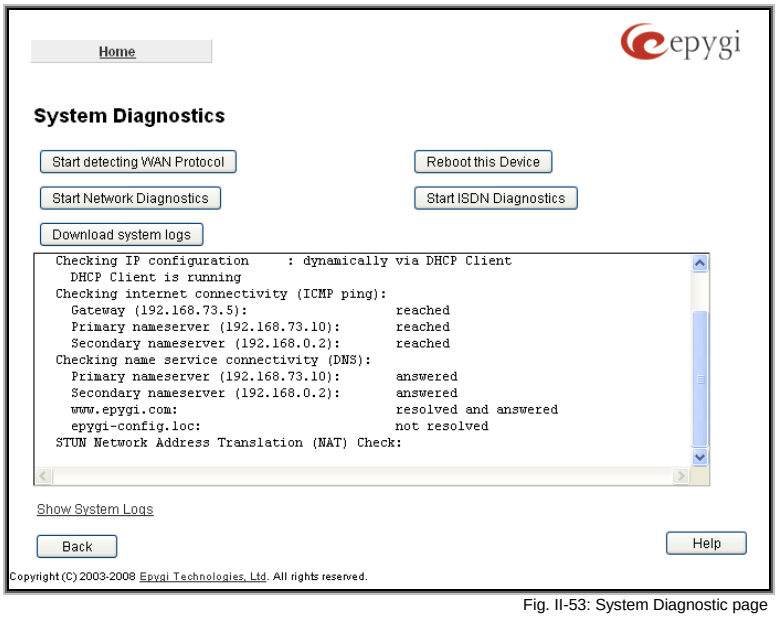


Fig. II-53: System Diagnostic page

Show System Logs link leads to the page where Quadro's logs might be viewed, downloaded and the logging setting may be adjusted.

System Logs

The **System Logs** page is accessible by pressing the **Show System Logs** link on the **Diagnostics** page. This page is used to adjust where system logging settings, view system logs directly in your browser or download them locally to your PC.

The **System Logs** page consists of three sub-pages.

The **System Logs Settings** page is used to adjust the system logging settings and contains the following components.

- The **Enable User Logging** checkbox is used to enable user level logging. This logging contains brief information about events on the Quadro.
- The **Enable Developer Logging** checkbox is used to enable developer high level logging. This logging contains detailed information about events on the Quadro.
- The **Archived Logging** checkbox is used to is used to keep more logs on the Quadro. This option allows to collect more system information in the log files and to keep them longer. **Attention:** This option requires quite sufficient resources on the Quadro. It is recommended to use this option in urgent cases only.

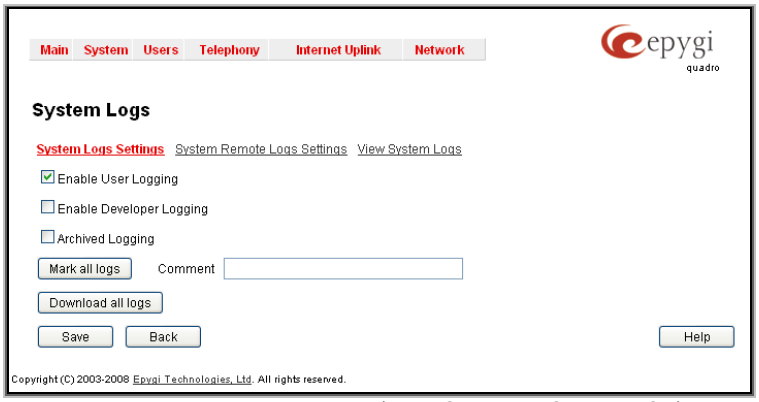


Fig. II-54: System Logs - System Logs Settings page

- The **Mark all Logs** button is used to set a line marker in the logs. If you need to follow a certain piece of log, push this button to set a starting mark in all logs and then perform the needed actions over the Quadro. When the actions are done, push this button again to set an ending mark in all logs. This way you shall clearly see a piece of log between the staring and ending marks generated during the certain actions taken over the Quadro. The **Comment** text field is used to insert some text information which will be displayed next to the marks inserted in the logs. This comment may describe the problem captured in the following logs and may be useful for the Technical Support.
- The **Download all Logs** button is used to download all logs to the local PC as a *.tar archive file. These logs can then be used by the Epygi Technical Support Office to determine the problem that has occurred on your Quadro.

The **System Remote Logs Settings** page is used to adjust the system logging settings and contains the following components.

- The **Enable Remote Logging** checkbox is used to enable remote monitoring of Quadro's logs. When this option is selected, remote administrators may connect Quadro with Telnet protocol (port number 645) and access the logs selected on this page. This is done for remote Quadro's diagnostics and is mainly used by Epygi's Technical Support Office. To make the Quadro's logs open for remote access, appropriate Firewall level or Filtering Rules must be created.
- Checkboxes below on this page are used to select those log types that should be accessible remotely. Select only those logs that you wish to have monitored remotely.

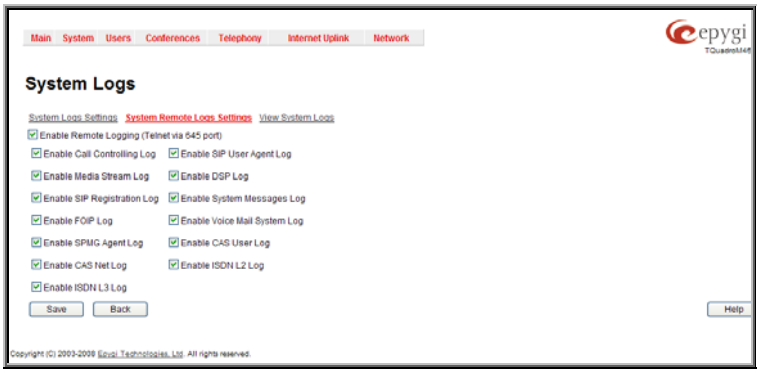


Fig. II-55: System Logs - System Remote Logs Settings page

In the **View System Logs** page you may view the generated logs on the Quadro. System logs are useful to determine any king of problems on the Quadro as well as to monitor the user's access and the usage of it.

On the left side of the page, a list of main logs is displayed. Clicking on the needed link will display the log on the right side of the page.

The text field on the left side is dedicated for support personnel only and is used to search a custom log not listed on this page. To do so, insert a required log name to the text field and press **Show Custom Log** functional button.

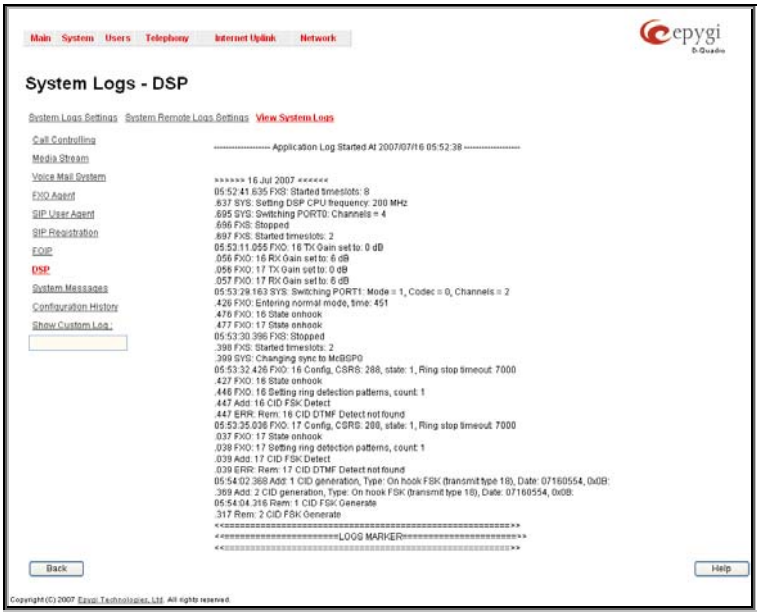


Fig. II-56: System Logs – View System Logs page

Features

This page lists all features, that may be activated by a software key, characterized by a **Feature Description** and provided with its **Status:**

- **No Key Found** - the feature is currently not available
- **Reboot Needed** - the feature key has been entered and Quadro needs to be rebooted
- **Activated** - the feature is now available on the Quadro
- **Free trail** – the feature is activated for evaluation. The evaluation period is 30 day.

Following features may be activated via the software key:

- **Debug** – enables Telnet connection towards the Quadro for debugging purposes.
- **3pcc Support** - enables Third Party Call Control feature on the Quadro. The feature allows the call controlling applications running on a user PC to remotely initiate and handle calls on the Quadro and to subscribe for certain event notifications from the Quadro.
- **IP Phone support** - enables additional LAN-sided IP phones support on the Quadro. This feature key allows you to activate a package of 8 IP lines support.
- **QCM Support** – allows Quadro's extensions to be used by Quadro Communication Manager after QCM trial period expires. Depending on the feature key type, additional 4 or 10 QCM licenses can be activated on the Quadro.

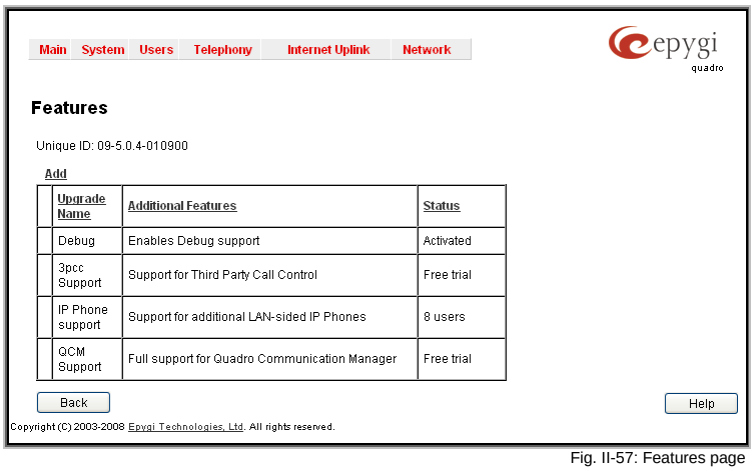


Fig. II-57: Features page

To enter a **Feature Key**, click **Add**. A page with the **Feature Key** text field is opened. Enter the key and press **Save**. The status of the selected feature entry will change to **Reboot needed**. Reboot the Quadro and the feature will receive the status **Activated.**

To receive a **Feature Key**, register the Quadro device and send a corresponding request to Epygi's Technical Support. This request must include the **Unique ID** that is displayed in the **Features** page above the features list.

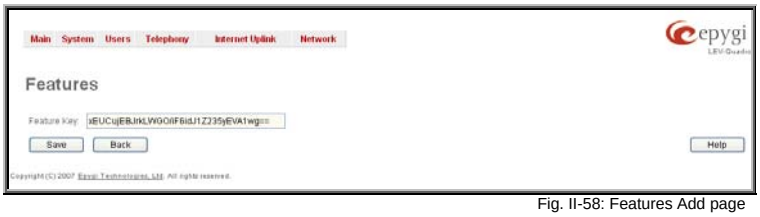


Fig. II-58: Features Add page

Upload Language Pack

The **Upload Language Pack** page allows you to upload a custom language for GUI and Voice Messages of the Quadro. The language of voice messages can be switched to the custom Language Pack language from the GUI setting page in the System Configuration Wizard. The language of GUI session can be changed to the custom Language Pack language from the radio buttons on the login page. Uploading a language pack will also change the language of some supported IP phones (Aastra, snom v.6.x, Grandstream GXP2000). After a custom Language Pack is uploaded onto the system, reboot the IP phone to load a matching language onto the phone.

Uploading a Language Pack will cause the loss of the following data:

- All voice mails and custom voice messages
- Call statistics
- Pending events
- Transfer statistics

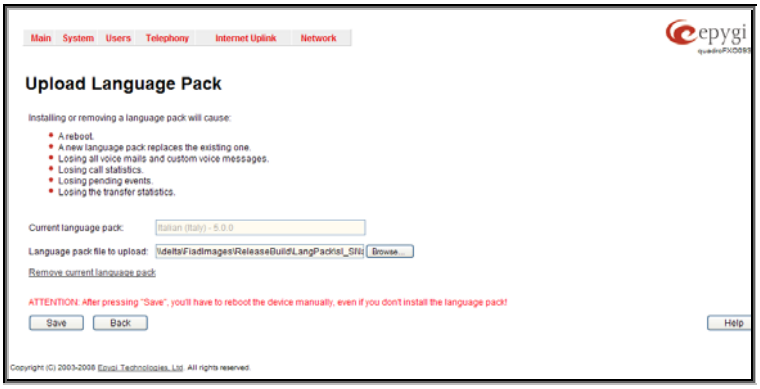


Fig. II-59: Upload Language Pack page

Please Note: Only one custom Language Pack can be uploaded at the time. Uploading a Language Pack will remove the existing one (if applicable) and will reboot the Quadro.

The **Current Language Pack** field displays read-only information about the custom language pack uploaded. When no custom language pack is uploaded, the field indicates "unknown".

Below, there is a **Language Pack File to Upload** text field that displays the selected image filename. The **Browse** button is used to browse the custom language pack to be uploaded.

The **Remove Current Language Pack** link is only seen when a custom language pack is uploaded and is also used to remove it from the system.

Pressing **Save** will start uploading the custom language pack to the board.

Attention: Pressing the **Save** button will stop some vital processes on the Quadro, therefore you will need to reboot your device manually even if you have cancelled the language pack update procedure on the following steps.

The next page displayed will show verification of the language pack being uploaded and asks for confirmation to overwrite the existing custom language pack (if applicable). After final confirmation, the system will upload the selected custom Language Pack and it will reboot.

User Rights Management

The **User Rights Management** service sets restrictions on the GUI access for various users, permits or denies the access to certain Web GUI configuration pages and creates multilevel user management of the Quadro. The feature is useful to the ISPs in order to set the restrictions for certain customers to manage the Quadro's configuration.

Two levels of Quadro GUI administration are available:

- **Administrator** – this is the main administrator's account. The administrator can configure to have the factory reset safe the default password or choose not to. The administrator has access to all Web GUI pages and no one else has configuration permission to adjust this account. The administrator is responsible for granting access to all other user groups.
- **Local Administrator** – this is a common (sub-) administrator's account. The password is not factory reset safe. Local Administrator can have permission to adjust each GUI page.
- **Extension** – this account refers to all extensions created on the Quadro. The password for default extensions is not factory reset safe but is contained in the backed up configuration. Permissions for an extension to access each GUI page can be adjusted here.

The **User Rights Management** page consists of two pages. The **Users** page is used to manage the available users on the Quadro. The **Roles** page is used to assign the corresponding permissions to the users.

The **Users** page contains a table where the Administrator and Local Administrator users are listed. This page allows them to modify the passwords of available users in the table and to manage the Local Administrator's account. The following functional buttons are available on this page:

The **Change Password** functional button is used to change the password of the Administrator and Local Administrator user's account. Select one of the available users in the table by toggling the corresponding checkbox and press **Change Password** to open the corresponding page.

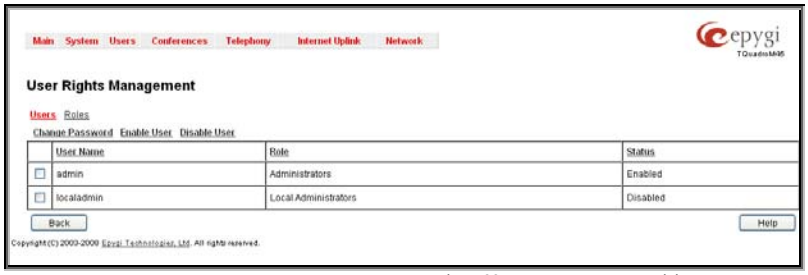


Fig. II-60: Users page at User Rights Management

The **Change Password** page is used to change the user's password.

The **GUI Access Password** offers the following components:

The **Old Password** text field is only present when modifying the Administrator account password and requires the current password of the Administrator. An error message prevents entering the wrong password.

The **New Password** text field requires a new password for the Administrator or Local Administrator. Reentering the new password in the **Confirm New Password** text field will confirm the new password.

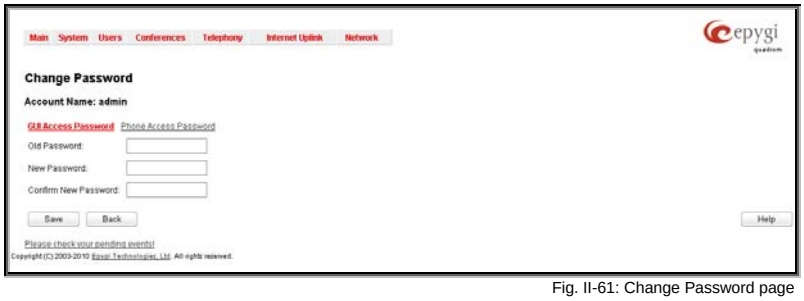


Fig. II-61: Change Password page

Please note: The password can consist of numeric values and symbols. Up to twenty (0-20) digits and symbols are allowed.

The **Phone Access Password** offers the following components:

The **Old Password** text field is present when modifying the Administrator account password and requires the current password of the Administrator. An error message prevents entering the wrong password.
The **New Password** text field requires a new password for the Administrator. Reentering the new password in the **Confirm New Password** text field will confirm the new password. The password can consist of numeric values only. Up to twenty (0-20) digits are allowed. A corresponding warning appears if any other symbols are inserted.

The **Enable User** and **Disabled User** functional buttons are used to enable or disable the Local Administrator's account.

Attention: It is highly recommended to define a proper and non-empty password on this page if the extension is being used for the Call Relay service from the Quadro's Auto Attendant.

Please Note: The Administrator's account cannot be disabled.

The **Roles** page contains a table where the Local Administrator and Extensions users are listed. This page allows you to set the permissions to the GUI pages for each user in the table.

The **Edit** functional button leads to the **Change Access Rights** page where a list of user specific GUI pages is displayed. Select the user in the table and press **Edit** to manage the permission for the corresponding user.

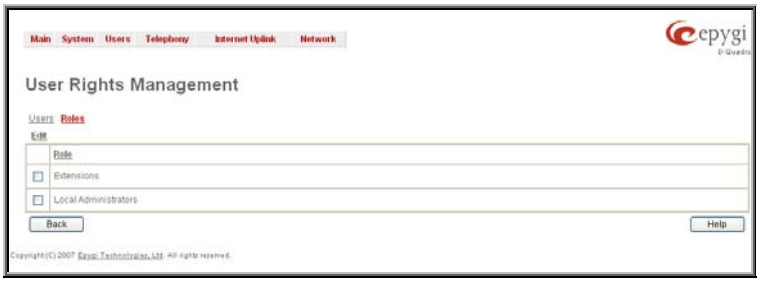


Fig. II-62: Roles page at User Rights Management

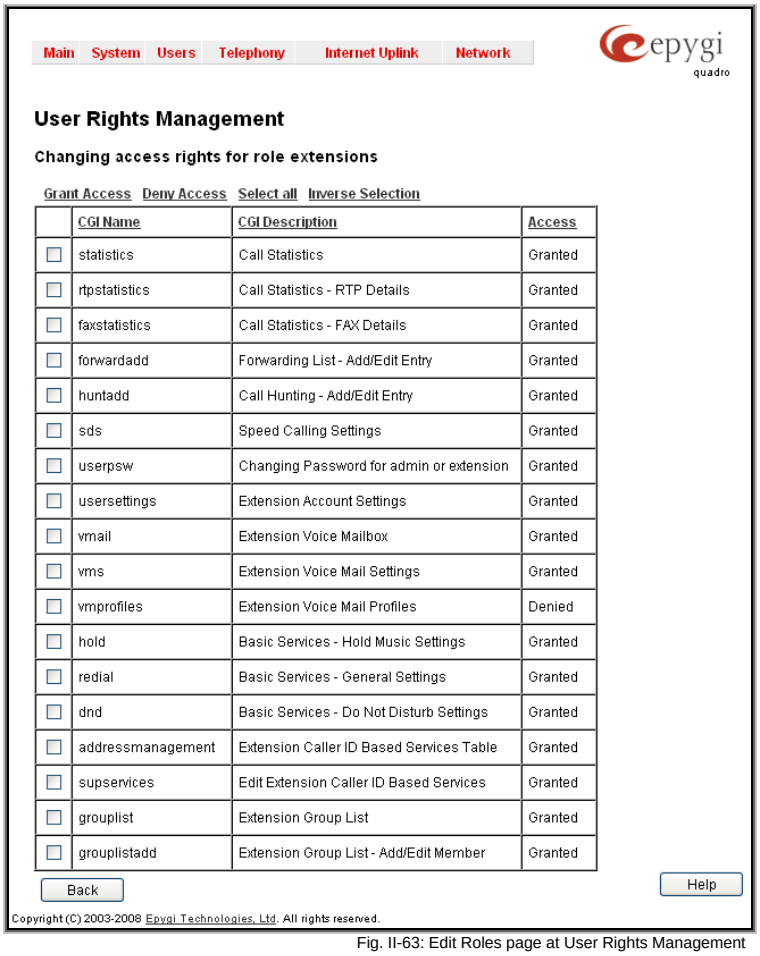


Fig. II-63: Edit Roles page at User Rights Management

On the **Change Access Rights** page, **Grant Access**/**Deny Access** functional buttons are used to grant or deny access to certain GUI page(s) for the selected user.

When access to a certain GUI page is denied for a user, the "You are not authorized to access this page!" warning message will be displayed.

Users Menu

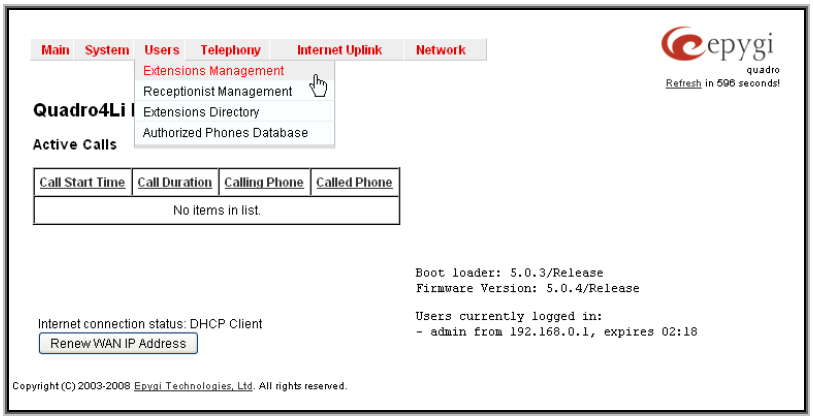


Fig. II-64: Telephone Users Menu in Dynamo Theme

F Fig. II-65: Telephone Users Menu in Plain Theme

Extensions Management

The **Extensions Management** page is used to create a variety of extensions and auto attendants on the Quadro. From this page, by clicking on the user extension, the Administrator can go to the extension settings pages.

When this page is accessed for the first time after the Quadro's initial boot-up or the default configuration settings restore, an intermediate page is displayed.

The **Change Extension Length** page is used to define the extension settings applicable to all extensions on the Quadro. This page disappears once being saved.

The **Change Extension Length** page consists of a radio-button selection:

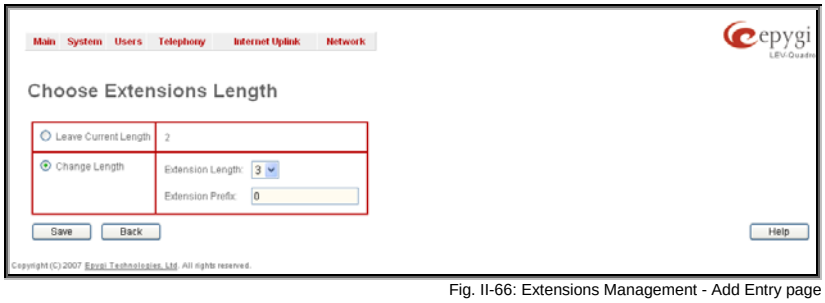


Fig. II-66: Extensions Management - Add Entry page

- **Leave Current Length** radio-button selection is used to leave the current length of extensions on the Quadro. Per default the extensions length on the Quadro is 2. In front of this selection, the actual configured length of extensions is displayed.
- **Change Length** radio-button selection is used to change the actual length of extensions on the Quadro. This selection enables the following information to be defined:

  The **Extension Length** drop-down list requires you to choose the length of the extensions on the Quadro. This number will apply to all existing extensions on the Quadro as well as to any newly created extensions. The length of the extension can be 2, 3 or 4.

  The **Extension Prefix** text field is used to define a prefix with which all existing extensions on the Quadro as well as to any newly created extensions should start. The prefix cannot start with the digits 0 or 9, otherwise an error message appears.

Please Note: By saving the settings on the **Change Extension Length** page, all existing extensions will lose the custom voice messages and voice mails in the voice mailbox. The device will be rebooted. You will not be automatically redirected to the login page, so you need to access it manually again when reboot ends. After the reboot, the **Change Extension Length** page will disappear and the **Extensions Management** page will be displayed. The **Change Extension Length** page will not appear again unless the default configuration settings are restored on the device.

Two types of user extensions, **active** and **inactive**, can be created on the Quadro. Active extensions are those that are attached to a line, can place and receive calls and use available telephony services. Inactive extensions are those that are not attached to the line. They can use some available telephony services but they cannot place and receive calls. Instead, inactive extensions have a voice mailbox available to store the messages from callers.

Quadro4Li has no FXS lines, only IP lines are available.

Attendant extensions are dedicated to the IVR system on the Quadro. These extensions are used by callers to reach Quadro's users and use the remote access and call relay services. It is possible to create Auto Attendants with the custom scenarios. By default, Quadro has one Auto Attendant extension (00) which is undeletable.

Attention: The system is limited to 100 extensions. Once the number of extensions in the Extensions table reaches 100, there will be no more possibility to add new extensions.

The **Extensions** table is a list of all extensions and their parameters.

The following columns are present in the table:

- **Extension** - lists user or attendant extensions on the Quadro. This number is used for internal PBX calls.
- **Display Name** - indicates an optional display name to identify the caller.
- **Attached Line** - indicates the IP line corresponding extension is attached to. "R" is displayed in this column when **SIP Remote Extension** (see below) functionality is enabled on the extension.
- **SIP Address** - displays the SIP address of the corresponding extension. The column displays the full SIP address, (i.e., username@sipserver:port) when the **Registration on SIP Server** checkbox is selected. If registration is disabled, the SIP address will be displayed in the following format: "username, Proxy: sipserver:port". If no SIP registration server or SIP server port is defined, corresponding information will not be included in this column. If no username is defined, the extension number will be displayed instead.

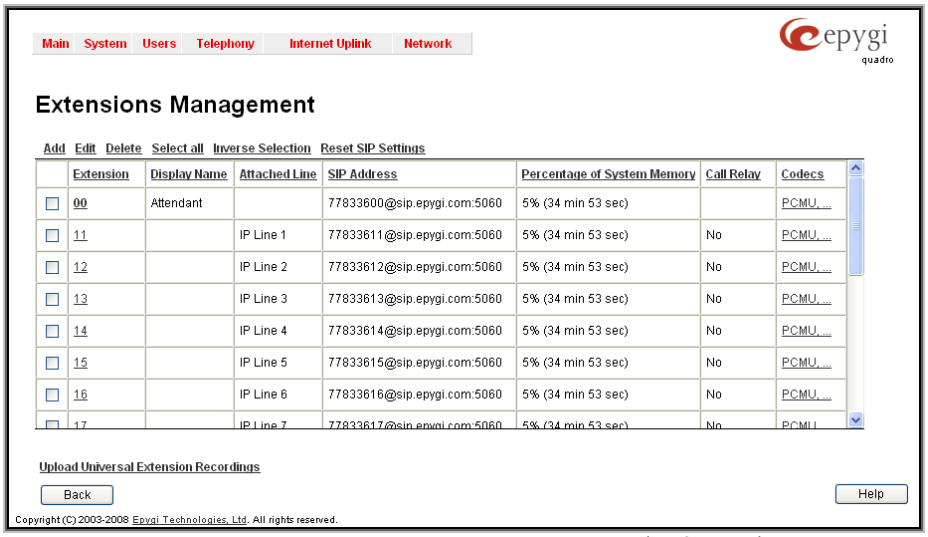


Fig. II-67: Extensions Management page

- **Percentage of System Memory** - indicates the user space (in percentages) configured for each extension. The actual available duration (in minutes) for the extension voice mails, uploaded/recorded greetings and blocking messages is also displayed here. The available minutes corresponding to the selected user space are dependent on the Voice Recording codec selected from the Voice Mail Recording Codec page. For example, for the same amount of marked out user space, selection of the G726 voice recording codec will provide more space for voice mails and user defined voice greetings than the G711 codec selection.
- **Call Relay** - indicates whether or not the Call Relay option is enabled on the extension.
- **Codecs** – column lists the short information (full information is seen in the tool tip) about extension specific voice Codecs. Extension codec's can be accessed and modified by clicking on the link of the corresponding extension's Codecs. The link leads to the
- Extension Codecs page.

Clicking on each user extension in the Extensions table will open the extension specific **Extension Settings** menu. The Pickup Group, Call Park and Paging Group extensions are displayed without a link in the Extensions Management table and extension pages. Additionally, the supplementary services configuration pages will not be accessible for this type of extensions.

Add opens the **Add Entry** page where the type and number of the new extension should be defined. This page consists of the following components:

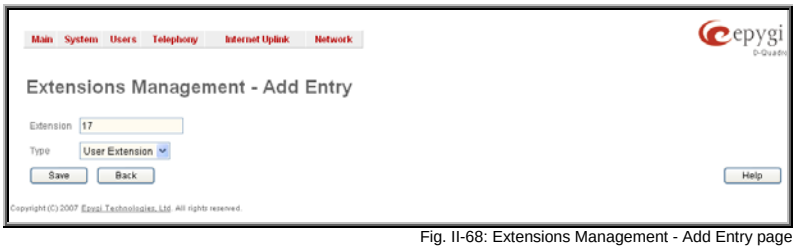


Fig. II-68: Extensions Management - Add Entry page

The **Extension** text field is used to enter a new extension number. If non-digit symbols have been entered, the error "Incorrect Extension: no symbol characters allowed" will appear. If an extension with the same number already exists in the Extensions Management table, the error "Extension already exists" will appear.

Please Note: Extension number cannot start with the digits 0. You can add extensions of up to 20 digits long. However, the Call Routing won't be adjusted automatically; you may need to manually adjust the routing rules for extensions in custom length.

The **Type** drop down list is used to select the type of the extension (User Extension, Pickup Group, Call Park, Paging Group or Attendant) to be created (for details see below).

Reset SIP Settings functional button is used to reset all SIP settings of the selected extension(s) to the default values, including all settings listed under SIP Settings and SIP Advanced Settings pages (see below).

Edit opens the **Edit Entry** page where a newly created user or attendant extension settings might be adjusted. To operate with **Edit**, one or more record(s) have to be selected, otherwise the "No records selected" error message will appear.

The **Edit Entry** page consists of two frames. In the left frame settings groups are listed. Clicking on the corresponding settings group displays their configuration options in the right frame.

Please Note: Save changes before moving among settings groups.

User Extension Settings

1. General Settings

This group requires extension's personal information and has the following components:

Display Name is an optional parameter used to recognize the caller. Usually the display name appears on the called party's phone display when a call is made or a voice mail is sent.

Password requires a password for the new extension.

The extension password may only contain digits. If non-numeric symbols are entered, the "Incorrect Password: no symbol characters allowed" error will prevent making the extension.

Confirm Password requires a password confirmation. If the input is not corresponding to the one in the **Extension Password** field, the "Incorrect Password confirm" error will appear.

Fig. II-69: Extensions Management - Edit Entry – General Settings page

Attached Line lists all free lines to where an extension may be attached.

Please Note: Extensions cannot be detached from the line if the **SIP Remote Extension** service is enabled on it. To detach the extension from the line, disable the SIP Remote Extension service on the extension first.

Use Kickback checkbox enables the **Kickback** service on the extension for the blind call transfer. When the extension transfers the call to the other extension and if there is no answer from the destination side, the call will automatically get back to the extension who initiated the transfer instead of getting into the destination's voice mailbox or being disconnected.

Allow Call Relay enables the current extension to be used to access the Call Relay service in the Quadro's Auto Attendant. It is recommended to define a proper and non-empty password when enabling this feature in order to protect the Call Relay service from an unauthenticated access.

Login Allowed checkbox enables the current extension to be used to access the Quadro via WEB interface by extension name and password.

When the **External Call Policy** checkbox is enabled, all incoming IP calls to the corresponding extension will be handled by the external Policy Server.

With the **Show on Public Directory** checkbox enabled, the details of the corresponding extension will be displayed in the User Settings table on the Main Page of the Extension's Quadro Web Management (accessed by the extension's login, see Manual III – Extension User's Guide). Besides this, the details of the extension will be displayed in the Public Directories on the Snom and Aastra SIP phones. Leave this checkbox unselected if the extension is reserved or not used, or when the extension serves as an intermediate unit for call forwarding, etc.

The **Percentage of Total Memory** drop down list allows you to select the space for the extension's voice mails and uploaded/recorded greetings and blocking messages. The maximum value in the drop down list is equal to the maximum available space for voice messages on Quadro. When editing an existing extension and decreasing the voice mailbox size, the system will check the present amount of voice mails in the mailbox of the extension. If the memory required for these voice mails exceeds the size entered, the system will suggest either to remove all voice messages from the extension's voice mailbox or to select a larger size so that the existing voice messages can be stored in the mailbox.

The **Enable Ringing Simulation** checkbox is available on virtual extensions only and enables extra ring tones played to the caller before the voice mail of the called virtual extension gets activated. If this checkbox is not enabled, the voice mailbox will get activated immediately the call arrives. The ring tones will be played during the timeout specified in the **Ringing Simulation Timeout** text field.

2. SIP Settings

This group is used to configure extension's SIP registration settings and consists of the following components:

User Name requires a user name for the extension registration on the SIP server. The registration user name needs to be unique on the SIP server and it is displayed on the called phone when performing an IP call.

Password indicates the password for the extension registration on a SIP server.

Registration Password is used to confirm the password. If the entered password does not correspond to the one entered in the **Password** field, the error message "The passwords do not match. Please try again" will appear.

SIP Server indicates the host address of the SIP server. The field is not limited regarding symbol usage or length. It can be either an IP address such as 192.168.0.26 or a host address such as sip.epygi.com.

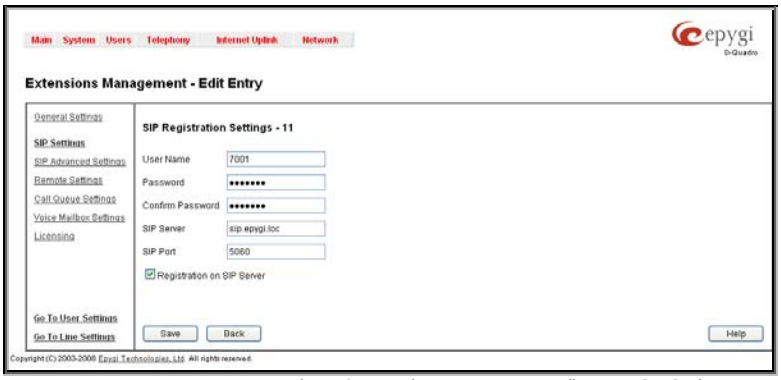


Fig. II-70: Extensions Management - Edit Entry – SIP Settings page

SIP Port indicates the host port number to connect to the SIP server. The SIP server port may only contain digit values, otherwise the error message "SIP Server Port is incorrect" will be displayed when applying the extension settings. If the SIP server port is not specified, Quadro will access the SIP server through the default port 5060.

Registration on SIP Server enables the SIP server registration option. If the extension has already been registered on an SIP server, its IP address will be displayed in brackets.

3. SIP Advanced Settings

This group is used to configure advanced SIP settings (Outbound Proxy, Secondary SIP Server and Outbound Proxy for the Secondary SIP Server settings and to define other SIP server specific settings).

The SIP Outbound proxy is an SIP server where all the SIP requests and other SIP messages are transferred. Some SIP servers use an outbound proxy server to escape restrictions of NAT. For example, Free World Dialup service uses an Outbound Proxy server. If an Outbound proxy is specified for an extension, all SIP calls originating from that extension are made through that outbound proxy, i.e., all requests are sent to that outbound proxy, even those made by Speed Calling.

The Secondary SIP Server acts as an alternative SIP registration server when the primary SIP Registration Server is inaccessible. If the connection with the primary SIP server fails, Quadro will automatically start sending SIP messages to the Secondary SIP Server. It will switch back to the primary SIP server as soon as the connection is reestablished.

Authentication User Name requires an identification parameter to reach the SIP server. It should be provided by the SIP service provider and can be requested for some SIP servers only. For others, the field should be left empty.

Send Keep-alive Messages to Proxy enables the SIP registration server accessibility to the verification mechanism. **Timeout** indicates the timeout between two attempts for the SIP registration server accessibility verification. If no reply is received from the primary SIP server within this timeout, the Secondary SIP server will be contacted. When the primary SIP server recovers, SIP packets will resume being sent to it.

The **RTP Priority Level** drop down list is used to select the priority (low, medium or high) of the RTP packets sent from a corresponding extension. RTP packets with higher priority will be sent first in case of heavy traffic.

The **Do Not Use SIP Old Hold Method** checkbox enables the new recommended method of call hold in SIP, in which case the hold request is indicated with the "a=sendonly" media attribute, rather than with the IP address of 0.0.0.0 used before. The checkbox should be enabled if the remote party does not recognize hold requests initiated from the Quadro.

A group of **Host address** and **Port** text fields respectively require the host address (IP address or the host name) and the port numbers of the **Outbound Proxy**, **Secondary SIP Server** and the **Outbound Proxy for the Secondary SIP Server**. These settings are provided by the SIP servers' providers and are used by Quadro to reach the selected SIP servers.

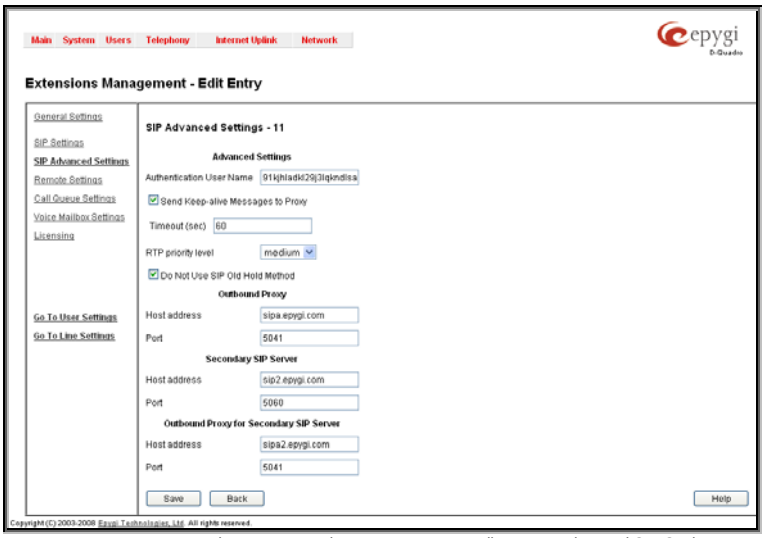


Fig. II-71: Extensions Management - Edit Entry – Advanced SIP Settings page

4. Remote Settings

This group is used to configure **SIP Remote Extension** functionality. This is an advanced telephony feature that allows Quadro users to remotely operate Quadro. Users need to register a hardware or software SIP phone on the Quadro by defining the Quadro's global IP address and an appropriate Username/Password. A registered SIP Remote phone can act fully as a phone connected locally to Quadro, i.e. it can use Quadro's PBX features, place and receive calls, access voice mails, etc.

The **Enable** checkbox activates the SIP Remote Extension's functionality.

Please Note: SIP Remote Extension functionality may be enabled only for active (attached to IP line) extensions.
Identification parameters used by the remote SIP device for registration on the Quadro should be defined in the **Username** and **Password** text fields.

When the **Enable RTP Proxy** checkbox is selected, incoming and outgoing RTP streams to and from the remote SIP phone will be routed through Quadro. When the checkbox is not selected, RTP packets will be moving directly between peers.

When the **Fallback To Local Extension When Not Registered** checkbox is selected, incoming calls towards the corresponding extension on the Quadro will be forwarded to the remote SIP phone only if it is registered. Otherwise, when the remote SIP phone is unregistered, incoming calls will be routed to the line extension it is attached to. When this checkbox is not selected, all incoming calls will be routed to the remote SIP phone only if it is registered. Otherwise, if the remote SIP phone is unregistered, calls will be forwarded to the extension's voice mailbox.

The **Symmetric RTP** checkbox should be selected when the remote extension is located behind the symmetrical NAT.

Fig. II-72: Extensions Management - Edit Entry – Remote Settings page

5. Call Queue Settings

This group is used to configure the **Call Queue** service that allows multiple incoming calls to be kept in the queue when being on the line and enables the calls to be answered in the order they have been received. This feature can be also used within Receptionist Management (see below for more details).

The **Enable** checkbox activates the Call Queue functionality on the extension.

The **Call Queue Size** text field requires the length of the call queue. This is the maximum number of calls that will be accepted into the queue and kept on hold while the extension user is on a call. If a maximum number of calls are already held in the call queue, the next incoming call will be routed to the extension's Voice Mail, if enabled, or will be disconnected.

Please Note: By configuring Call Queue size, Call Forwarding if Busy and Voice Mail telephony services will not take effect on the corresponding extension until the call queue is not filled. These telephony services will affect only the calls out of the call queue.

The **Max Call Queue Appearance** text field requires the maximum number of active calls on the line. For example, if 1 is configured in this field and the extension is in use, the next incoming call will go to the call queue. If 2 is configured in this field and extension is in use, the next incoming call alert will be heard in the background (if Call Waiting service is enabled on the corresponding extension) and the extension will hold the first call to answer the second one or they can be joined for a call conference. However, the next incoming call will again go to the call queue.

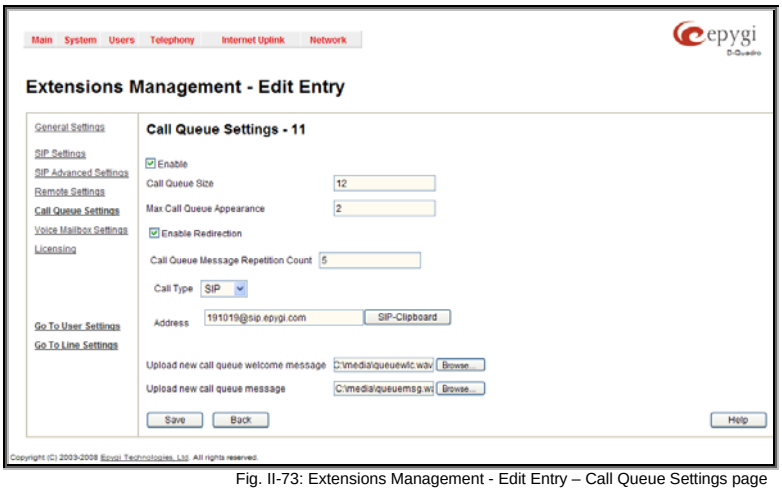


Fig. II-73: Extensions Management - Edit Entry – Call Queue Settings page

Enable Redirection checkbox is used to enable the call redirection to the other destination after some time spent in the queue. This will avoid the caller to wait in the queue for too long. This checkbox selection enables the following components:

Call Queue Message Repetition Count text field requires the number of call queue messages (played during the caller is in the queue) after which the call in the queue will be automatically redirected to the destination defined below.

Call Type lists the available call types:

- PBX - local calls to Quadro's extensions
- SIP – calls through a SIP server
- PSTN – calls to a global telephone network
- Auto – used for undefined call types. The destination (independent on whether it is a PBX number, a SIP address or a PSTN number) will be reached through the Call Routing Table.

The **Address** text field is used to define the address where the call will be redirected. The value in this field is strictly dependent on the **Call Type** defined in the same named drop down list. If the **PBX** call type is selected, the Quadro extension number should be defined in this field. For the **SIP** call type, the SIP address should be defined, for the **PSTN** call type, the PSTN user number should be defined here. For the **Auto** call type, a routing pattern needs to be defined.

Upload new call queue welcome message allows updating the active Call Queue welcome message (played when a caller joins the extension's call queue), downloading it to the PC, or restoring the default one.

The **Remove call queue welcome message** functional link appears only when the custom call queue welcome message is already uploaded and is used to remove it and restore the default call queue welcome message.

The **Download call queue welcome message** functional link appears only when the custom call queue welcome message is already uploaded and is used to download it to PC and opens the file chooser window where the saving location can be specified.

Upload new call queue message allows updating the active call queue message (played when a caller is being held in the queue), downloading it to the PC, or restoring the default one.

The **Remove call queue message** functional link appears only when the custom call queue message is already uploaded and is used to remove it and restore the default call queue welcome message.

The **Download call queue message** functional link appears only when the custom call queue message is already uploaded and is used to download it to PC and opens the file chooser window where the saving location can be specified.

Browse buttons open the file chooser window to browse for a new Call Queue welcome message file. The uploaded files should to be in PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format, otherwise the system will prevent uploading it with the "Invalid audio file, or format is not supported" warning message. The system also prevents uploading if there is not enough memory available for the corresponding extension, which will cause the "You do not have enough space" warning message.

6. Voice Mailbox Settings

This group is used to configure voice mailbox storage and consists of a group of manipulation radio buttons to define the location where voice mails will be collected.

- **Disable Voice Mail** – disables the Voice Mail service for the corresponding extension. With this selection, the extension user will be unable to reach their Voice Mail Settings, but will be able to access their Voice Mailbox and manage the existing voice mails.

- **Use Internal Voice Mail** – enables the Voice Mail service for the corresponding extension and defines the Quadro's internal storage as a location for the Voice Mails.

  This selection also allows you to manipulate with the **Voice Mail Configuration Wizard** used by the extension's user to setup personal settings (the password, the voice mail greeting message and the user's name for **Extensions Directory**) from the handset. By default, the **Voice Mail Configuration Wizard** is enabled when the Quadro's is in the factory reset state. It can be manually enabled from this page by pressing the **Activate** button. When the **Voice Mail Configuration Wizard** is activated, the extension's user is prompted to insert personal settings as he/she enters his/her Voice Mailbox for the first time. Unless the required information is not inserted, the button is changed to **Deactivate** and the **Configuration Wizard Status** becomes **Activated**. Use **Deactivate** button to stop **Voice Mail Configuration Wizard**. When the user inserted the required information, the **Configuration Wizard Status** on this page is changed to **Passed** and a **Reactivate** button appears. Using **Reactivate** button you might re-enable the **Voice Mail Configuration Wizard** so the user will be again prompted about his/her personal settings next time entering his/her Voice Mailbox.

  Instructions on how to insert the information prompted in the **Voice Mail Configuration Wizard** are available in the **Features Codes** (see Manual III – Extension's Users Guide).

- **Use External Voice Mail** – enables the Voice Mail service for the corresponding extension and is used to define a remote Voice Mail Server as a location for the Voice Mails. In this case recorded voice mails will be collected on the remote server. Radio button selection enables a sub-group of manipulation radio buttons:

  If the remote Voice Mail Server is combined with the SIP Proxy server, it is recommended to select **Proxy Controlled Mailbox Type**. With this selection, SIP proxy will keep the recorded voice mail on itself. When extension accesses his mailbox by dialing *0, the call will be redirected to the voice mailbox on the proxy server.

  If the remote Voice Mail Server acts as a standalone location of voice mails, it is recommended to select **Independent Mailbox Type**. With this selection, Quadro redirects the recorded voice mails to the defined remote Voice Mail server. When extension accesses his mailbox by dialing *0, the call will be redirected to the remote voice mail server.

  For each of these selections, it is required to enter the SIP URI of the Voice Mail Server where voice mails of the corresponding extension will be collected.

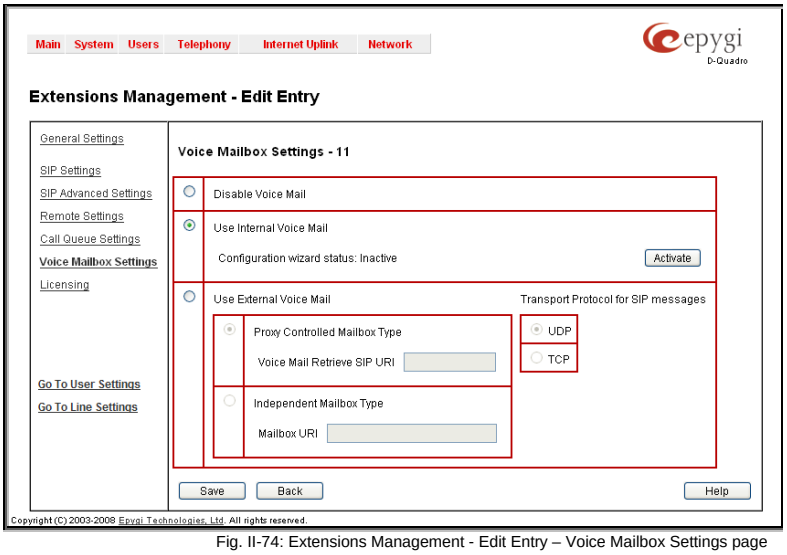


Fig. II-74: Extensions Management - Edit Entry – Voice Mailbox Settings page

The **Transport Protocol for SIP messages** radio buttons allow the transport protocol (UDP or TCP) for transmission of SIP messages to be selected.

Attention: By choosing the **Use External Voice Mail** option, some internal voice mailbox services may become unavailable. Instead, the services of the external voice mail server will become available to the user. Please consult with the external voice mail server administrator before enabling this option.

7. Licensing

This page is only available if the corresponding licensing is enabled from the Features page.

This group allows you to configure the extension to be used by the Quadro Communication Manager (QCM) soft-phone application.

The page contains **Enable QCM (Quadro Communication Manager) license** checkbox which allows you to set the corresponding extension to be used by the QCM application. When the checkbox is not selected on this page, the QCM will be functional with the extension only during trial period.

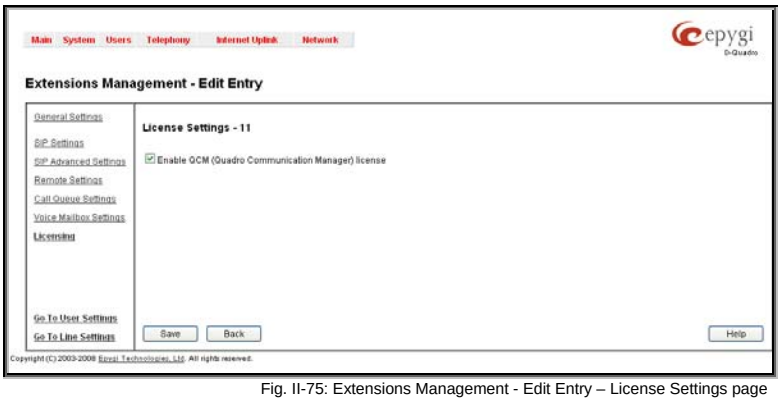


Fig. II-75: Extensions Management - Edit Entry – License Settings page

Please Note: This checkbox can be simultaneously selected on as many extensions as QCM licenses are available on the Quadro.

The **Go to User Settings** link is used to make a quick jump to the extension specific Extension's Main Menu page (see Manual III – Extension User's Guide).

The **Go to Line Settings** link is used to make a quick jump to the Line Settings page of the corresponding extension.

Pickup Group Extension Settings

Pickup Group & Access List

The **Pickup Group** service is used to monitor calls addressed to a certain list of extensions and to pick up calls ringing on the listed extensions. This service may be used when a group of extensions are located in the same area so the persons nearby can hear the ringing on one of the extensions. This feature allows you to pick up the call ringing on a certain extension by dialing the number of the pickup extension.

The **Pickup Group** list is used to define the extensions that can be monitored by calling a certain pickup extension.

The **Access List** is used to define PBX, SIP or PSTN users that are allowed or forbidden to intercept calls ringing on extensions in the Pickup Group.

If a user dials the pickup extension when several extensions of the pickup group are ringing, the first (oldest in time) call will be picked up. When the user dials the pickup extension and no extensions of the pickup group are ringing, the "No call is available to pickup" message will be played to the user. When the user that is not listed in the **Access List** dials the pickup extension, password authorization (of the pickup extension) will be required to answer the call. When a denied user dials the pickup extension, the "Party does not accept your call" message will be played to the user.

For **Pickup Group** extensions, the **Extensions Management** - **Edit Entry** page consists of **General Settings, SIP Settings** and **Advanced SIP Settings** pages. The **SIP Settings** and **Advanced SIP Settings** pages are the same as for regular extensions (see User Extension Settings) described above. The **General Settings** page has a different content as follows:

1. General Settings (for pickup group extension)
This group requires personal extension information and has the following components:

Display Name is an optional parameter used to recognize the caller. Usually the display name appears on the called party's phone display when a call is made or a voice mail is sent.

Password requires a password for the new extension.

The extension password may only contain digits. If non-numeric symbols are entered an "Incorrect Password: no symbol characters allowed" error message will prevent making the extension.

Confirm Password requires a password confirmation. If the input is not corresponding to the one in the **Extension Password** field, the "Incorrect Password confirm" error message will appear.

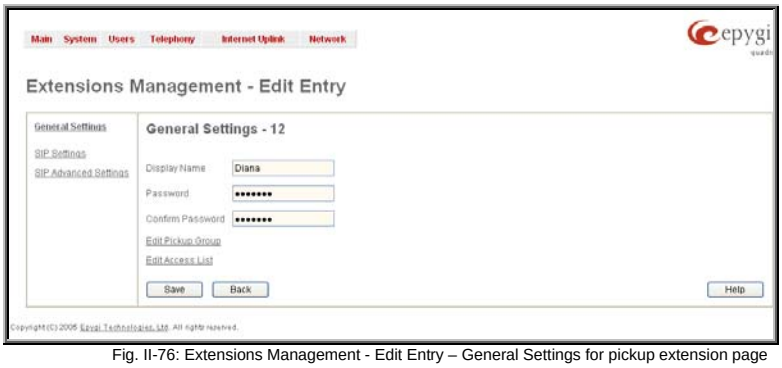


Fig. II-76: Extensions Management - Edit Entry – General Settings for pickup extension page

The **Edit Pickup Group** link leads to the page where a list of monitored extensions can be defined.

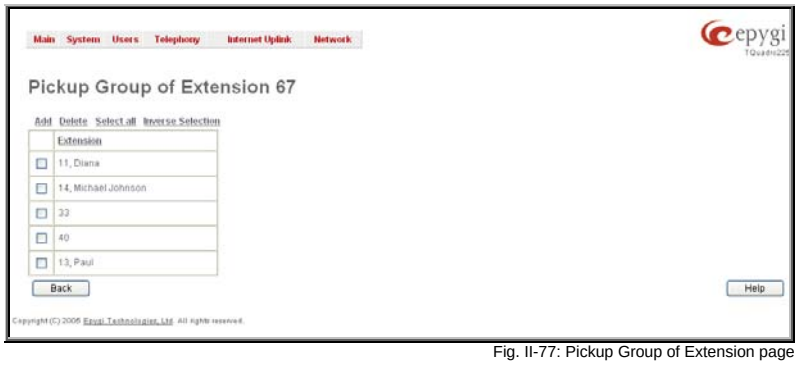


Fig. II-77: Pickup Group of Extension page

The **Pickup Group of Extension** page lists all extensions in the pickup group, i.e. it lists those that can be monitored and the calls addressed to that may be picked up by calling the corresponding pickup extension.

The **Add** functional button opens an **Add Entry** page with a drop down list containing all available extensions on the Quadro.

The **Edit Access List** link leads to the page where permissions for the users to use the pickup service can be defined.

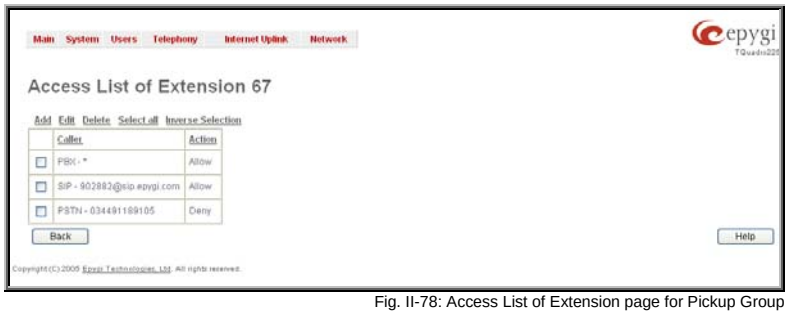


Fig. II-78: Access List of Extension page for Pickup Group

The **Access List of Extension** page lists all users (or a group of users if a wildcard is used) and the appropriate permissions to pickup the calls ringing on the extensions from the Pickup Group.

The **Add** functional button opens an **Add Entry** page where a new user with corresponding permissions might be created. This page consists of the following components:

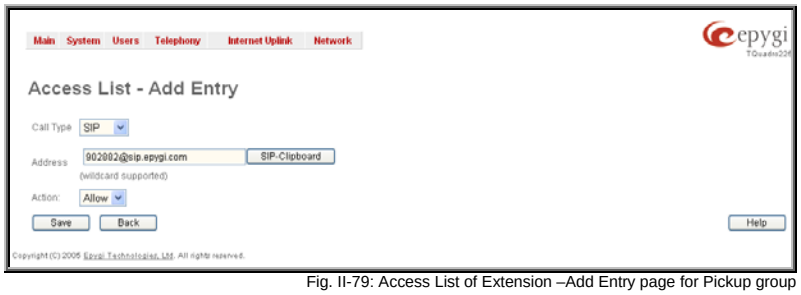


Fig. II-79: Access List of Extension –Add Entry page for Pickup group

Call Type lists the available call types:

- PBX - local calls from Quadro's extensions
- SIP – calls through a SIP server
- PSTN – calls from global telephone network
- Auto – used for undefined call types. The destination (independent on whether it is a PBX number, SIP address or PSTN number) will be parsed through the Call Routing Table.

The **Address** text field is used to define the address to be included in the Access List table. The value in this field is strictly dependent on the Call Type defined in the same named drop down list. If the **PBX** call type is selected, the Quadro extension number should be defined in this field. For the **SIP** call type, the SIP address should be defined, for the **PSTN** call type, the PSTN user number should be defined here.

The **Action** drop down list is used to select the defined user's permissions (allow or deny) to use the pickup service for the extensions included in the Pickup Group.

Call Park Extension Settings

For **Call Park** extensions, the **Extensions Management** - **Edit Entry** page consists of **General Settings, SIP Settings** and **Advanced SIP Settings** pages. The **SIP Settings** and **Advanced SIP Settings** pages are the same as for the regular extensions (see User Extension Settings), while **General Settings** page has a different content:

1. General Settings (for call park extension)
This group requires personal extension information and has the following components:

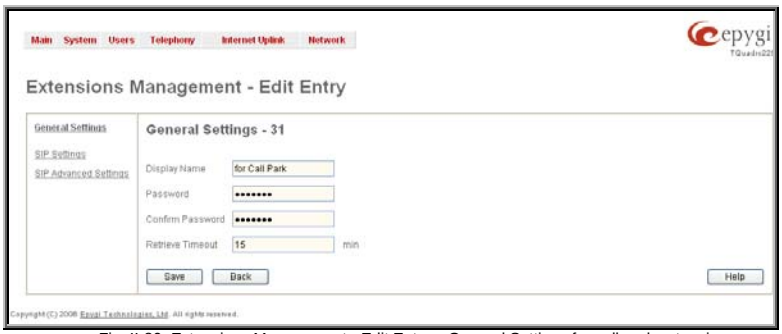


Fig. II-80: Extensions Management - Edit Entry – General Settings for call park extension page

Display Name is an optional parameter used to recognize the caller. Usually the display name appears on the called party's phone display whenever a call is performed or a voice mail is sent.

Password requires a password for the new extension.

The extension password may only contain digits. If non-numeric symbols are entered an "Incorrect Password: no symbol characters allowed" error will prevent making the extension.

Confirm Password requires a password confirmation. If the input is not corresponding to the one in the **Extension Password** field, the error will appear: "Incorrect Password

confirm".

Retrieve Timeout text field requires a timeout (in minutes) during which the parked call will stay active, i.e. the parked user will remain on-hold. When the call park retrieve timeout expires, the hold music stops playing to the parked user and a new call is being placed towards the extension initiating the call park. If the extension initiating the call park does not answer the call, the caller which has been recently parked will reach the extension's Voice Mailbox, if enabled, otherwise will be disconnected.

Paging Group Extension Settings

Paging Group & Access List

The **Paging Group** service is used to page a group of extensions by forcing extensions to go off-hook and opening one-way communication. The service is particularly used for announcements addressed to a group of extensions. Service allows to page multiple extensions by dialing the **Paging Group** extension.

Please Note: The **Paging Group** service requires called extensions to use one of the following SIP or analog phones which are able to automatically go off-hook:

- SNOM 300 (SIP phone)
- SNOM 320 (SIP phone)
- SNOM 360 (SIP phone)
- SNOM 370 (SIP phone)
- Aastra 480i (SIP phone)
- Aastra 9133i (SIP phone)
- Aastra 9112i (SIP phone)
- Aastra 51i (SIP phone)
- Aastra 53i (SIP phone)
- Aastra 55i (SIP phone)
- Aastra 57i (SIP phone)
- Aastra 480e (analog phone)
- Grandstream BT100
- Grandstream BT200
- Grandstream GXP2000

The **Paging Group** list is used to define the extensions that will be paged. They will automatically go off-hook when the paging call comes in.

The **Access List** is used to define PBX, SIP or PSTN users that are explicitly allowed/forbidden to activate the call paging using the corresponding extension.

When calling to the **Paging Group** extension, the call will be forwarded to the extensions listed in the **Paging Group** table. The phones of the called extensions will automatically go off-hook (the phone speaker automatically becomes activated) and the caller will be able to make his announcement. Since the paging call opens one-way communication, the called extensions will not be able to give an answer to the caller. To terminate the paging call, caller should simply hang up.

Attention: Call paging will not work if the called extension is in call.

When caller not listed in the **Access List** calls the **Paging Group** extension, password authorization (using the password of the **Paging Group** extension) will be required to start the call paging. When a denied user tries to call the **Paging Group** extension, "Party does not accept your call" message will be played to the caller. When caller dials the **Paging Group** extension with empty Paging Group table, "Number dialed temporarily unavailable" message will be played to the caller.

For **Paging Group** extensions, **Extensions Management** - **Edit Entry** page consists of **General Settings, SIP Settings** and **Advanced SIP Settings** pages. The **SIP Settings** and **Advanced SIP Settings** pages are the same as for the regular extensions (see User Extension Settings), while **General Settings** page has a different content:

1. General Settings (for paging group extension)
This group requires personal extension information and has the following components:

Display Name is an optional parameter used to recognize the caller. Usually the display name appears on the called party's phone display whenever a call is performed.

Password requires a password for the new extension.

The extension password may only contain digits. If non-numeric symbols are entered an "Incorrect Password: no symbol characters allowed" error will prevent making the extension.

Confirm Password requires a password confirmation. If the input is not corresponding to the one in the **Extension Password** field, the error will appear: "Incorrect Password confirm".

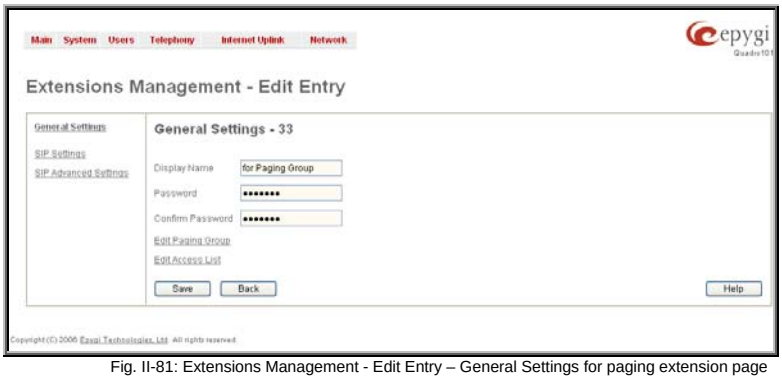


Fig. II-81: Extensions Management - Edit Entry – General Settings for paging extension page

The **Edit Paging Group** link leads to the page where a list of extensions to be paged is created.

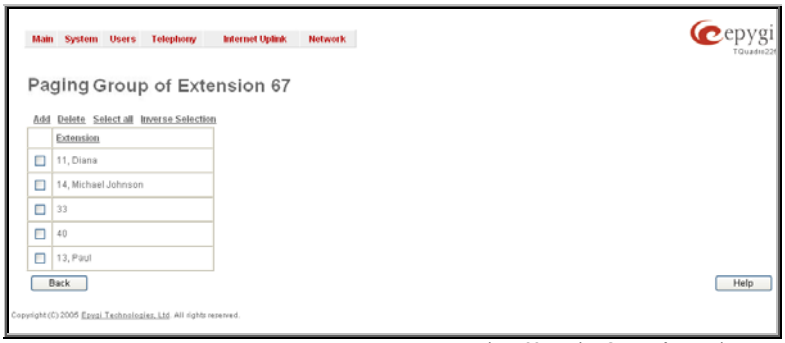


Fig. II-82: Paging Group of Extension page

The **Paging Group of Extension** page lists all to be paged, i.e. those that will automatically go off-hook (by automatic activation of the phone's speaker) once the call to the paging group comes in.

Add functional button opens an **Add Entry** page with an only drop down list containing all available extensions on the Quadro.

The **Edit Access List** link leads to the page where permissions for users to use the Paging Group service can be defined.

Fig. II-83: Access List of Extension page for Paging group

The **Access List of Extension** page lists all users (or a group of users if a wildcard is used) and the appropriate permissions to use the Paging Group through the corresponding extension.

The **Add** functional button opens an **Add Entry** page where a new user with corresponding permissions might be created. This page consists of the following components:

Call Type lists the available call types:

- PBX - local calls from Quadro's extensions
- SIP – calls through a SIP server
- PSTN – calls from global telephone network
- Auto – used for undefined call types. The destination (independent on whether it is a PBX number, SIP address or PSTN number) will be parsed through Call Routing Table.

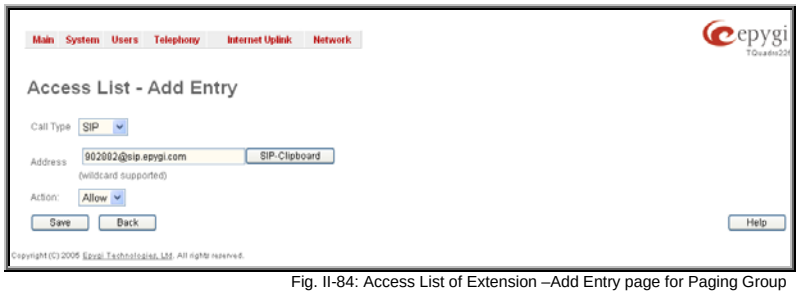


Fig. II-84: Access List of Extension –Add Entry page for Paging Group

The **Address** text field is used to define the address to be included in the Access List table. The value in this field is strictly dependent on the Call Type defined in the same named drop down list. If the **PBX** call type is selected, the Quadro extension number should be defined in this field. For the **SIP** call type, the SIP address should be defined, for the **PSTN** call type, the PSTN user number should be defined here.

The **Action** drop down list is used to select the defined user's permissions (allow or deny) to use the Paging Group service for the extensions included in the Paging Group table.

Attendant Extension Settings

For **Attendant** extensions, the **Extensions Management** - **Edit Entry** page consists of **General Settings, Attendant Scenario**, **SIP Settings** and **SIP Advanced Settings** pages. The **SIP Settings** and **SIP Advanced Settings** pages are the same as for the regular extensions described above. The **General Settings** and **Attendant Scenario** pages are described below:

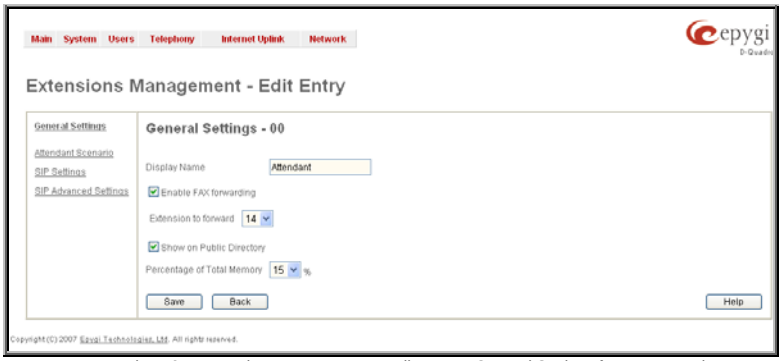


Fig. II-85: Extensions Management - Edit Entry – General Settings for Auto Attendant page

1. General Settings (for attendant extension)
This group requires personal extension information and has the following components:

Display Name is an optional parameter used to define the Auto Attendant's description. Usually the display name appears on the called party's phone display when a call is made or a voice mail is sent.

With the **Enable FAX Forwarding** checkbox enabled, the system moves the incoming FAX to the selected extension if a FAX tone is detected on the Auto Attendant.

The **Extension to forward** drop down list is used to choose the extension where the incoming FAX addressed to the Quadro's Auto Attendant will be forwarded. The list contains only those extensions that have FAX support enabled. FAX support can be enabled from the

Extension Codecs page.

Please Note: FAX forwarding is applicable only for incoming calls from PSTN and IP networks. It is not valid for PBX calls.

With the **Show on Public Directory** checkbox enabled, the details of the corresponding auto attendant extension will be displayed in the User Settings table on the Main Page of the Extension's Quadro Web Management (accessed by the extension's login, see Manual III – Extension User's Guide). Besides this, the details of the extension will be displayed in the Public Directories on the Snom and Aastra SIP phones. Leave this checkbox unselected if this auto attendant extension is reserved or not used.

The **Percentage of System Memory** drop down list is used to define the space for the Auto Attendant's system messages. The maximum value in the drop down list is equal to the maximum available space for voice messages on Quadro.

2. Attendant Scenario

This group is used to select between default and custom attendant functionality scenarios. When the **Default** scenario is selected, a group of settings should be adjusted. Here, the user defined Auto Attendant system messages can be uploaded and the list of **Friendly Phones** can be configured. For **Custom** scenario, a scenario script file (in EpygiXML coding, the coding standard can be found at Epygi Technical Support) should be defined and the custom voice messages can be uploaded.

The **Default** manipulation radio button selection enables the following components:

- The **Send AA Digits to Routing Table** checkbox selection switches the Auto Attendant to the routing mode. Any inserted digits on the Auto Attendant prompt will be parsed through the Routing Table on the Quadro.
- **Redirection on Timeout -** this group allows automatic call redirection in case no action has been performed by the caller. The group offers the following options:

  Enable Redirection on Timeout checkbox is used to enable/disable the automatic call redirection.

  Recurring Attendant Prompt Repetition Count text field indicates the number of Recurring Attendant Prompts to be consecutively played to the caller with no action from his/her side. When the Recurring Attendant Prompt is played the number of times indicated in this text field, the call will be automatically redirected to the defined destination.
- **Call Type** drop down list includes possible incoming call types (PBX, PSTN, SIP or Auto). PBX selection means that the call will be redirected to the local extension. **SIP** selection means that the call will be redirected to the SIP destination correspondingly. **PSTN** selection means that the call will be redirected to the PSTN destination. **Auto** selection is used for undefined call types: destination (independent on whether it is a PBX number, SIP address or PSTN number) will be reached through Routing.

  Call To text field requires the destination number dialed in the format depending on the selected Call Type. The wildcard is supported in this field.
- **Attendant Welcome Message -** this group allows updating the active Auto Attendant welcome message (played only once when entering Auto Attendant), downloading it to the PC, or restoring the default one. The group offers the following components:

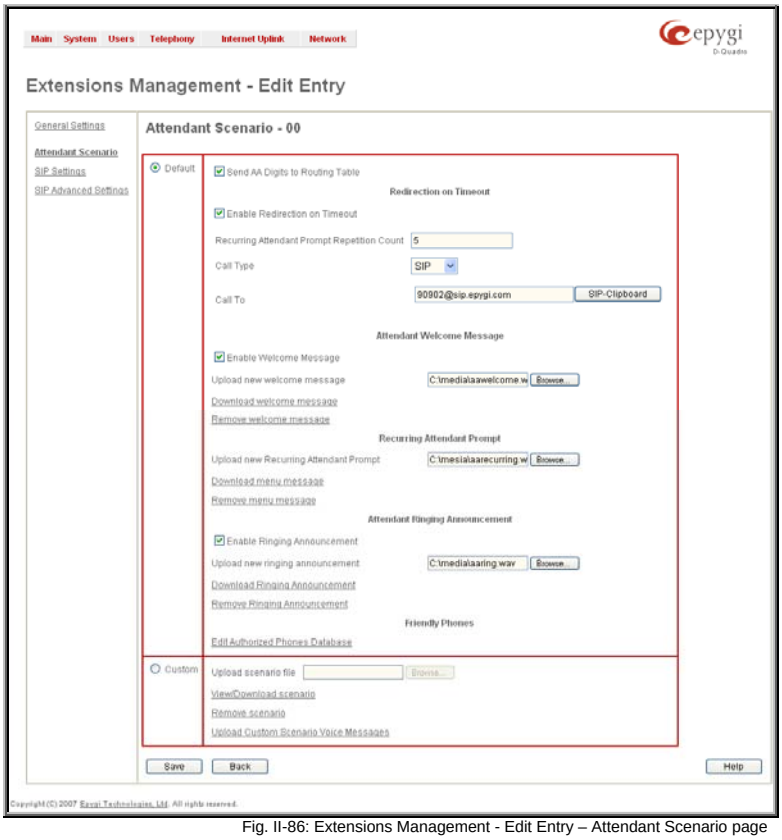


Fig. II-86: Extensions Management - Edit Entry – Attendant Scenario page

Enable Welcome Message checkbox is used to enable/disable the Auto Attendant welcome message (the default one or the custom one uploaded from this page or recorded from the handset (see Feature Codes) being played when callers enter Quadro's Auto Attendant.

Upload new welcome message indicates the file name used to upload a new welcome message. The uploaded file needs to be in PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format, otherwise the system will prevent uploading it and the "Invalid audio file, or format is not supported" warning message will appear. The system also prevents uploading if there is not enough memory available for the corresponding extension and the "You do not have enough space" warning message will appear.

Browse opens the file chooser window to browse for a new welcome message file.

The **Download Welcome Message** and **Remove Welcome Message** links appear only if a file has been uploaded previously. The **Download Welcome Message** link is used to download the message file to the PC and opens the file-chooser window where the saving location may be specified. The **Remove Welcome Message** link is used to restore the default welcome message.

- **Recurring Attendant Prompt -** this group allows updating the active recurring Auto Attendant message (played after the Attendant Welcome Message and then periodically repeated while being in the Auto Attendant), downloading it to the PC, or restoring the default one. The group offers the following components:

  Upload new Recurring Attendant Prompt indicates the file name used to upload a new recurring auto attendant prompt. The uploaded file needs to be in PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format, otherwise the system will prevent uploading and the "Invalid audio file, or format is not supported" warning message will appear. The system also prevents uploading if there is not enough memory available for the corresponding extension. This will cause the "You do not have enough space" warning message to appear.

  Browse opens the file chooser window to browse for a new Recurring Attendant Prompt file.

  The **Download Recurring Attendant Prompt** and **Remove Recurring Attendant Prompt** links appear only if a file has been uploaded previously. The **Download Recurring Attendant Prompt** link is used to download the Recurring Attendant Prompt file to the PC and opens the file-chooser window where the saving location may be specified. The **Remove Recurring Attendant Prompt** link is used to restore the default Recurring Attendant Prompt.

  The **Attendant Ringing Announcement** group allows uploading an optional voice message that is played to callers instead of ring-back tones when making calls through an auto attendant. The **Ringing Announcement** can be enabled for both custom and default attendants.

  Please note: The **Attendant Ringing Announcement** is played to SIP-to-extension and PSTN-to-extension calls only. The announcement can also be played to SIP-attendant-SIP and PSTN-attendant-SIP calls if they are made by a call routing rule for which the RTP proxy is enabled.

  The group offers the following components:

  The **Enable Ringing Announcement** checkbox enables/disables the Auto Attendant optional announcement message. When this checkbox is selected but no custom announcement message is uploaded, the default message will be played to callers.

  Upload new Attendant Ringing Announcement indicates the file name used to upload an announcement. The uploaded file needs to be in PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format, otherwise the system will prevent uploading and the "Invalid audio file, or format is not supported" warning message will appear. The system also prevents uploading if there is not enough memory available for the corresponding extension. This will cause the "You do not have enough space" warning message to appear.

  Browse opens the file chooser window to browse for a new announcement.

  The **Download Ringing Announcement** and **Remove Ringing Announcement** links appear only if a file has been uploaded previously. The **Download Ringing Announcement** link is used to download the announcement file to the PC and opens the file-chooser window where the saving location may be specified. The **Remove Ringing Announcement** link is used to restore the default ring back tones.

- **Friendly Phones -** the **Edit Authorized Phones Database** link refers to the Authorized Phones Database page where a list of trusted external phones can be created. If external SIP or PSTN users are added to the Quadro Authorized Phones database, they are free to access the Auto Attendant Services without passing the authentication or to use the Call Back services.

The **Custom** manipulation radio button selection allows you to upload Attendant's custom scenario file and voice messages. The selections are:

- The **Upload Scenario File** indicates the file name used to upload a new scenario file. The uploaded file needs to be in EpygiXML format (the coding standard can be found at Epygi Technical Support) and is restricted to a 20KB file size. **Browse** opens the file chooser window to browse for a custom scenario file.
  Please note: You may upload an attendant scenario file along with the voice prompt recordings as a single file. To do this, create an archive file of the "tar.gz" type containing all the necessary files and upload it from the **Upload Custom Scenario Voice Messages** page.
- The **View/Download Scenario** link appears only when a custom scenario file has been previously uploaded and is used to view or download the scenario file. The **Remove Scenario** link is used to remove a custom scenario file and return to the default Auto Attendant scenario.
- The **Upload Custom Scenario Voice Messages** link refers to the page where voice messages used in the uploaded custom scenario should be managed.

This page provides the possibility of uploading voice messages to be played in the custom Auto Attendant scenario. It also removes and downloads the uploaded files to a PC.

The **Upload Custom Scenario Voice Messages** page contains a table where uploaded custom voice messages are listed. Use the **Download** functional button to download and use **Remove** to delete the corresponding custom voice message. **Browse** opens a file chooser window to browse for a custom voice message or for an archive file with the "tar.gz" extension containing the custom attendant scenario and the voice prompt recordings.

Fig. II-87: Upload Custom Voice Messages page

The **Edit** functional button provides a possibility of editing multiple extensions at the same time. In this case, fields that cannot be edited for multiple records have **Multiple** values in the **Edit Entry** page. When editing user and attendant extensions together, the **Edit Entry** page displays only those fields that are for both user extension and attendant settings. Additionally, for the fields that need to be modified, a **Select to modify fields** checkbox alongside the corresponding field needs to be selected to submit changes, otherwise the fields will not be updated.

Delete removes the selected extensions. If no records are selected an error message occurs. Deleting an extension from the Extensions Table will automatically remove the name attached to the deleted extension in Extensions Directory.

The **Upload Universal Extension Recordings** link leads to the page where universal default voice messages for all extensions are defined.

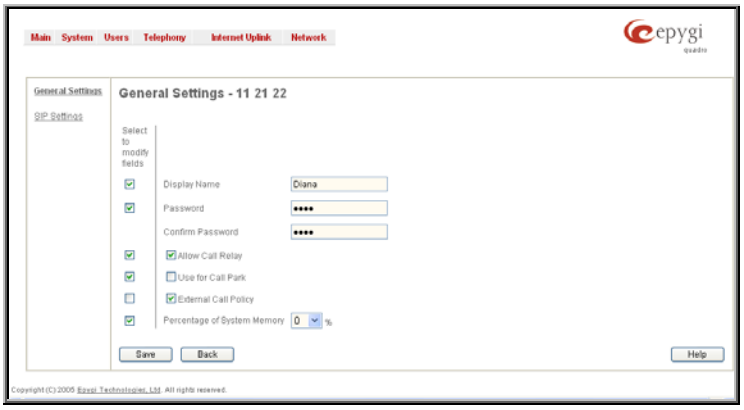


Fig. II-88: Extensions Management - Edit Entry page for multiple edit operation

To Configure an Extension

1. Press the **Add** button on the **Extensions Management** page. The **Add Entry** page will appear in the browser window.
2. Enter the desired extension number in the **Extension** text field and select the extension type from the **Type** drop down list.
3. Press **Save** to create an extension with the defined number.
4. Select the checkbox of the newly created extension in the **Extensions Management** table and press the **Edit** button. The **Edit Entry** page will appear in the browser window.
5. Move through the extension's configuration pages and fill the fields with the appropriate information.
6. To apply extension settings, press **Save**.

To Delete an Extension

1. To remove an extension with all its settings select one or more checkboxes of the corresponding extensions that should be deleted from the **Extensions Management** table. Press **Select all** if all extensions should be deleted.
2. Click on the **Delete** button on the **Extensions Management** page.
3. Confirm the deletion by clicking on **Yes**. The extension(s) will be deleted. To abort the deletion and keep the extension in the list, click **No**.

Extension Codecs

To establish IP voice communication, both partners have to use the same codec. When establishing the communication line, this codec is negotiated. If the caller does not find an appropriate codec, the communication cannot take place. If you want to be reachable by all IP calls, it is helpful to support as many codecs as possible. In this case, all the codecs that Quadro offers should be added to the **Codecs** table. Some codecs require a high transfer rate of up to 64 kbit/s. If you are certain you do not want to use these codecs, make sure they are not listed in the table **Codecs**.

The **Extension Codecs** page displays a list of **Codecs** with the state of the **Out of Band DTMF** and **FAX Support** features for Quadro extensions and the Auto Attendant.

Please Note: Use caution when configuring Auto Attendant Codecs as they are used by virtual extensions for redirecting the incoming calls.

The table **Codecs** lists active voice codecs for the selected line that are supported by Quadro. The order of records in the **Active Codecs** table is important for transmitting and receiving. A codec placed at the top of the table will be used as the preferred codec. If the remote party does not support the preferred codec, the following codecs will be tried in a top to down order in the **Codecs** table.

Each record in the table has an assigned checkbox. They are used to select the record to be deleted or moved up or down.

An error occurs if no records are selected and the user activates the delete button, the "No records selected" error message appears. At least one codec must be attached to the line. When attempting to delete the last codec, the "At least one codec should stay in the codec list" error message will appear.

Enable/Disable functional button is used to enable or disabled the corresponding codec for the extension. When the codec is disabled, the extension user will not be able to use it for placing a call.

The **Move Up/Move Down** buttons are used to move the selected codec one level up/down in the table.

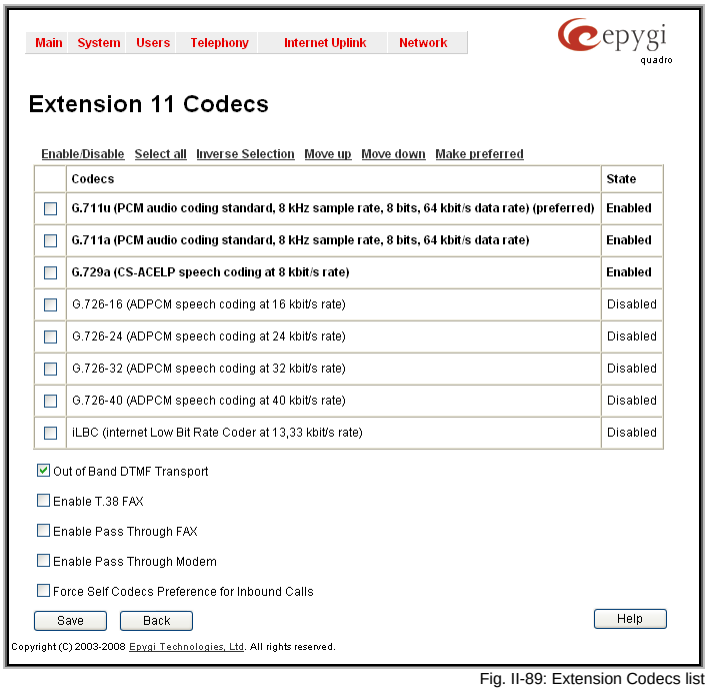


Fig. II-89: Extension Codecs list

Make preferred moves the selected codec to the top of the table, setting its priority to the highest. Clicking the **Make preferred** button when a disabled codec is selected will first enable the codec and then move it to the top.

The **Out of Band DTMF Transport** checkbox enables DTMF code transmission in parallel with the voice stream. The destination receiving the DTMF code will play it locally if it supports the feature. This is helpful to avoid DTMF's loss upon bad traffic. This feature is valuable for all codecs but it is especially recommended to enable it in case low bit rate codecs (G.729, G.726/16, etc.) are selected.

Enable T.38 FAX checkbox enables the FAX tone detection and the T.38 codec support for the FAX transmission from/to the FAX machine/modem attached to the line. It also enables the T.38 codec support for incoming unified FAX messages.

The **Enable Pass Through FAX** checkbox enables the FAX tone detection and the G.711 codec support for the FAX transmission from/to the FAX machine/modem attached to the line. It also enables the G.711 codec support for incoming unified FAX messages.

If both of the above checkboxes are enabled, the T.38 codec will be used as a preferred codec for FAX transmission. If it is not supported by the peer, the G.711 codec will be used instead. If the extension is attached to the line that has no FAX machine/modem connected (the extension is virtual or is attached to an IP line), the incoming FAX can only be stored in the extension's voice mailbox. To allow FAX to be stored in the voice mailbox, the extension's user should not answer the incoming calls, so that they are forwarded to the voice mailbox.

Please note: If both of the above checkboxes are disabled, no FAX transmission to the peer's voice mailbox will be possible. **Enable Pass Through Modem** checkbox is only available for Auto Attendant and extensions attached to the FXS lines (it is not available for extensions attached to the IP line). This checkbox enables the modem tone detection and the G.711 codec support for the data transmission from/to the modem attached to the line. During data transmission, Silence Suppression (see RTP Settings) and Echo Cancellation are being disabled on the line.

Please note: If the extension/attendant is intended to accept modem connections, disable the **Enable T.38 FAX** checkbox to allow the system to identify the modem tones correctly. Otherwise, the modem connection may fail.

The **Force Self Codecs Preference for Inbound Calls** checkbox enables the usage of your own preferred codecs (if available on both peers) for the IP connection establishment on the extension.

Call Park Service

Call Park service is used to store a call on a specific number so that any other user on the system can retrieve it. For example, a user receives a call but wants to take it in a conference room where it is possible to speak privately. Transferring the call to the conference room is not an option because the conference room it is transferred to might be in use, or the user is unable to walk to the conference room in time to answer the call. The user can use **Call Park** to place the call at a specific number and then retrieve when they reach the conference room.

To use the **Call Park** feature, the call parking service should be enabled for one or more extensions on the Quadro from the Extensions Management page.

To activate the Call Park service, the Quadro user should dial the appropriate digit combination (see Feature Codes) during the call. The destination party will be placed on hold, while the SIP username of the first available extension is being configured for the call parking (if the extension is registered on the SIP server). The extension's PBX number, will be played to the Quadro user. The Call Parking is valid for 15 minutes. During this time hold music (if configured) will be played to the parked destination party. When the **Call Park** timeout expires, the phone initiating the call parking will start to ring. If no one picks up the parked call, or if the phone is off hook, the parked destination party will be automatically disconnected.

The pickup user will be able to pick up the parked call from any destination by calling the extension where the call has been parked. Both PBX and IP calls are allowed. For PBX calls, the extension number should be dialed. For IP calls, the SIP address is played by the Quadro when activating the **Call Park** service, if it is routed to the corresponding extension. The pickup user will be prompted to pass the authentication by inserting the password of the Quadro user (where the call has been parked) in order to retrieve the parked call.

For example, the Call Park service is enabled for extension 23, which has been registered on the SIP Server under the 892220 registration username. While being on a call with user A, the Quadro user dials the appropriate calling code. As a reply, Quadro will play the 892220 to the Quadro user, while user A is put on hold. The Quadro user then moves to a different location and makes an SIP call to the 892220 number. When this SIP call is established to the 892220 number, user A will then be connected to the Quadro user and the conversation will resume.

Please Note: Any PBX or IP calls addressed to the extension where the call has been parked, will require you to pass the authentication to reconnect the Destination party being parked. The parked Destination party will be disconnected if an incorrect password has been inserted and authentication has been rejected. To avoid unexpected calls received on the extension used for the call parking, it is recommended to use virtual extensions for the **Call Park** service.

Upload Universal Extension Recordings

The **Upload Universal Extension Recordings** are to be defined by the Quadro administrator and will be present instead of the default voice messages for all extensions on the Quadro. They will be used when no custom messages have been uploaded or recorded.

The following system messages can be uploaded from this page:

- **Hold Music** – played to the held user
- **Voice Mail Regular Greeting** – played when a caller reaches the extension's voice mailbox
- **Voice Mail Out-of-Office Greeting** – played when a caller reaches the extension's voice mailbox if the Out-of-office greeting is enabled
- **Incoming call blocking** - played when a blocked user calls the extension
- **Outgoing call blocking** – played when the extension dials a blocked destination

The **Upload Universal Extension Recordings** page consists of a table where the universal voice messages are listed.

An **Upload** functional link is present for each voice message recording that is not uploaded in the table and it is used to upload the custom system message. When a message is uploaded, the **Upload** functional link is replaced by **Download** and **Remove** functional links respectively. These are used to download to the PC and to remove the uploaded system message.

The **Memory Allocation** group includes a drop down list used to specify the **Percentage of System Memory** for the universal extension recordings. The maximum value in the drop down list is equal to the maximum available space for voice messages on Quadro.

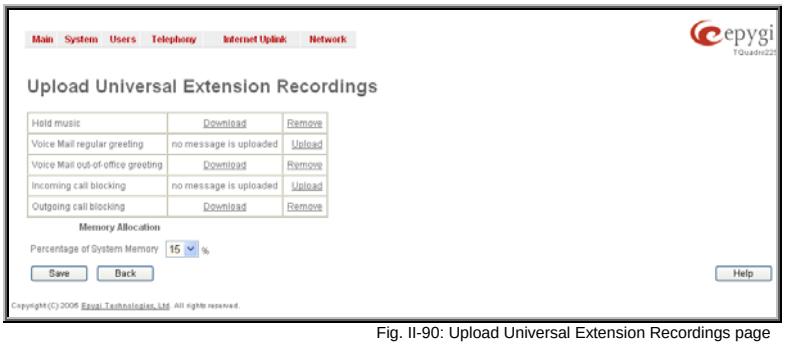


Fig. II-90: Upload Universal Extension Recordings page

Please Note: Changing the **Percentage of System Memory** on this page will stop any recordings of universal extension voice messages from the handset.

Receptionist Management

The receptionist feature on the Quadro offers a variety of services to manipulate with multiple calls, to keep the calls in the queue with the perspective to be answered by the receptionist and finally to be forwarded to the corresponding destination, if needed.

The following services are available to the receptionist:

- Call Queue
- Extension Status
- Call Interception
- Voicemail Transfer
- Multi-Company Receptionist

Call Queue

This feature allows keeping multiple incoming calls in the queue when being on the line and to answer calls in the order they have been received. The usage of this service is not limited to receptionist only and can also be used by the extension user, if configured correspondingly.

The configuration of the Call Queue feature is done from the Extensions Management – Edit Entry page where the length of the call queue and the call queue appearance is defined. When the Call Queue service is enabled, the second arriving call to the receptionist/extension user will be either set into the queue (if call queue appearance is 1) or will be ringing in the background of the active call (if call waiting is enabled for the user and the call queue appearance value is greater than 1). If the call ringing in the background isn't answered, it will be transferred to the user's voice mailbox or, if no answer forwarding is enabled, it will be forwarded to the corresponding destination.

If the call is set into the queue, the caller will hear a message asking them to wait until the call will be answered. Once the receptionist or extension user terminates the call, the next call in the queue will ring to the user.

For regular IP users, indication about the callers in the queue is through the Call Waiting service (see Manual III-Extension Users Guide). When a new caller arrives to the call queue, the phone display (if available) of the phone connected to the IP will display the total number of callers in the queue along with the name/phone number of the last caller.

Extension Status

Quadro provides the possibility of controlling and determining the actual state of the managers phones' through the receptionist's IP phone (configuration of the IP phone is done automatically by Quadro through the Receptionist Phone Configuration Wizard). A programmable key on the receptionist's IP phone that is assigned to the corresponding manager will blink when an incoming call to the manager's phone is currently ringing. The key lamp will be ON when manager is on a call and will be OFF if the manager's phone is in the idle state. The extension status can be watched (viewed) by the receptionist to determine the availability of managers for incoming call transfers to them.

Call Interception

To use Call Interception service, the managers' phones watch option should be enabled and each manager should have a programmable key assigned on the receptionist's IP phone. This is performed automatically by Quadro through the Receptionist Phone Configuration Wizard.

When an incoming call addressed to the certain manager comes in, the receptionist can see the corresponding programmable key blinking and the caller's ID on the phone's display. The receptionist is able to intercept the incoming call by pressing the blinking key. The caller will then be connected to the receptionist. If the receptionist does not answer the call addressed to the manager, and if the manager does not answer it either, the call will be directed to the manager's voice mailbox if it is enabled. If the manager's voice mailbox is not enabled, the call will be disconnected.

Kickback

Quadro allows the receptionist to forward the incoming calls to the manager's extension and if there is no answer the call is returned to the receptionist's phone, instead of getting into Voice Mail Service or being disconnected. To use this service, receptionist should simply transfer the incoming call to the local extension. In case of no answer, the call will automatically get back to the receptionist.

Voicemail Transfer

Quadro allows the receptionist or extension user to forward incoming calls directly to the voice mail of the other attached extension. To do so, an appropriate routing pattern should be added to the Call Routing table. Hence, when transferring a call to the assigned extension, incoming call will directly go to the extension's voice mailbox.

Multi-Company Receptionist

Quadro provides the possibility to use a single IP phone to manage the receptionist's features for multiple companies at the same time. To do so, the incoming line appearance for the phone should be created, attached to the IP line of the IP phone and be labeled to the corresponding company name. Being busy with a call related to one company, the receptionist is able to also receive the calls related to other companies. While calls are ringing in the background, the receptionist can switch between the incoming calls. If the receptionist does not answer the incoming calls, and if the Call Queue service is enabled on the extensions, the incoming calls will be stored in the queue specific for each company line.

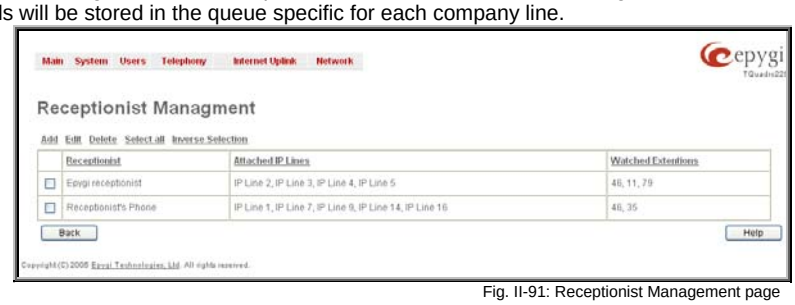


Fig. II-91: Receptionist Management page

The **Receptionist Management** page allows you to configure IP phones to be used as a receptionist on the Quadro. This page contains the list of configured receptionists with information about the attached IP lines and watched extensions.

Add opens the **Receptionist Phone Configuration Wizard** where the new receptionist phone can be created and configured. The wizard consists of several pages.

The **Receptionist Phone Configuration Wizard - Page 1** has the following components:

The **Description** text field requires the description of the receptionist to be configured.

The **Phone Model** drop down list is used to select the IP phone model to be used by the receptionist.

The **MAC Address** text fields require the MAC Address of the corresponding IP phone.

Based on the selected IP phone model and the inserted MAC Address, the IP phone can be automatically configured by simple reset/reboot (for more information about IP phone configuration, refer to the corresponding IP phone's users manual).

The **Attached IP Lines** text field requires the numbers of Quadro's IP lines used by the receptionist. The IP lines should be separated by commas.

Fig. II-92: Receptionist Phone Configuration Wizard – Page 1

The **Use Session Timer** enables the SIP session timer for the IP lines specified in the **Attached IP Lines** text field. This checkbox enables advanced mechanisms for connection activity checking. This option allows both user agents and proxies to determine if the SIP session is still active.

The **Use Kickback** checkbox enables the kickback service on the corresponding receptionist. When this service is enabled, if receptionist transfers the incoming calls to the extension and if there is no answer or if the called extension is busy on another call, the call is returned to the receptionist's phone, instead of getting into Voice Mail Service or being disconnected. To use this service, receptionist should simply transfer the incoming call to the local extension. In case of no answer or busy, the call will automatically get back to the receptionist. When this service is not enabled, the incoming call will reach the Voice Mail Service or the call queue of the called extension, depending on the extension user's configuration.

If you have selected the 55i, 57i, Snom 360 or Grandstream GXP2000 IP phones from the **Phone Model** drop down list, the next page in the wizard will be the **Receptionist Phone Configuration Wizard – Hardware Modules**. For all other phone models, this page is skipped.

For Snom 360 and Grandstream GXP2000 IP phones, this page contains a single checkbox only:

The **Enable Expansion Module** checkbox is used to enable the supplementary module attached to the IP phone. The **Expansion Modules Count** drop down list allows you to select how many additional expansion modules will be connected to the IP phone. When the module is selected, the number of programmable keys on the next page of the wizard is multiplied accordingly.

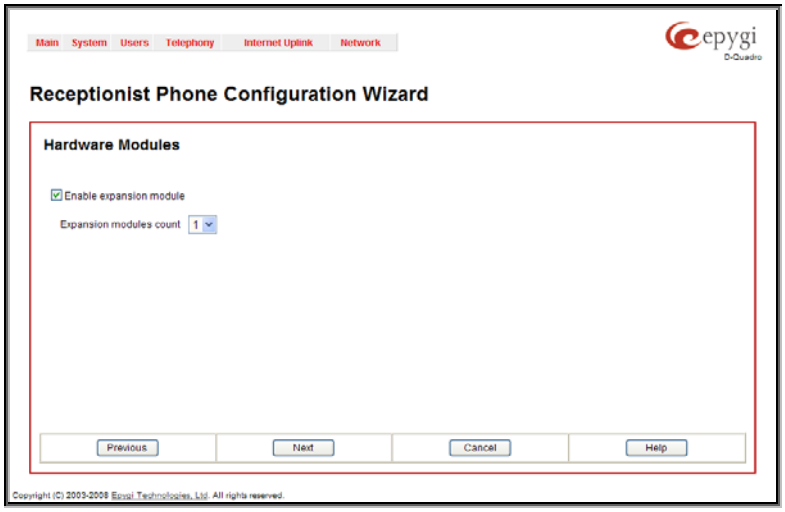


Fig. II-93: Receptionist Phone Configuration Wizard – Hardware Modules for Snom phone

For Aastra 55i and 57i IP phones, **Receptionist Phone Configuration Wizard – Hardware Modules** page contains a number of drop down lists to select the types of the expansion modules and the sequence in which they are connected to the IP phone.

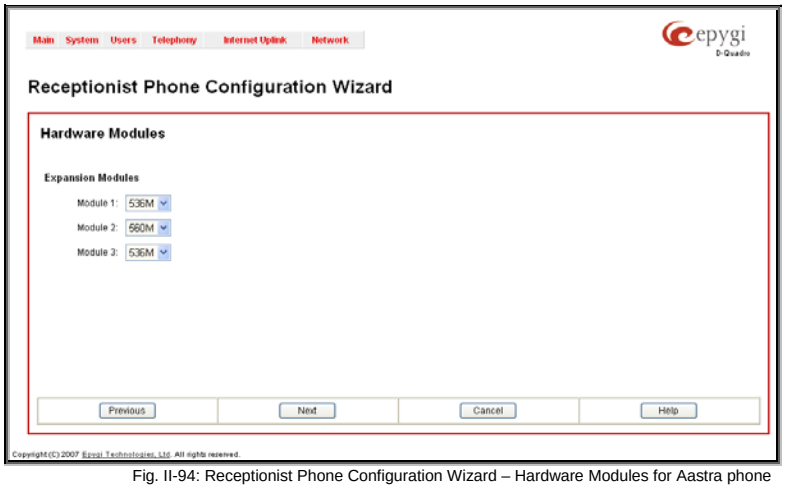


Fig. II-94: Receptionist Phone Configuration Wizard – Hardware Modules for Aastra phone

The next page of the wizard is available for Snom and Aastra phones. This page is skipped for QCM **Phone Model** selection. The content of this page depends on the configuration made on the first page of the Receptionist Phone Configuration Wizard.

The **Receptionist Phone Configuration Wizard – Programmable Keys Configuration** page both for Aastra and Snom phones is used to set the correspondence between the selected **Functions** and the available Programmable keys on the IP Phone. To do so, assign a Function to each programmable key from the drop down list on this page.

The following options are available in **Functions** the drop down list:

- **Watch Ext. #** - watch the extension on the Quadro and a possibility to pickup the call addressed to that extension.
- **Call Park Ext #** - watch the calls parked to the corresponding extensions and a possibility to retrieve the calls parked to that extension.

This list also contains a number of PBX services available on the Quadro and accessible with the * key combination (see Quadro's Feature Codes). When configured from this page, the key combinations become transparent for the IP phones too.

- **Vmail** – accesses the voice mailbox of the extension to which the receptionist IP line is attached to.
- **DND** – enables the Do Not Disturb service on the extension to which the receptionist IP line is attached to.

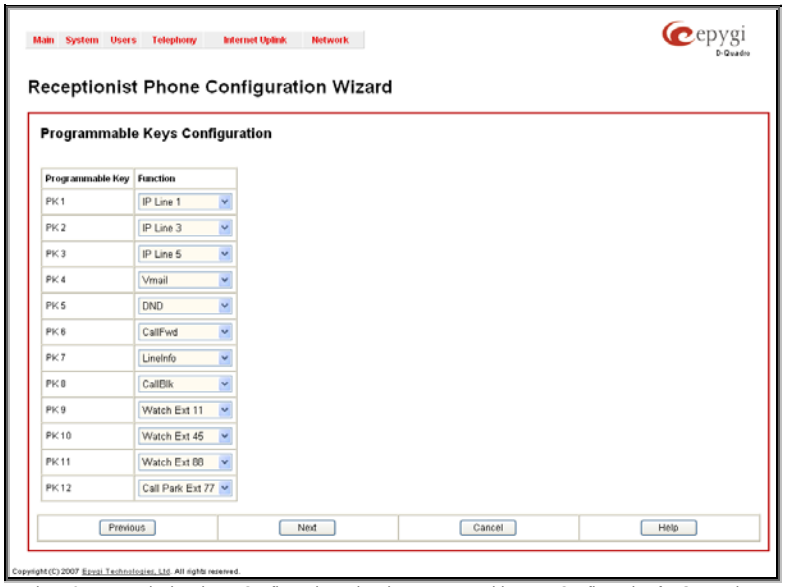


Fig. II-95: Receptionist Phone Configuration Wizard – Programmable Keys Configuration for Snom phone

- **CallFwd** – accessed Forwarding Management of the extension to which the receptionist IP line is attached to.
- **AutoReDl** – auto redials the last dialed call.
- **CallBack** – calls back to the last caller.
- **LineInfo** – gets the IP line information from the Quadro.
- **CallBlk** – blocks the last caller.

For Snom phones, when multiple IP lines are selected on the **Attached IP Lines** text field on the first page of the **Receptionist Phone Configuration Wizard**, this list additionally contains the number of specified IP lines. That selection is used to set the correspondence between the selected IP lines and the available Programmable keys on the IP Phone. To do so, select the IP lines corresponding to each programmable key from the **Functions** drop down list on this page. Each programmable key on the Snom IP phone will now be responsible for the selected IP line on the Quadro.

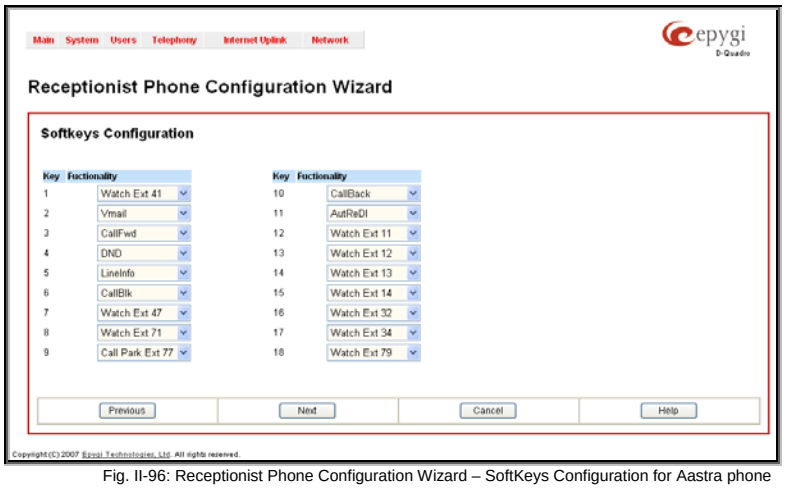


Fig. II-96: Receptionist Phone Configuration Wizard – SoftKeys Configuration for Aastra phone

For **Aastra** phones (except the 9133i model), a **Hard Key Line 4 (L4)** drop down is available to use the default Hard Key Line 4 of the IP phone for the SLA lines. You may select the SLA line to which the Hard Key Line 4 of your Aastra phone will be assigned. The Hard Key Line 4 assigned to an SLA line will work exactly the same way like the programmable key does.

Please Note: Once a new receptionist is created, the **Call Queue** feature will be automatically enabled with the corresponding **Call Queue Size** and **Max Call Queue Appearance** settings on all extensions attached to the IP lines defined in the **Attached IP Lines** text field.

The next page of the wizard is a **Receptionist Phone Configuration Wizard - Summary** where the configured settings for the receptionist should be verified. Additionally, this page contains a **Reboot IP Phone now** checkbox which should be selected if you wish to have your IP phone rebooted once the corresponding receptionist is created. Reboot is needed for a proper functionality of the IP phone. However, if you wish to reboot the IP phone later, leave this checkbox unselected.

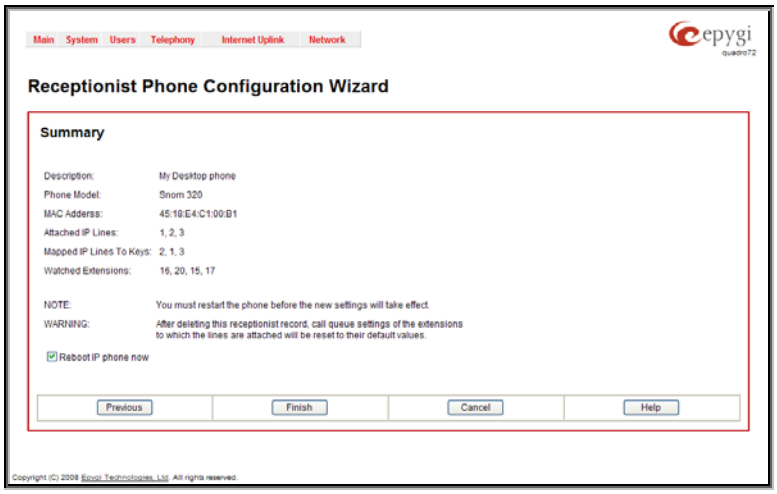


Fig. II-97: Receptionist Phone Configuration Wizard – Summary page

Extensions Directory

The **Extensions Directory** is a useful tool for callers to get direct access to the Quadro extensions by spelling the username with the help of the phone keypad. The Extensions Directory can be accessed through Quadro's Auto Attendant Services and it has its own manipulation buttons to browse the directory.

The **Extensions Directory Settings** page allows you to make a list of names assigned to the extensions on the Quadro. If the name spelled by the caller matches the one(s) listed in the Extensions Directory, the corresponding extension user name(s) will be played to the caller for verifying the input and selecting the user to connect. Each extension's user should record their name with the help of the handset (see chapter Update System Messages), or they can upload a wave file from the Account Settings page.

The **Custom Greeting** column in the Extensions Directory table displays whether or not a custom greeting (user's name) is recorded or uploaded. Users cannot be accessed through the Extensions Directory and it is implied as being an inactive entry in the event a custom greeting is not recorded or uploaded. Warnings will be seen in the Extensions Directory table for inactive entries. Extension numbers in the Extensions Directory table are made as a link to move to the corresponding extension's Account Settings page. This helps the administrator access the extension's settings page where a custom greeting can be manually uploaded.

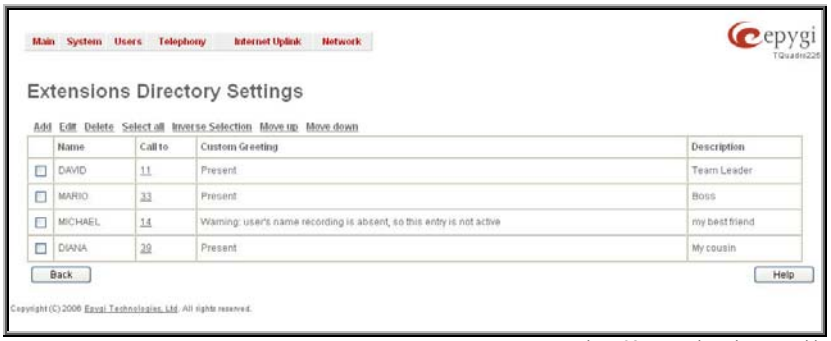


Fig. II-98: Extension Directory table

Move Up and **Move Down** are used to move the selected record one level up or down in the Extensions Directory table. The sequence of the entries in the Extensions Directory is important if several records match the same spelled name. The Extensions Directory table is parsed from the top down and the matched entries will be played according to their position in the table.

Add opens the **Add Entry** page where a new name may be assigned to the extension. An error message appears and prevents adding a new entry to the Extensions Directory if no extensions are available in the Extensions Management table.

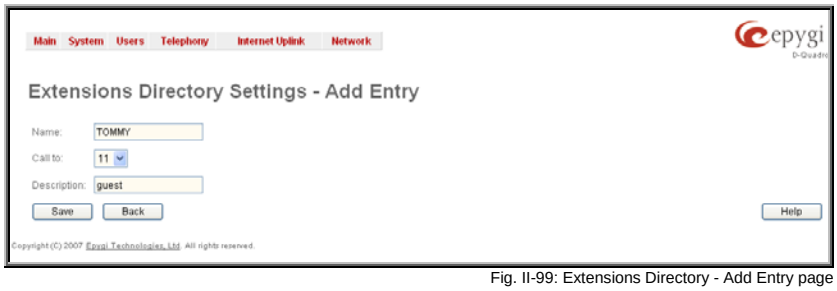


Fig. II-99: Extensions Directory - Add Entry page

The **Add Entry** page offers the following components:

Name requires the name of the extension owner. Several extensions can have the same name and a single extension may have several names. User's Name is the identification parameter being searched within the Extensions Directory. You should use uppercases letters in this field, otherwise the name will automatically be changed to uppercase when saving it to the Extensions Directory table.

Call to drop down list contains all extensions on the Quadro that should ring when selecting the specified Name.

Description can be used for any optional information requiring entry in the Extensions Directory.

Please Note: The entries in the Extensions Directory can automatically be deleted if the extensions assigned to the entries are removed from the Extensions Management table.

Authorized Phones Database

The **Authorized Phones Database** page is used to create a list of trusted external phones. If they are part of the Quadro Authorized Phones database, external SIP or PSTN, then users are free to access the Quadro Auto Attendant services without requiring authentication. When adding a trusted phone to the list, an existing extension has to be chosen. The parameters (extension number and password, as well as SIP and Speed Calling Settings) will be used automatically for the trusted caller access of the Quadro Auto Attendant. A direct connection to the **Call Relay** menu can be optionally provided.

The **Authorized Phones Database** page displays the **Authorized Phones Database** table where the trusted phones are listed. Only SIP and PSTN users can be added to the **Authorized Phones Database**.

The **Authorized Phones Database** table displays all trusted callers with their settings. For example, the call type, caller address, extension they automatically login with, information if they have automatic access to Call Relay Menu of the Auto Attendant, etc.

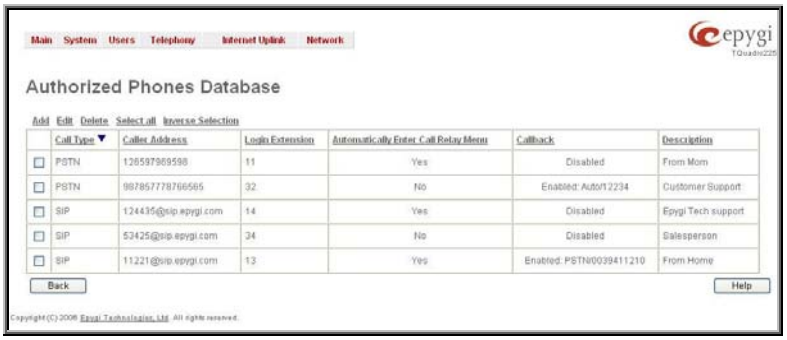


Fig. II-100: Authorized Phones Database

Each record in the table has an assigned checkbox. The checkbox is used to edit or delete the corresponding record. The "No records selected" error message occurs if the user activates the edit or delete button with no records being selected. The error message "One record should be selected" appears if the user tries to edit more than one record. The heading of each column in the table has a link. By clicking on the column heading, the table will be sorted by the selected column. When sorting (ascending or descending), arrows will be displayed next to the column heading.

The **Add** functional button refers to the **Authorized Phones Database- Add Entry** page where new trusted users may be entered.

The **Authorized Phones Database- Add Entry** page offers two groups of input options:

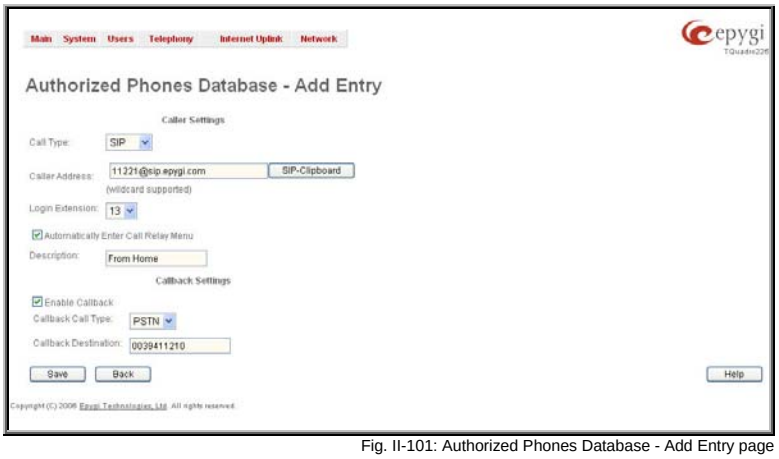


Fig. II-101: Authorized Phones Database - Add Entry page

Caller Settings

The **Call Type** drop down list includes possible incoming call types (PSTN, SIP or Auto). In **SIP**, the caller connects Quadro through a SIP server and **PSTN** means the caller is a PSTN user. **Auto** is used for undefined call types and the destination (independent on whether it is a PBX number, SIP address or PSTN number) will be reached through Routing.

The **Caller Address** text field requires the caller's SIP address or PSTN number to be added to the trusted phones list. The PSTN number length depends on the area code and phone number. The wildcard is supported in this field. If the caller address already exists in the **Authorized Phones Database**, the error message "The record already exists" appears when selecting the **Save** button.

The **Login Extension** drop down list provides all existing extensions on the Quadro. When calling the Quadro Auto Attendant, a trusted user will automatically be logged in as the selected extension, i.e., the extension number and its password will be automatically submitted by the Quadro system. The trusted user will directly access the Quadro Auto Attendant services. The SIP settings of the login extension will be used when making IP calls.

The **Automatically Enter Call Relay Menu** checkbox enables direct access for the trusted user to the Quadro Auto Attendant Call Relay menu. If the checkbox is not selected, a trusted caller will be directed to the Auto Attendant's main menu, but will still be able to reach Remote Access (Voice Mailbox of the specified extension) and Call Relay services (see Feature Codes) with no authentication.

Please Note: **Login Extension** drop down list and **Automatically Enter Call Relay Menu** checkbox have no sense for Auto Attendant with custom scenario configured (see Attendant Extension Settings).

The **Description** text field allows entering an optional comment.

Callback Settings

The **Enable Callback** checkbox selection gives the possibility for a specified trusted caller to use the Instant Call Back service (see chapter Call Back Services).

The **Callback Call Type** drop down list includes possible callback call types (PBX, PSTN, SIP and Auto).

The **Callback Destination** text field requires the destination number where Quadro should instantly call back to. The value inserted in this field is dependent on the selected callback call type: for **PBX**, 2-digit extension is required, for **SIP**, the SIP address is requires and for **PSTN**, a PSTN number is required. **Auto** is used for undefined call types: destination (independent on whether it is a PBX number, SIP address or PSTN number) will be reached through Call Routing table. If this field is left empty, the callers address will be implied as a callback destination.

Please Note: The Call Back service is functional and enabled only for PSTN callers.

To Add an Authorized phone to the database

1. Enter the desired **Auto Attendant Settings** page.
2. Select **Edit Authorized Phones Database** to enter the **Authorized Phones Database** page.
3. Press the **Add** button on the **Authorized Phones Database** page. The **Add Entry** page will appear in the browser window.
4. Choose the call type and enter a caller address in the corresponding text field.
5. Select a **Login Extension** and the **Automatically Enter Call Relay Menu** checkbox (if required).
6. Enable **Call Back** service if required and define a **Call Back Destination** in the same named field.
7. Fill in an optional **Description** in the appropriate field, if required.
8. Press **Save** to submit the settings.

To Delete an Authorized phone from the database

1. Enter the desired **Auto Attendant Settings** page.
2. Select **Edit Authorized Phones Database** to enter the **Authorized Phones Database** page.
3. To remove an authorized phone(s), select one or more checkboxes of the corresponding records that should be deleted from the **Authorized Phones Database** table. Press **Select all** if all records should be deleted.
4. Press the **Delete** button on the **Authorized Phones Database** page.
5. Confirm the deletion by clicking on **Yes** or cancel the action by clicking on **No**.

Call Back Services

With **Call Back** service, PSTN callers can save a call charge when calling to and through Quadro. Quadro provides the possibility of creating a list of those trusted PSTN callers that are allowed to make free of charge calls to Quadro's Auto Attendant or through its Call Relay menu to the third party IP or PSTN destination. Two types of Call Back services are available on the Quadro: **Pre-configured Call Back** and **Remote Call Back Configuration**.

Pre-Configured Call Back

For **Pre-configured Call Back**, a list of trusted PSTN callers must be configured in the Quadro's Authorized Phones Database using Web Management. The Call Back service should be enabled and a valid callback destination should be specified for each PSTN caller.

To use **Pre-configured Call Back**, the PSTN caller registered in the Authorized Phones Database simply calls to the PSTN number attached to the Quadro from the global PSTN network. Let the call to ring twice and then hang up. Call Back will be instantly activated, and Quadro will call back to the defined Call Back destination. By answering the incoming call the PSTN party will be connected to the Auto Attendant menu.

Remote Call Back

The **Remote Call Back Configuration** service is used by authorized PSTN caller to configure or reconfigure by an authorized PSTN caller using a phone and calling to the Quadro's Auto Attendant. Remote Call Back Configuration is divided into two modes accessible from the Quadro's Auto Attendant: **Permanent Call Back** and **Non-Permanent Call Back**.

Please Note: Remote Call Back Configuration services are only available when the **Automatically Enter Call Relay Menu** checkbox is disabled in Authorized Phones Database for the trusted user.

Permanent Call Back service allows the callers registered in the Authorized Phones Database to create a new trusted PSTN Caller with Call Back enabled. They can also modify the Call Back destination of an existing PSTN Caller in the Authorized Phones Database. By calling Quadro's PSTN number (that is previously routed to the Auto Attendant) and entering the Auto Attendant menu, the caller can use the * 6 code (see Feature Codes) to create a new trusted PSTN Caller as well as to modify the Call Back destination for the already registered Caller in the Authorized Phones Database.

Entering the **Permanent Call Back** reconfiguration menu, the system will ask the caller to login by dialing the number and an appropriate password for the Quadro's extension that is used as login extension in Call Back settings. After entering the login successfully the PSTN callers should follow the voice instructions for configuring a new entry or reconfiguring the existing entry in Authorized Phone database.

When the system accepts the settings, the corresponding entry will be logged to the Authorized Phones Database. The detected PSTN caller address must correspond to the one applied by the caller, the ISDN line must be available on the Quadro, there must be network connectivity and the destination must be reachable. The PSTN caller will then be disconnected from the Quadro's Auto Attendant and the defined Call Back destination will receive a call from the Quadro within the next 45 seconds. Answering the incoming call, the PSTN caller will be reconnected to the Quadro's Auto Attendant.

Non-Permanent Call Back configuration service allows the trusted caller to organize one-time Call Back to the defined PSTN destination. In this situation, no entry will be logged to the Authorized Phones Database.

By calling Quadro's PSTN number (that is previously routed to the Auto Attendant) and entering the Auto Attendant menu, the caller is able to use the ***5** menu (see Feature Codes) to modify the Call Back destination for the already registered Caller in the Authorized Phones Database.

The system will ask the caller to login by dialing the number and an appropriate password for the Quadro's extension that is used as login extension in the Call Back settings. After successful login, the PSTN caller should follow the voice instructions for reconfiguring the existing entry in Authorized Phone database.

The detected PSTN caller address must correspond to the one applied by the caller, the ISDN line must be available on the Quadro, there must be network connectivity and the destination must be reachable. The PSTN caller will then be disconnected from the Quadro's Auto Attendant and the defined Call Back destination will receive a call from the Quadro within the next 45 seconds. Answering the incoming call, the PSTN caller will be reconnected to the Quadro's Auto Attendant.

Telephony Menu

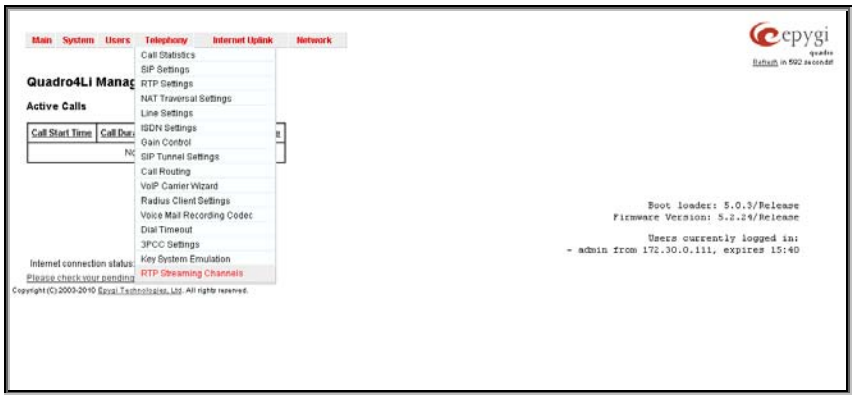


Fig. II-102: Telephony Menu in Dynamo Theme

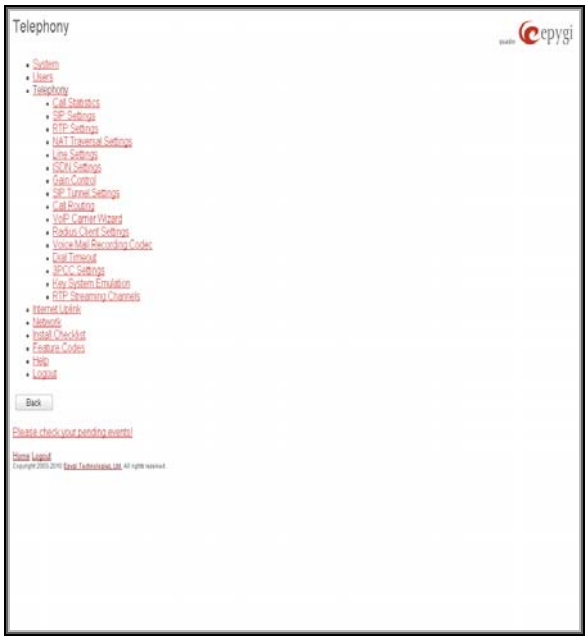


Fig. II-103: Telephony Menu in Plain Theme

Call Statistics

The **Call Statistics** page displays four tables. They provide information on successful, unsuccessful and missed incoming and outgoing calls on the first three tables, and statistics settings on the fourth page. Call statistics allows the collecting of call events on the Quadro with their parameters and to search them by various criteria.

The **Statistics Settings** page offers the following input options:

The **Enable Call Reporting** checkbox enables Call Statistics reporting. The selected number of statistics entries will be displayed in the Call Statistics tables.

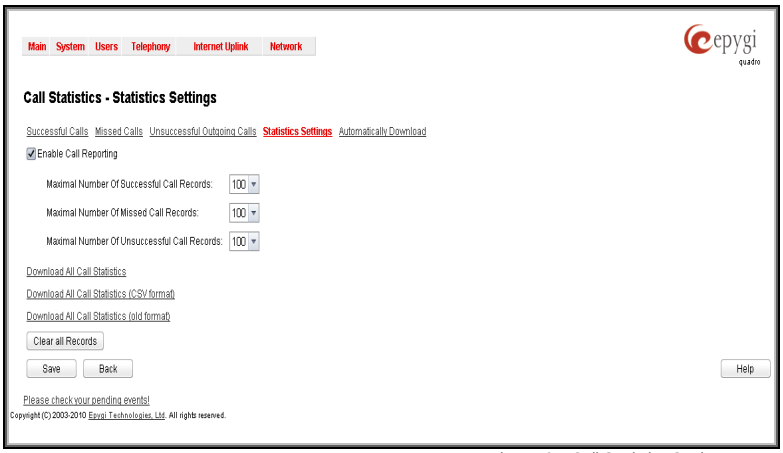


Fig. II-104: Call Statistics Settings page

The **Maximal Number of Displayed Call Records** drop down lists are used to select the number of **Successful**, **Missed** and **Unsuccessful Outgoing** statistics entries to be displayed in the corresponding **Call Statistics** tables. If the record numbers exceed the numbers specified in these drop down lists, the oldest record will be removed.

The **Download All Call Statistics** link is used to download whole displayed statistics in a file that can be viewed with a simple text editor. This type of call statistics file is more easy-to-read and can be aligned in a spreadsheet.

The **Download All Call Statistics (old format)** link is used to download whole displayed statistics in an old formatted file. This file can also be viewed with a simple text editor but contains more intricately aligned content.

The **Clear all Records** button is used to clear all statistics records.

The **Automatically Download** page is used to configure the automatic downloading of the call statistics. Two options of downloading the call statistics are available: uploading the call statistics file to the server or sending it to the mailing address. This page consists of the following components:

The **Enable Automatically Download Call Statistics** checkbox enables automatic downloading mechanism of the call statistics. **Please Note:** This service only refers to the statistics collected from the moment of enabling this service and forward; any previously generated statistics will not be downloaded.

The **Number of Call Records to Download** drop down list is used to select the portion size of the call statistics (including all types of call statistic, i.e. successful, missed and unsuccessful outgoing call statistics, in the timing order) which will be downloaded to the server or send per email. The number selected in this drop down list indicates the number of entries in the single downloaded call statistics file. If there are no enough entries in the call statistics table on the Quadro, the system will wait until the necessary number of entries will be collected and then will upload the statistics file to the server or send it to the email address.

The **File Format** drop down list is used to select the format in which call statistics will be saved. This list offers to choose between Tab Deliminated Text (.log) and Comma Separated Values (.cvs) file formats.

The following group of manipulation radio buttons allows you to select whether the call statistics files will be delivered by email or stored in some location on the server:

- The **Send via Email** radio button is used to send the call statistics files via email. The selection enables **Email Address** text field that requires the email address of the administrating person to receive the call statistics files.
- The **Send to Server** radio button is used to store the call statistics files on a remote server. This selection enables the following fields to be inserted:

  The **Server Name** requires the IP address or the host name of the remote server.

  The **Server Port** requires the port number of the remote server.

  The **Path on Server** requires the path on the server to store the call statistics files in.

  The **Send Method** manipulation radio buttons allow you to select the remote server type: TFTP or FTP. In case of FTP selection, the authentication username and the password need to be inserted. In case these fields are left empty, anonymous authentication will be used.

The **Download Now** button is used to perform a manually immediate download of the call statistics.

The **Number of Records** displays the current number of statistics entries in the table. For successful calls, **Total Duration, Maximum Duration, Average Duration** and **Minimum Duration** statistics are displayed on top of the table.

The **Call Statistics - Successful Calls, Missed Calls** and **Unsuccessful Outgoing Calls** pages consist of the general information on successful, missed and unsuccessful calls, search fields and the calls table. The search components are as follows:

From and **To** text fields are used to search by date and time. The data must be entered in either of the following formats: dd-mm-yyyy hh:mm:ss or dd-Mon-yyyy hh:mm:ss. The time criteria are optional. **From** requires an earlier date and time than the **To** field. If the entered data does not meet this condition, the error message “Minimal date should be less than maximal date” prevents statistics filtering.

From and **To** drop down lists are used to search by duration. The duration has to be selected from the list of values. **From** field must indicate a shorter duration than the **To** field. If the inserted data does not meet this condition, the error message “Minimal duration should be less than maximal duration” prevents statistics filtering.

Calling Phone and **Called Phone** respectively require the caller and called party’s SIP address (see chapter Entering a SIP Addresses correctly), extension or PSTN number as search criteria. Wildcard symbols are allowed here.

The **Call Statistics: Successful Calls, Missed Calls and Unsuccessful Outgoing Calls** tables are lists of successful, missed and unsuccessful incoming and outgoing calls and their parameters (Call Start Time, Call Duration, Call destinations). Each column heading in the tables is a link. By clicking on the column heading, the table will be sorted by the selected column. Upon sorting (ascending or descending), arrows will be displayed close to the column heading.

The **Details** column is only present in **Successful Calls** table and provides the following information:

- Brief information about the call quality, voice codec used to receive and transmit packets and the close call reason. The close call reason appears to provide more information about the call termination reason which can be a network problem, termination by one of the call parties, voice mail service activation, etc. Clicking on the details information will open the
- RTP Statistics page where all RTP parameters of established call are provided.
- **Authenticated By** information about the callers that passed an authentication on the Quadro as configured in the Local AAA Table (see Call Routing).
- Information about FAX statistics for the calls that have a FAX transmission handled. It only appears when there was a FAX transmission during the call. Clicking on the **FAX** link in the **Details** column will move to the FAX Statistics page.

Fig. II-105: Call Statistics page

The **Call Detail** column is present only in the **Unsuccessful Outgoing Calls** table and indicates the reason why the call was unsuccessful.

The **Filter** performs a search procedure by the selected criteria. The search may be done with several criteria at the same time.

The **Download Call Statistics** links are available below all Call Statistics tables and allows you to download the displayed call statistics in a text file.

To Enable/Disable the Statistics

1. Enter the **Call Statistics Settings** page.
2. Select or deselect the **Enable Call Reporting** checkbox to enable or disable statistics recording.
3. If enabling the statistics, the maximum number of records to be stored in the statistics table should be selected from the corresponding drop down lists.
4. Press **Save** to apply the new configuration.

To Filter the Statistics

1. Enter the desired criteria fields.
2. Press the **Filter** button to search the call reports within the **Call Statistics** table.

Please Note: To return to the complete **Statistics Table**, clear all search criteria and press **Filter**.

To Reset the Statistics

1. Press the **Clear All Records** button in the **Call Statistics Settings** page.
2. Confirm the deletion by clicking on **Yes**. The call statistics will then be deleted. To abort the deletion and keep the statistics information, click on **No**.

RTP Statistics

The **RTP Statistics** page provides detailed information about the established call is provided. When Quadro serves as an RTP proxy, this page displays two groups (legs) of RTP statistics. For example, when calling from an IP Phone attached to the Quadro's IP line to an external SIP destination or from one external SIP destination to another through the Quadro's Auto Attendant. Each group of parameters describes characteristics of a piece of RTP stream composing an overall SIP session. Normally, one leg describes the RTP stream from caller to the Quadro and the other leg describes the RTP stream from Quadro to the destination.

Fig. II-106: RTP Statistics page

Quality - estimated call quality, which depends on RTP statistic. Below is the legend for Call Quality definitions on the displayed RTP Statistics:

excellent – RX Lost Packets < 1% & RX Jitter < 20
good - RX Lost Packets < 5% & RX Jitter < 80
satisfactory - RX Lost Packets < 10% & RX Jitter < 150
bad - RX Lost Packets < 20% & RX Jitter < 200
very bad - RX Lost Packets > 20% or RX Jitter > 200

The **Source** and **Destination** fields indicate the two peers between which the RTP stream is transmitted. The characteristics in the table below describes to the piece of RTP stream between these peers.

Rx/Tx Codec - codec for received and transmitted RTP stream respectively.

Rx/Tx Packets - number of RTP packets received and transmitted respectively.

Rx/Tx Packet Size - size of RTP packet (payload) received and transmitted respectively.

Rx Lost Packets - number of lost RTP packets for received stream.

Rx Jitter - inter-arrival jitter is an estimate of the statistical variance of the RTP data packet inter-arrival time, measured in timestamp units.

The inter-arrival jitter is defined to be the mean deviation (smoothed absolute value) of the difference D in packet spacing at the receiver compared to the sender for a pair of packets. If Si is the RTP timestamp from packet i, and Ri is the time of arrival in RTP timestamp units for packet i, then for two packets i and j, D may be expressed as:

$$D(i,j) = (Rj - Ri) - (Sj - Si) = (Rj - Sj) - (Ri - Si)$$

$$J(i) = J(i-1) + (|D(i-1,i)| - J(i-1))/16,$$ where J(i) is Rx Jitter for packet i.

For more details about Jitter calculations, please refer to the RFC1889.

Rx Maximum Delay - maximum variance (absolute value) of actual arrival time of the RTP data packet compared to estimated arrival time, measured in milliseconds.

If Si is the RTP timestamp from packet i, and Ri is the time of arrival in RTP timestamp units for packet i, then variance for packet i may be expressed as following: $V(i) = |(Ri - R1) - (Si - S1)| = |(Ri - Si) - (R1 - S1)|$

Rx Maximum Delay = max V(i) / 8

RX Delay Increase Count – indicates the number of times the delay in jitter buffer is increased during the call.

RX Delay Decrease Count - indicates the number of times the delay in jitter buffer is decreased during the call.

Please Note: RTP Statistics is logged only when at least one of the call endpoints is located on the Quadro. For example, it will not be logged when:

- calls incoming from or addressed to the IP lines or remote extension,
- calls from an external user are routed to another external user through Quadro's routing rules.

In the first case, RTP statistics will be logged if remote extension or IP line user is calling locally to the Quadro's extension or auto attendant.

The **Configure Call Quality Event Notification** link leads to the **Configure Call Quality Event Notification** page where call quality control notification specifics can be configured.

From the **Configure Call Quality Event Notification** page you may configure event notification policy when the call quality is lower than the allowed level.

This page consists of a **Notify** checkbox, which enables the call quality monitoring mechanism for the corresponding event notifications, and a **Call Quality less than** drop down list where the least satisfactory call quality should be selected. When a call with the quality less than the level selected here is registered on the Quadro, an event notification will appear. When the **Notify** checkbox is disabled, no Call Quality events will occur on the Quadro.

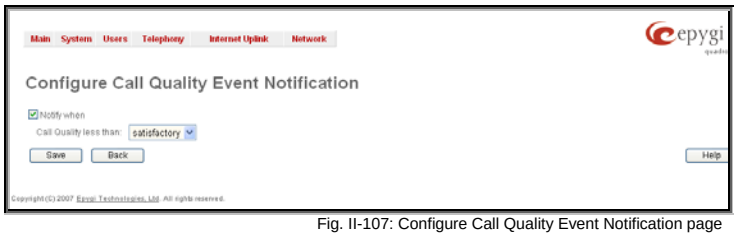


Fig. II-107: Configure Call Quality Event Notification page

Please Note: The ways of notification for the Call Quality events should be configured from the Events page.

The **Configure System Events** link leads to the Events page where the methods of notification for each system event can be configured.

FAX Statistics

The **FAX statistics** page is accessed from the Call Statistics page by clicking on the **FAX** link in the **Details** column for the calls that contain T.38 FAX transmission.

The **FAX statistics** page provides information about received and transmitted packets, lost, bad and duplicated packets. This statistics refers only to the T.38 FAX transmission. The FAX statistics is not available for the FAX transmitted with other protocols.

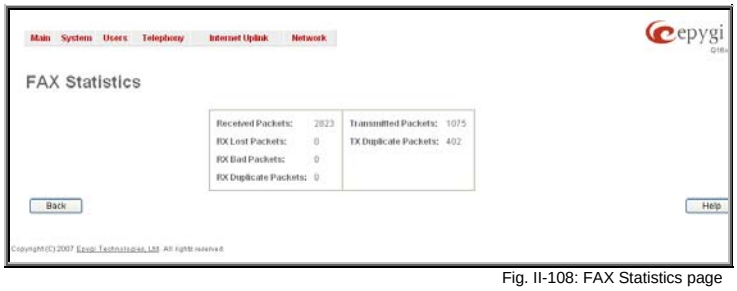


Fig. II-108: FAX Statistics page

SIP Settings

The **SIP Settings** provide information on the SIP receive UDP and TCP ports and allows you to select DNS server configurations for SIP and the SIP timers scheme.

The **UDP Port** indicates the SIP UDP (User Datagram Protocol) receive port number. By default 5060 is selected and used. The SIP UDP port cannot be in the selected RTP/RTCP port range for IP lines (see RTP Settings), otherwise the "Mapped port for SIP shouldn't be in RTP port range" error message appears.

The **TCP Port** indicates the SIP TCP (Transmission Control Protocol) receive port number. By default, 5060 is selected and used.

Please Note: Quadro will not use TCP protocol as a transport for SIP messages if the **TCP Port** field is left empty.

Enable Session Timer enables advanced mechanisms for connection activity checking. This option allows both user agents and proxies to determine if the SIP session is still active.

The **DNS server for SIP** radio button group allows you to choose between regular DNS servers configured in the DNS Settings page and specific DNS servers for SIP traffic.

- **Use default** is used to apply regular DNS servers for SIP traffic.
- **Specific** is used to enable SIP specific DNS servers. For this selection, both primary and secondary SIP DNS servers should be defined in the **SIP DNS 1** and **SIP DNS 2** text fields. At the least, a primary DNS server should be inserted.

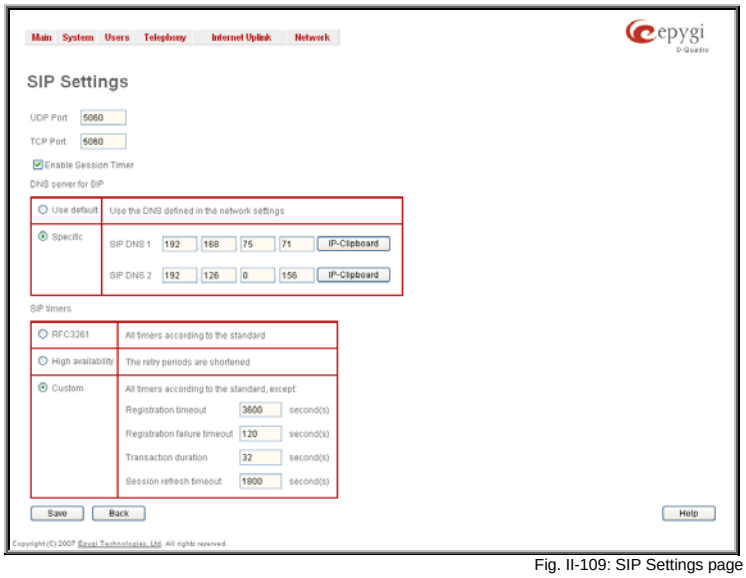


Fig. II-109: SIP Settings page

The **SIP Timers** radio button group is used to define the timeouts of the SIP messages retransmission.

- **RFC 3261** will apply standard SIP timers described in the corresponding specification.
- **High availability** will apply SIP timers to shorten the call establishment, registration confirmation and registration failure procedures. This selection provides more firmness to the SIP connection but increases the network traffic on the Quadro.
- **Custom** allows manually defining the **Registration Timeout**, **Registration Failure Timeout**, **Transaction Duration** and **Session refresh timeout** SIP timers (in seconds).

RTP Settings

The **RTP Settings** page allows the administrator to configure the codec's packet size and silence suppression for each voice codec, to select the G726 codec standard, to define RTP/RTCP port ranges, etc. All parameters listed on this page may be modified and submitted.

The **Codec Properties** table lists all codecs with the corresponding packetization interval and information about silence suppression.

Edit opens the **Edit RTP Settings** page where the codec settings can be modified. To use **Edit**, only one codec may be selected at a time, otherwise the "One record should be selected" error message appears.

The **Packetization Interval** is the time interval between two RTP packets of the same stream. If the interval is increased, the overhead is decreased but the voice quality may deteriorate as a result. If the interval is decreased, the network load is increased and the delay is reduced.

Silence Suppression disables RTP packet transmission in case of no voice activity. This feature helps to avoid extra traffic if the RTP stream contains no voice activity. It is activated after two seconds of silence and restarted immediately if any audio appears.

The **G.726 Standard** radio buttons are used to select between packaging the G.726 codewords into octets. If you experience problems with the G.726 voice quality when one of these packaging is selected, try a different one.

- If **Use ITU_T specification** is selected, the ITU I.366.2 ("AAL2 type 2 service specific convergence sublayer for narrow-band services") type packaging of codewords is used, where packing code words into octets is starting from the most significant rather than the least significant digit in the octet.
- If **Use IETF RFC** is selected, the IETF RFC ("RTP Profile for Audio and Video Conferences with Minimal Control") type packaging of codewords is used, where packing code words is starting from the least significant position in the octet.

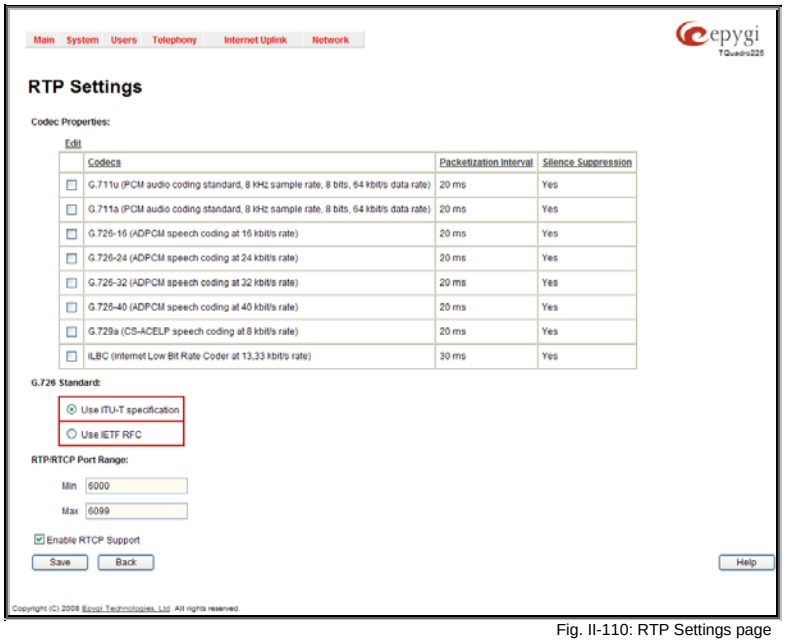


Fig. II-110: RTP Settings page

RTP/RTCP Port Range:

- **Min** - minimal port has to be higher than 1024 and lower than the maximal port range. Only even numbers are allowed.
- **Max** - maximal port has to be lower than 65536 and higher than the minimal port range. Only odd numbers are allowed.

Since the specified maximum port has to be higher than the minimum port, the error message "Min port number should be less than max port number" will appear if this condition is not met. The port range must consist of digits only, otherwise the error "Incorrect Port Range: only Integer values allowed" will appear. The difference between Max and Min RTP ports should be 100 ports or less (according to the system's capabilities) otherwise the corresponding warning appears. RTP/RTCP Port ranges cannot include the defined SIP UDP ports (see SIP Settings) otherwise an error message will appear.

Telephone Event Draft Support enables telephony events transmission according to the draft-ietf-avt-rfc2833bis-04. The checkbox needs to be toggled if the SIP destination party phone or IVR has problems recognizing DTMFs generated by the Quadro.

Enable RTCP Support enables Real Time Control Protocol support and allows for the RTCP packets transmission. RTCP protocol is used for monitoring the RTP streams and changing RTP characteristics depending on Network conditions.

The **RTP Settings – Edit Entry** page offers a drop down list and a checkbox.

Packetization Interval contains possible values (in milliseconds) to be configured for the selected codec.

The **Enable Silence Suppression** checkbox selection enables voice activity detection for the selected codec.

Fig. II-111: RTP Settings - Edit Entry

To Edit Codec Parameters

1. Select the codec from the **Codecs Table** that is to be edited.
2. Press the **Edit** button on the **RTP Settings** page. The **Edit Entry** page will appear in the browser window.
3. Change values in **Packetization Interval** and/or enable/disable **Silence Suppression**.
4. To save the codec settings press **Save**, or to keep the initial data click **Back**.

NAT Traversal Settings

The **NAT Traversal Settings** page is divided into separate pages used to configure General NAT settings, SIP NAT parameters, RTP and STUN parameters for NAT and a page where the NAT Exclusion table may be filled.

The **General Settings** page consists of a manipulation radio buttons group to select the mode of the NAT Traversal usage for the SIP traffic (any incoming and outgoing SIP messages from and to the Quadro will be routed through the NAT PC).

- **Automatic** – with this selection, system will analyze the Quadro's WAN IP address and if it is in the IP range specified for local networks (according to RFC), the SIP traffic will be routed through NAT. Otherwise, if Quadro's WAN IP address is outside the specified IP range, no SIP traffic will be routed through NAT server.
- **Force** – with this selection, all the SIP traffic will be routed through the NAT server.
- **Disable** – with this selection, no SIP traffic will be routed through the NAT server.

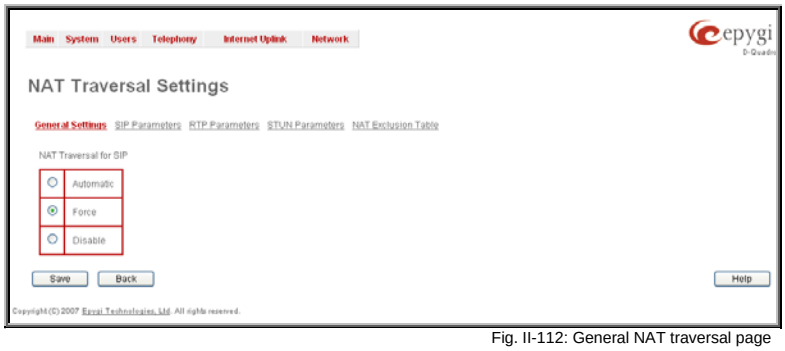


Fig. II-112: General NAT traversal page

The **SIP Parameters** page is used to configure NAT specific settings for SIP and offers two independent groups of settings:

UDP Parameters:
Manipulation radio buttons allow you to select the type of connection over NAT:

Selecting **Use STUN** will switch to automatic discovery of Mapped settings for the SIP UDP traffic over NAT. STUN settings are configured on the STUN parameters page (see below).

Selecting **Use Manual NAT Traversal** allows you to manually define the mapped settings for the SIP UDP traffic over NAT:

Mapped Host requires the IP address of the mapped host for SIP UDP traffic over NAT.

Mapped Port requires the port number on the mapped host for the SIP UDP traffic over NAT.

TCP Parameters:

Mapped Host requires the IP address of the mapped host for SIP TCP traffic over NAT.

Mapped Port requires the port number on the mapped host

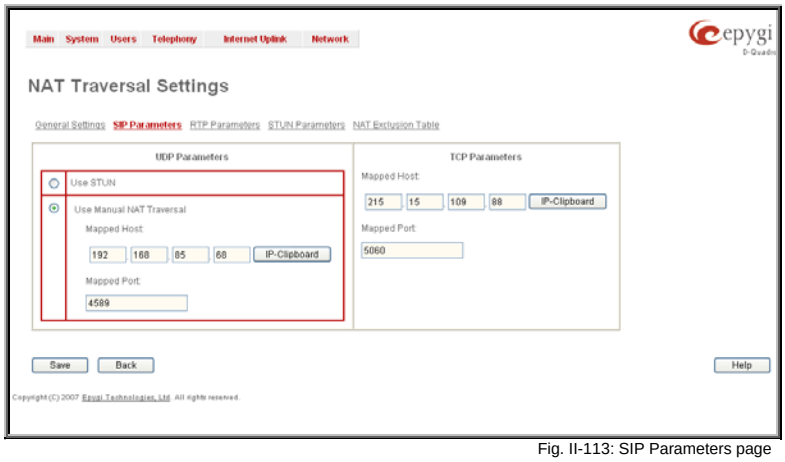


Fig. II-113: SIP Parameters page

for the SIP TCP traffic over NAT.

The **RTP Parameters** page is used to choose between the STUN and Manual NAT traversal connection for the RTP traffic and to define the RTP/RTCP ports for the connection over NAT.

Manipulation radio buttons allow you to select the type of connection over NAT:

Selecting **Use STUN** will switch to automatic discovery of Mapped settings for the RTP UDP traffic over NAT. STUN settings are configured on the STUN Parameters page (see below).

Selecting **Use Manual NAT Traversal** allows you to manually define the RTP/RTCP port ranges for the RTP traffic over NAT:

- The **Mapped Host** text fields require the Mapped Host for RTP traffic over NAT.
- **Mapped RTP/RTCP Port Range:**
  Min - minimal port has to be higher than 1024 and lower than the maximal port range. Only even numbers are allowed.
  Max - maximal port has to be lower than 65536 and higher than the minimal port range. Only odd numbers are allowed.

Please Note: RTP/RTCP Mapped Port ranges should be greater than or equal to the RTP/RTCP port ranges defined on the RTP Settings page.

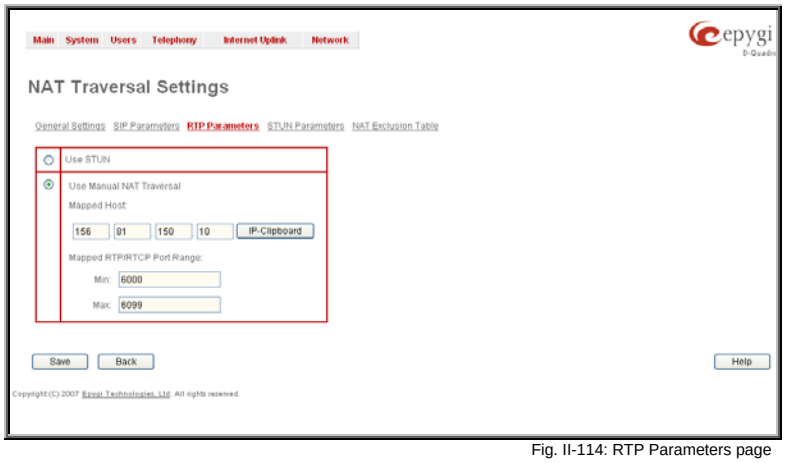


Fig. II-114: RTP Parameters page

The **STUN Parameters** page enables automatic NAT configuration through the STUN server and is used to configure the STUN (Simple Traversal of UDP over NAT) client on the Quadro. This page requires the following data to be inserted:

The **STUN Server** text field requires the STUN server's hostname or IP address. The **STUN Port** text field requires the STUN server port number.

The **Secondary STUN Server** and **Secondary STUN Port** text fields respectively require the parameters of the secondary STUN server.

The **Polling Interval** drop down list contains the possible time intervals between referrals to the STUN server.

The **Keep-alive interval** text field provides the options to select the time interval (in seconds) for keeping NAT mapping alive. The value should be in the range of 10 to 300 seconds.

The **NAT IP checking interval** text field indicates the interval (in seconds) between the NAT IP checking attempts (used to distinguish the possible NAT IP address changes and to perform registration on the new host). The value should be in the range of 10 to 3600.

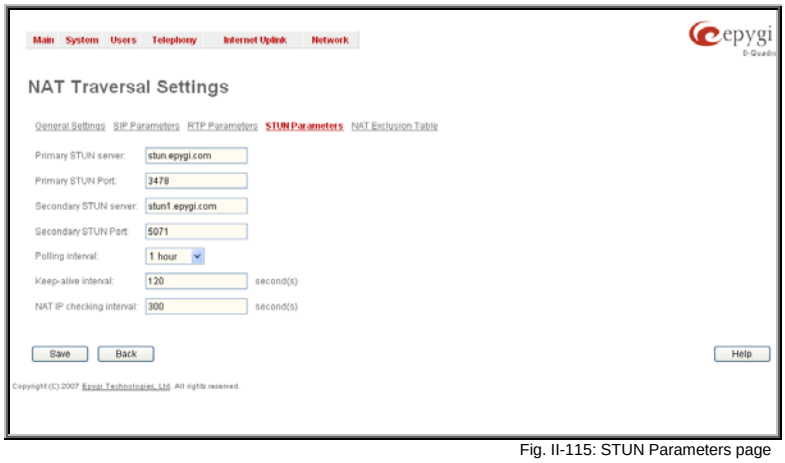


Fig. II-115: STUN Parameters page

The **NAT Exclusion Table** page includes a table where all possible IP ranges are listed that allows you to exclude some network addresses from being NATed. For example, if a Quadro user needs to make SIP calls within the local network as well as outside of that network, all local IP addresses are required to be excluded from NAT traversal settings by being listed in this table. Otherwise, a malfunction may occur in SIP operations.

The **NAT Exclusion Table** page offers the following input options:

Each record in the table has a corresponding checkbox assigned to its row. The checkbox is used to delete or to edit the corresponding record. Only one record may be edited at a time. An error message will appear if no selection is made or more than one is selected.

Each column heading in the table is a link. By clicking on the column heading, the table will be sorted by the selected column. When sorting (ascending or descending), arrows will be displayed next to the column heading.

The **Add Entry** page includes the following text fields:

Add opens the **Add Entry** page where a new IP range can be added.

Fig. II-116: NAT Exclusion Table page

Edit opens the **Edit Entry** page where the IP range can be modified. This page includes the same components as the **Add Entry** page.

The **NAT Exclusion Table** lists all possible IP ranges that are not included in the NAT process, but may be accessed directly. IP addresses that are not listed in the **NAT Exclusion Table** are accessed over NAT.

IP address requires the IP address that is placed behind NAT within the local network.

Subnet Mask requires the subnet mask corresponding to the specified IP address.

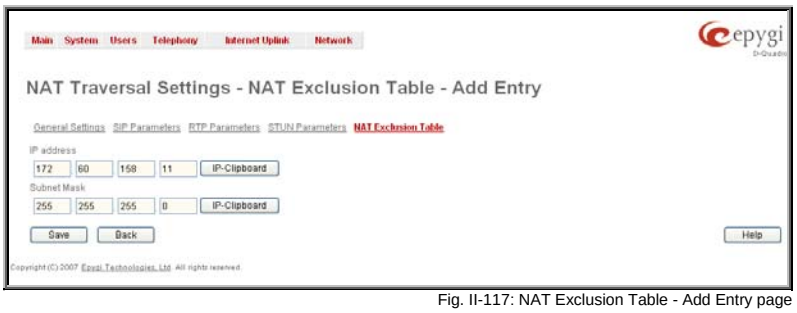


Fig. II-117: NAT Exclusion Table - Add Entry page

To Configure the NAT Exclusion Table

1. Press the **Add** button on the **NAT Exclusion Table** page. The **Add Entry** page will appear in the browser window.
2. Specify an **IP Address** and its **Subnet Mask** in the corresponding text fields.
3. Press **Save** on the **Add Entry** page to add the selected IP range to the **NAT Exclusion Table** list.

To Delete an IP Range from the NAT Exclusion Table

1. Select the checkboxes of the corresponding IP range(s) that should to be deleted from the **NAT Exclusion Table**. Press **Select all** if all IP ranges should to be deleted.
2. Press the **Delete** button on the **NAT Exclusion Table** page.
3. Confirm the deletion by pressing **Yes**. The IP range will then be deleted. To abort the deletion and keep the IP range in the list, press **No**.

Line Settings

The **Line Settings** are used to configure Quadro IP Line (if available on the board) settings. The **Line Settings** page consists of **IP Line Settings** page for IP Lines configuration.

IP Line Settings

The **IP Line Settings** page is used to configure IP lines for IP phones to be connected to the Quadro. Quadro provides the options to connect SIP phones to its LAN side, assign the corresponding IP line to an active extension, and use SIP phones as a simple phone with all telephony services of the Quadro (for example, call hold, waiting, transfer, etc).

There are 10 IP lines available on Quadro4Li.

The **IP Lines Settings** page displays a table with the available IP lines on the Quadro.

Enable PnP to IP lines checkbox is used to setup the SIP phones connected to the Quadro via Plug and Play automatic configuration service. To use this service, this checkbox needs to be selected. The SIP phone should be reset then. After a clean boot-up of the SIP phone, Quadro will detect the SIP phone and all its characteristics, generate the automatic configuration file and will upload it to the SIP phone. The SIP phone will be then configured on the first available IP line of the Quadro and will become completely functional.

Please Note: The Plug and Play service is only available for the supported SIP phones (see the list below). This service will not work in case the SIP phone is already manually configured or if it is not reset after enabling the **Enable PnP to IP lines** checkbox.

Enable Firmware Version Control checkbox is used to control the firmware version running on the SIP Phone attached to the Quadro. This service also allows you to have the new firmware automatically downloaded and installed on your SIP Phone (in case your SIP phone was running an old firmware upon connecting to the Quadro or when the Quadro's firmware has been updated and the compatibility was changed to the higher firmware version of the SIP phone). Every new firmware of Quadro is compatible to a certain firmware version of each supported SIP phone. If you are running older firmware on your SIP phone, this service will automatically download and install the newer firmware on your SIP phone.

Please Note: The Firmware Version Control service is only available for the supported SIP phones (see the list below).

Attention: Do not select this checkbox if you wish to run other firmware version on your SIP phone than the one compatible with the Quadro.

The **Connect IP phones from WAN side** checkbox indicates whether the IP phones are connected to the Quadro via its WAN or LAN port. Disable the checkbox if the phones are placed on the Quadro LAN; otherwise leave it enabled.

The alternating **Hide disabled IP lines** and **Show disabled IP lines** buttons are used to respectively hide or show the IP lines that have not been activated with a feature key. To enable the lines, install a feature key from the **Features** page.

The **IP Lines** table lists all available IP lines with additional information about each of them: number of the extension attached to it, information about the phone type and the configuration details.

Each column heading in the tables is link. By clicking on the column heading, the table will be sorted by the selected column. When sorting (ascending or descending), arrows will be displayed next to the column heading.

By pressing on the **IP line #** link in the **Available IP Lines** column, the **Edit IP Line** page specific for the current IP line is opened. This page offers a group of manipulation radio buttons that allows you to enable the IP line and to configure it to for use by the SIP phones.

Inactive – this selection disables the corresponding IP line.

SIP Phone – this selection configures the IP line for a SIP phone to be connected to the Quadro's LAN.

- **Phone Model** drop down list is used to select the IP phone model to be used by the receptionist. The drop down list, excluding **Other** selection, enables the MAC address text fields used to insert the **MAC Address** of the corresponding SIP phone. Use **Other** selection if your SIP phone is not in this list.
- **Line Appearance** text field requires a number of simultaneous calls supported by the SIP phone.
- **Username** and **Password** are required for this selection. They should match on both the Quadro and the SIP phone for a successful connection. The **Password** field is checked against its strength and you may see how strong is your inserted password right below that field. To achieve the well protected strong password minimum 8 characters of letters in upper and lower case, symbols and numbers should be used. If you are unable to define a strong password, press **Choose Generated Password** to use one of system defined strong passwords.
- **Transport** drop down list is used to select the SIP protocol transport layer - UDP, TCP or TLS. For TLS you may activate the TLS certificate update mechanism from IP Phone to obtain the latest certificate generated by the Quadro.

For automatic SIP phone configuration, the SIP phone should be reset/rebooted. The appropriate configuration will then be automatically downloaded from Quadro to the SIP Phone.

Please Note: For automatic configuration, some SIP phones may require additional actions to follow the restart. For example, by default the IP Dialog SIP Tone II is in a non-auto-provisioning mode, so it should be manually enabled on the phone. Refer to the user's manual of the corresponding SIP phone for instructions on performing a factory reset or reboot on any of the supported phones, what additional configurations are required for a specific SIP phone, and how to manipulate with the GUI.

By pressing the **Web** link in the **Details** column for each configured SIP phone will lead you to the Web configuration page of the corresponding SIP phone.

Please Note: This link only works from the LAN side of the Quadro, i.e. when the Quadro's GUI is accessed from a PC located in the Quadro's LAN. If you wish to connect the SIP phone's GUI through the WAN, an appropriate **Incoming Traffic/Port Forwarding** Filtering Rules should be added on the Quadro.

The **Advanced** link in the **Details** column appears for the Snom and Aastra IP phones and takes you to the Programmable Keys Configuration page where programmable keys for the corresponding IP phone can be configured.

The **Reboot** link in the **Details** column appears for supported IP phones and is used to remotely initiate a reboot of an IP phone attached to the line.

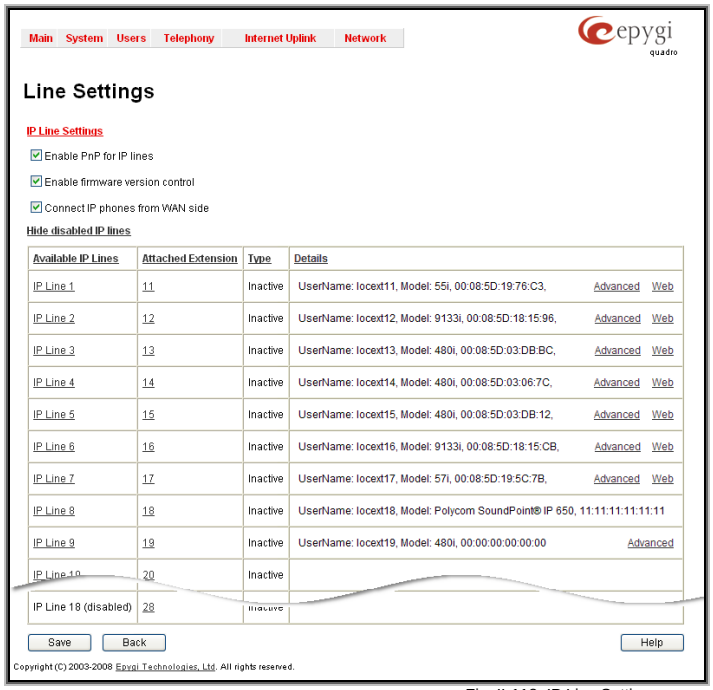


Fig. II-118: IP Line Settings page

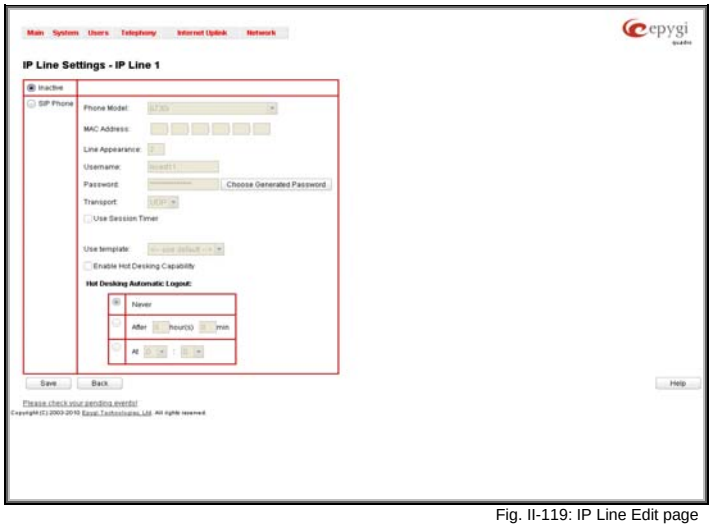


Fig. II-119: IP Line Edit page

Supported SIP Phones

The following is the list of SIP phones that can be configured to work with Quadro IP PBXs using the Plug-and-Play option:

- snom 190
- snom 200
- snom 220
- snom 300 (also supports FVC)
- snom 320 (also supports FVC)
- snom 360 (also supports FVC)
- Aastra 6751i (also supports FVC),
- Aastra 6753i (also supports FVC),
- Aastra 6755i (also supports FVC),
- Aastra 6757i (also supports FVC),
- Aastra 6757iCT,
- Aastra 6730i (also supports FVC),

- snom 370 (also supports FVC)
- snom 820 (also supports FVC)
- snom 870 (also supports FVC)
- snom MeetingPoint (also supports FVC)
- Aastra 480i (also supports FVC)
- Aastra 480iCT
- Aastra 9112i (also supports FVC)
- Aastra 9133i (also supports FVC)
- Aastra 9143i(33i)(also supports FVC)
- Aastra 9480i(35i)(also supports FVC)
- Aastra 9480iCT
- Linksys SPA921,
- Linksys SPA922,
- Linksys SPA941,
- Linksys SPA942,
- Aastra 6731i (also supports FVC),
- Polycom SoundPoint IP 300SIP,
- Polycom SoundPoint IP 330SIP,
- Polycom SoundPoint IP 331SIP,
- Polycom SoundPoint IP 335SIP,
- Polycom SoundPoint IP 450SIP,
- Polycom SoundPoint IP 501SIP,
- Polycom SoundPoint IP 550SIP,
- Polycom SoundPoint IP 601SIP,
- Polycom SoundPoint IP 650SIP,
- Polycom SoundStation IP 6000,
- Yealink T26,
- Grandstream BT200,
- Grandstream GXP2000,

Programmable Keys Configuration

The **Programmable Keys Configuration page** is used to assign a function to the programmable keys of the IP phone. The design of this page depends on the IP phone model.

Independently on the IP phone model, this page contains a number of the programmable keys and **Functionality** drop down list assigned to each of them.

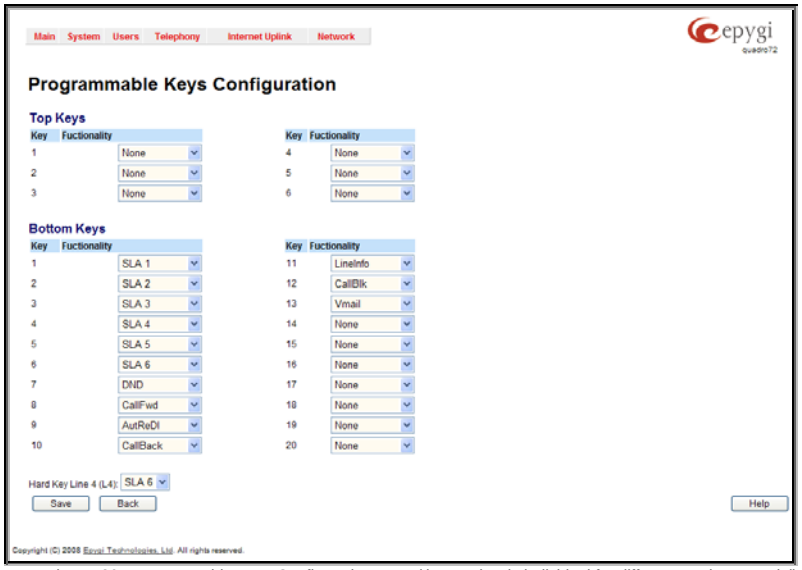


Fig. II-120: Programmable Keys Configuration page (the preview is individual for different IP phone model)

The following options are available in the **Functionality** drop down list:

- **SLA** - use the functionality of the SLA line as configured in the Key System Emulation page. It may be a direct connection to the available PSTN lines on the Quadro or to the certain SIP server.
- **Watch Ext. #** - watch the extension on the Quadro and a possibility to pickup the call addressed to that extension.
- **Call Park Ext #** - watch the calls parked to the corresponding extensions and a possibility to retrieve the calls parked to that extension.

This list also contains a number of PBX services available on the Quadro and accessible with the * key combination (see Quadro's Feature Codes). When configured from this page, the key combinations become transparent for the IP phones too.

- **Vmail** - accesses the voice mailbox of the extension to which the receptionist IP line is attached to.
- **DND** - enables the Do Not Disturb service on the extension to which the receptionist IP line is attached to.
- **CallFwd** - accessed Forwarding Management of the extension to which the receptionist IP line is attached to.
- **AutoReDl** - auto redials the last dialed call.
- **CallBack** - calls back to the last caller.
- **LineInfo** - gets the IP line information from the Quadro.
- **CallBlk** - blocks the last caller.

For **Aastra** phones (except the 9133i model), a **Hard Key Line 4 (L4)** drop down is available to use the default Hard Key Line 4 of the IP phone for the SLA lines. You may select the SLA line to which the Hard Key Line 4 of your Aastra phone will be assigned. The Hard Key Line 4 assigned to an SLA line will work exactly the same way like the programmable key does.

Please Note: When saving changes on this page, the system asks for a confirmation to remotely reboot the IP phone. It is recommended to reboot the IP phone after configuration changes on this page in order to make the new configuration effective on the IP phone.

ISDN Settings

The **Integrated Services Digital Network** (ISDN) is distinguished by digital telephony and data-transport services offered by regional telephone carriers. ISDN involves the digitization of the telephone network, which permits voice, data, text, graphics, music, video, and other source material to be transmitted over existing telephone wires. The ISDN Basic Rate Interface (BRI) service offers two B channels (voice transfer) and one D channel (signaling data transfer). The BRI B-channel service operates at 64 kbit/s and is meant to carry user data. The BRI D-channel service operates at 16 kbit/s and is meant to carry control and signaling information, although it can support user data transmission under certain circumstances.

The **ISDN service** allows Quadro act as a user or as a network. If connected to a private PBX, the Quadro should be configured in the network mode. If an ISDN trunk from the CO (Central Office) is connected to the Quadro, it should be configured as a user. Quadro supports the MSN (Multiple Subscriber Number) service, i.e., it can be subscribed to multiple numbers from the CO, and two simultaneous calls can take place at a time.

The **ISDN Trunk Settings** page is used to configure the ISDN trunk and their signaling. There are 4 ISDN trunks available on the Quadro4Li gateway.

The **Trunk Settings** table lists the available ISDN trunks on the Quadro and their settings (trunk name and interface types).

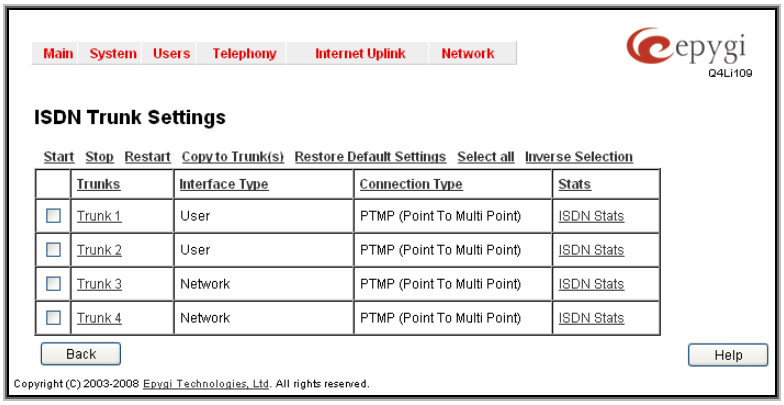


Fig. II-121: ISDN Settings page

The **Start** and **Stop** functional links are used to start/shutdown the selected ISDN trunk(s). When an ISDN trunk is in a shutdown state, ISDN calls cannot be placed or received.

The **Restart** functional link is used to bring channel(s) to the initial idle state on both sides. When applying one of these options, any active traffic on the channel(s) will be terminated.

The **Copy to Trunk(s)** functional link displays a page used to choose a trunk to which selected trunk's settings should be copied to.

The **Restore Default Settings** functional link restores the default signaling settings of the selected ISDN trunk(s).

Clicking on the corresponding ISDN trunk will lead to the **ISDN wizard** where trunk's ISDN signaling settings can be configured. The **ISDN Wizard** consists of several pages.

The **ISDN Wizard – ISDN Settings** allows you to choose the interface type and the connection type of the selected trunk(s).

The **Interface Type** drop down list allows you to select between the User and the Network interfaces. If the ISDN port of the Quadro is connected to the CO then **User** interface type should be selected. If the ISDN port of the Quadro is connected to the PBX then **Network** interface type should be selected (in that case Quadro acts as a CO for that PBX).

The **Connection Type** manipulation radio button group allows you to choose the connection type for the selected trunk(s):

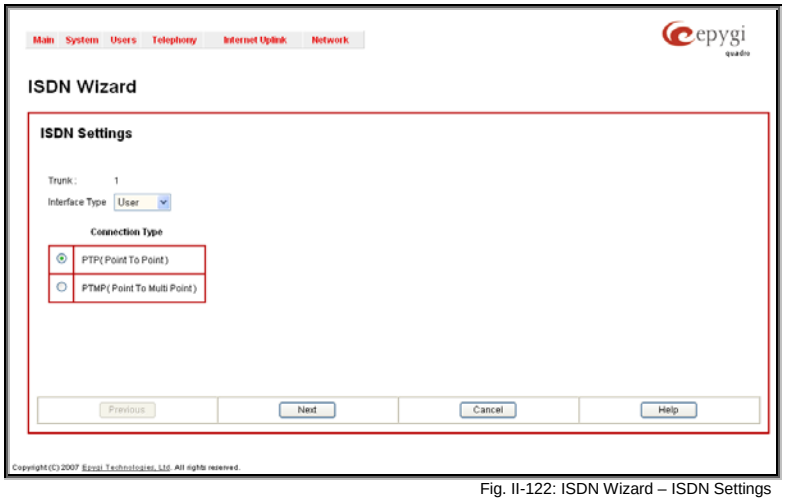


Fig. II-122: ISDN Wizard – ISDN Settings

- **PTP (Point to Point)**
  In case of connection to the CO (**User** interface type is selected on Quadro) choose this option if only Quadro is connected to the ISDN trunk from CO (no other ISDN devices are connected to the particular ISDN trunk from CO besides the Quadro).
  In case of connection to the PBX (**Network** interface type is selected on Quadro) choose this option if only the PBX is connected to the ISDN trunk from the Quadro (no other ISDN devices are connected to the particular ISDN trunk from the Quadro).
  In both cases, with this selection, Quadro sets the TEI to manually mode assigning the default value of 0. If needed, that value can be changed later in the **Advanced Settings** page of ISDN Wizard.
- **PTMP (Point to Multi Point)**
  In case of connection to the CO (**User** interface type is selected on the Quadro) choose this option if there can be other devices connected to the same ISDN trunk from CO except the Quadro.
  In case of connection to PBX (**Network** interface type is selected on the Quadro) choose this option if there can be other devices connected to the same ISDN trunk from Quadro except for the PBX.
  In both cases, with this selection Quadro sets the TEI to automatic mode.

Please Note: Consult with your CO operator or network administrator before configuring the ISDN connection type.

The **ISDN Wizard - Page 2** content is dependent on the connection type selected on the previous page of **ISDN Wizard**:

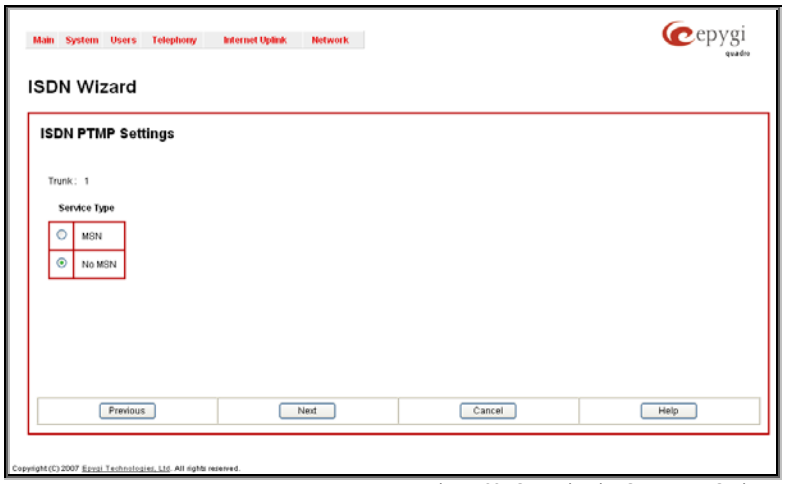


Fig. II-123: ISDN Wizard – ISDN PRMP Settings

The next page is **ISDN Wizard – MSN Settings** page which is used to turn on the MSN configuration. It is recommended to enable the MSN when there are multiple ISDN devices connected to the same ISDN bus. If the MSN is enabled on this page, the next page will require the MSN table configuration.

For MSN service enabled, the **Routing Settings** page is used to assign MSN numbers to the certain destinations on the Quadro. The MSN number can be assigned to the Quadro's extensions, to the Auto Attendant, or to the routing agent. The destination selected from this page will ring upon incoming call to the corresponding MSN number comes in.

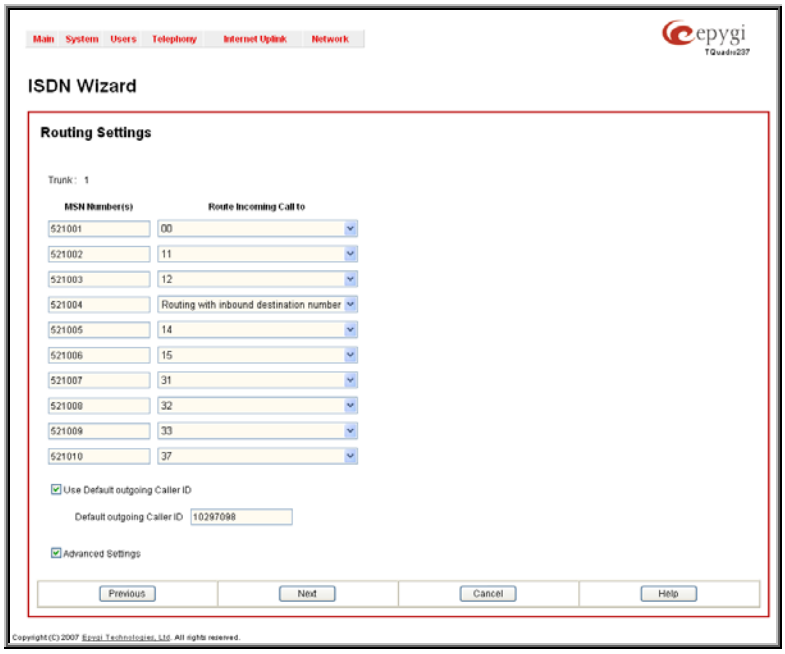


Fig. II-124: ISDN Wizard – Routing Settings

The fields in the **MSN Number** column require the MSN numbers allocated to the Quadro.

Please Note: At least one MSN number should be defined in this page. The system displays an error message if the same MSN number is used twice in this page.

The **Route Incoming Call to** drop-down lists are used to select the destination where the incoming call addressed to the certain MSN number will be routed. Choosing the **Routing with inbound destination number** selection will automatically use the initially dialed number to connect the destination without any additional dialing. If MSN is disabled on the **ISDN Wizard - MSN Settings** page, the **ISDN Wizard - Routing Settings** page contains only one **Route Incoming Call to** drop-down list.

Selecting the **Use Default outgoing Caller ID** allows you to overwrite the source caller information with the one specified in the **Default outgoing Caller ID** field when placing outgoing calls toward the CO. The **Default outgoing Caller ID** field requires the caller ID for the outgoing calls from the Quadro through the ISDN trunk. That number should be registered at the CO and can be one of the MSNs provided by the CO. If this checkbox is enabled but no value is defined in the **Default outgoing Caller ID**, empty caller information will be sent to the CO. If this checkbox is disabled, the source caller information will be forwarded to the CO.

Select the **Advanced Settings** checkbox if you wish to adjust trunk L2 and L3 Settings manually, otherwise leave this checkbox unselected to use the system default values.

If the trunk is configured in the Network mode, the next page of the wizard will be the **ISDN Wizard** - **ISDN Low Level Settings** page, otherwise if the trunk is configured in the User mode, this page will be skipped and the next page will be the **ISDN Wizard** - **L2&L3 Settings** page.

Fig. II-125: ISDN Wizard – ISDN Low Level Settings

The **ISDN Wizard - ISDN Low Level Settings** page offers a **Power Source** selection option. When this option is selected, the QuadroISDN device will act as a power supply for the ISDN phones connected to it. Otherwise when this checkbox is not selected, ISDN phones should have their own power supplies.

Please Note: This checkbox should be always disabled when the ISDN gateway has a PBX or Telecom connected.

The **ISDN Wizard – L2&L3 Settings** is used for advanced configuration only and contains L2&L3 Settings. This page only appears when the **Advanced Settings** checkbox is selected on the previous page of the wizard. This page contains the following components:

ISDN L2 Timers:

- **Excessive Ack. Delay T200** configures the period in milliseconds (numeric values from 500 to 9999) between the transmitted signaling packet and its acknowledgement received.
- **Idle Timer T203** configures the period in milliseconds (numeric values from 1000 to 99999) for the ISDN client idle timeout.

ISDN L3 Timers:

- The **T302 Timer** text field requires the value for the T302 timer in milliseconds (digit values from 0 to 15000). It indicates that the time frame system is waiting for a digit to be dialed. When the timer expires, it initiates the call.
- **T309 Timer** requires the value for the T309 timer in milliseconds (numeric values from 0 to 90000). It is responsible for call steadiness during link disconnection within the period equal to this timer value. If the value in this field is zero (0), the T309 timer will be disabled.
- **T310 Timer** requires the value for the T310 timer in milliseconds (numeric values from 1000 to 120000). It is responsible for the outgoing call steadiness when CALL PROCEEDING is already received from the destination but call confirmation (ALERT, CONNECT, DISC or PROGRESS) has not yet arrived.
- **Alert Guard Timeout** requires the value for the Alert Guard Timer in milliseconds (numeric values from 0 to 500) between CALL PROC and ALERT messages. Alert Guard Timer it is used when Quadro is connected to a slow ISDN-PBX.
  Recommended values are:
  - fast connection (0ms);
  - normal (150ms), default;
  - slow ISDN-PBX (350ms);
  - very slow ISDN-PBX (500ms).

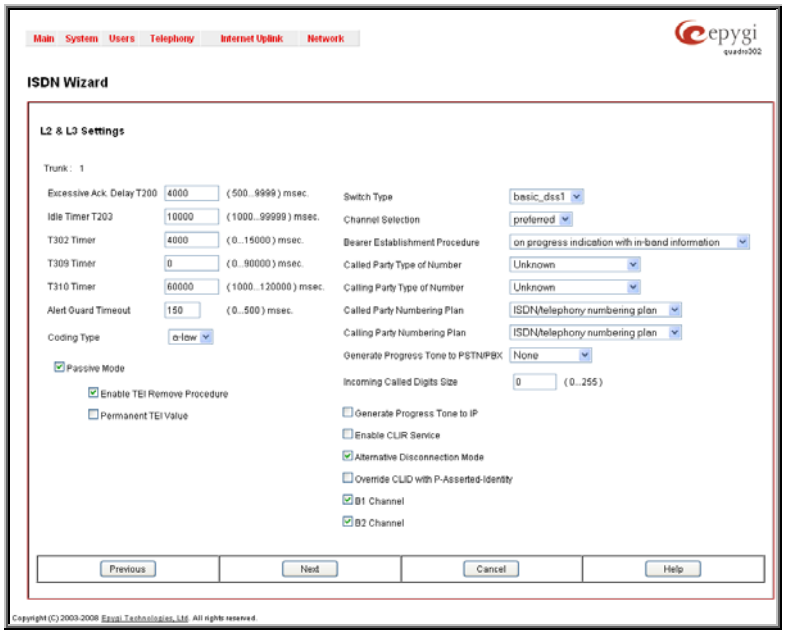


Fig. II-126: ISDN Wizard – L2&L3 Settings

The **Coding Type** drop down list allows you to select between **a-law** and **mu-law** coding types.

The **Switch Type** is another configuration parameter that depends on the Service Provider.

The **Passive Mode** checkbox is used to leave the ISDN Layer1 connection in the Slave mode. When this checkbox is selected, Layer1 remains idle when calls are not available. When this checkbox is not selected, Quadro keeps its Layer1 always active. This checkbox enables the **Enable TEI Remove Procedure** and **Permanent TEI Value** checkboxes. With the **Enable TEI Remove Procedure** checkbox is selected, the trunk will lose the assigned TEI when entering into passive mode on the Layer 2. With the **Permanent TEI Value** checkbox is selected, the trunk will keep the assigned TEI when entering into passive mode on the Layer 2 or when Quadro detected ISDN link DOWN signal from carrier.
Please Note: The **Passive Mode**, **Enable TEI Remove Procedure** and **Permanent TEI Value** checkboxes are present only for connection types different from PTP (Point to Point) selected on the first page of ISDN Wizard. If PTP (Point to Point) connection type is selected on the first page of the ISDN Wizard, these three checkboxes are replaced with a **TEI Address** text field that requires the channel number (digit values from 0 to 63) for connection establishment between the CO and the ISDN client.

Channel Selection 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. With the **Exclusive** channel selection, the CO should feedback only by the timeslot asked in the call request.

The **Bearer Establishment Procedure** drop down list allows selecting the session initiation method on the B channel. One of the following options can be selected for the transmission path completion prior to receipt of a call acceptance indication:

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

The **Calling Party Type of Number** drop down list allows you to select the type identifying the origin of call.
The **Called Party Type of Number** drop down list allows you to select the type identifying the subaddress of the called party of the call.

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

The **Incoming Called Digits Size** text field indicates the number of received digits (in a range from 0 to 255) required to establish a call. When this field has a "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 on the value in this field, **Sending Complete Information element** and the pound sign always result in call establishment.
The **Generate Progress tone on IP** checkbox selection will generate the progress tone to IP.
When **Generate Progress Tone to PSTN/PBX** checkbox is selected, Quadro generates ring tones to callers during ISDN call dialing. This feature is mainly applicable to 2-stage dialing mode.

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

When the **Alternative Disconnection Mode** checkbox is not selected, Quadro will disconnect the call as soon as the disconnect message has been received from the peer. When the checkbox is selected, Quadro's user may hear a busy tone when peer has been disconnected.

The **Override CLID with P-Asserted-Identity** checkbox selection enables SIP P-Asserted-Identity support. For the calls from SIP to ISDN if Invite SIP message contains a P-Asserted-Identity, then the CallerID on ISDN is sent with the value from the " P-Asserted-Identity" field, otherwise the CallerID on ISDN is sent with the value from the "From" field. For the calls from ISDN to SIP if the incoming CallerID from the ISDN network contains a restricted flag then the "P-Asserted-Identity" field in the Invite SIP message contains the restricted CallerID and the "From" field contains "anonymous".

The **B1 Channel** and **B2 Channel** checkboxes enables/disables timeslots for voice transfer. Disabling the timeslot will prevent both incoming and outgoing calls.

Clicking on the **ISDN Stats** link will open the **ISDN Status** page that displays ISDN traffic statistics on the corresponding ISDN trunk. The **ISDN Stats** link is displayed for every active trunk on the board and refers to the page where ISDN trunk and traffic statistics can be viewed.

The **ISDN Trunk Status** page provides the following information about the selected trunk state:

Link displays the ISDN link state: **up** or **down**.

Frame Synchronization displays the signal synchronization state in the trunk: **Yes** or **No**.

HDLC Receive shows the number of packets received in HDLC (High-level Data Link Control) format.

HDLC CRC Error shows the number of packets received with CRC (Cyclical Redundancy Check) errors.

HDLC Packet Abort displays the number of received aborted packets.

HDLC Transmit displays the number of packets transmitted in HDLC format.

HDLC Octet Count displays the number of error packets received in HDLC format.

The following **SDN BRI Layer 2** statistics are displayed for received and transmitted packets:

TEI value shows the actual TEI value.

L2 State shows the actual BRI L2 state.

Information Frame shows the number of signaling packets for call initiation and termination.

Receive Ready displays the number of controlling packets while the ISDN link is up.

Receive Not Ready displays the number of controlling packets in case of inability to accept calls by destination.

SABME shows the number of packets upon connection establishment.

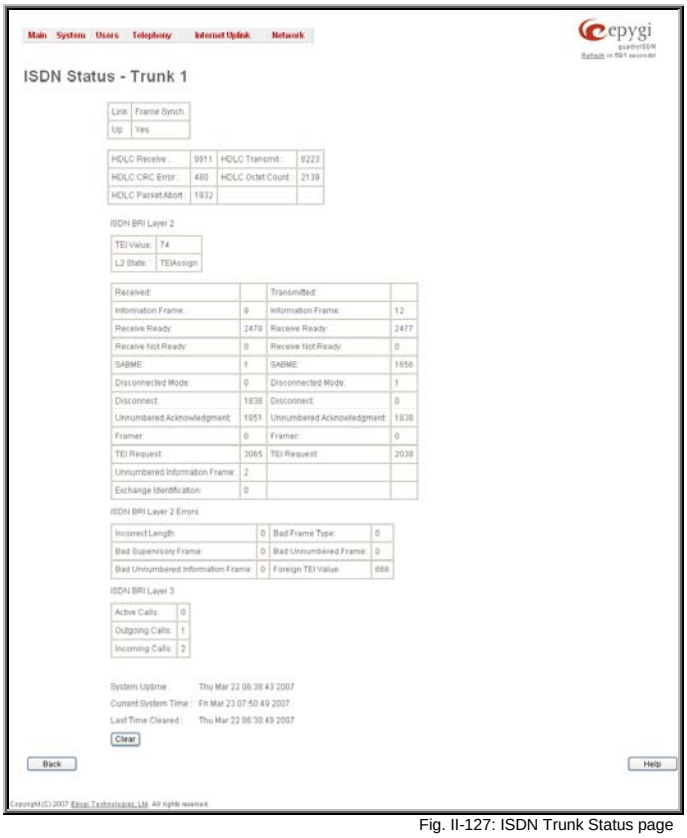


Fig. II-127: ISDN Trunk Status page

Disconnected Mode shows the number of packets when the connection is being disconnected.

Disconnect shows the number of packets upon connection termination.

Unnumbered Acknowledgement shows the number of packets upon accepting connection establishment/termination.

Framer shows the number of packets as a result of an error condition.

TEI Request shows the number of packets containing TEI (Terminal Endpoint Identifier) to initiate subscription of the device in the network.

Unnumbered Information Frame shows the number of broadcast signaling packets received for call initiation and termination.

Exchange Identification shows the number of received packets containing connection management settings.

ISDN BRI Layer 2 Errors statistics:

Incorrect Length shows the number of packets with an incorrect length.

Bad Supervisory Frame shows the number of packets with an incorrect supervisory header.

Bad Unnumbered Information Frame shows the number of packets with an incorrect unnumbered information frame header.

Bad Frame Type shows the number of packets with a bad frame type.

Bad Unnumbered Frame shows the number of packets with an incorrect unnumbered acknowledgement frame header.

Foreign TEI Value shows the number of packets with a bad or foreign TEI (Terminal Endpoint Identifier) value.

ISDN BRI Layer 3 statistics:

Active Calls shows the number of currently active calls in the selected trunk.

Outgoing Calls shows the number of all outgoing calls in the selected trunk.

Incoming Calls shows the number of all incoming calls in the selected trunk.

ISDN trunk statistics are not displayed on this page at first, but the page is automatically refreshed every 10 minutes. Statistics collected from that time, as well as the last resetting of the counter, will be displayed there. **System Uptime**, **Current System Time** and **Last Time Cleared** (last time ISDN statistics has been cleared) are displayed at the bottom of the page.

To reset the statistics counters press the **Clear** button.

Gain Control

The Gain Control settings are used to define transmit and receive gains.

- For ISDN trunks **Transmit Gain** defines the level of voice transmitted by Quadro to the PSTN network and **Receive Gain** defines the volume of voice received by Quadro from the PSTN network.
- For Voice Mail the **Recording Gain** defines the volume of the phone microphone upon playing voice mails or system messages and the **Playback Gain** defines the phone speaker volume upon playing voice mails or system messages.

The **Gain Control** page consists of the **Transmit Gain** and **Receive Gain** drop down lists for each line. They contain the allowed gain values, which can be set by the administrator for every line.

Please Note: If gain control is configured incorrectly, DTMF digits may not be recognized properly. The gain control settings depend solely on the board location (country) and the phone type.

The **Restore Default Gains** button reloads the default values.

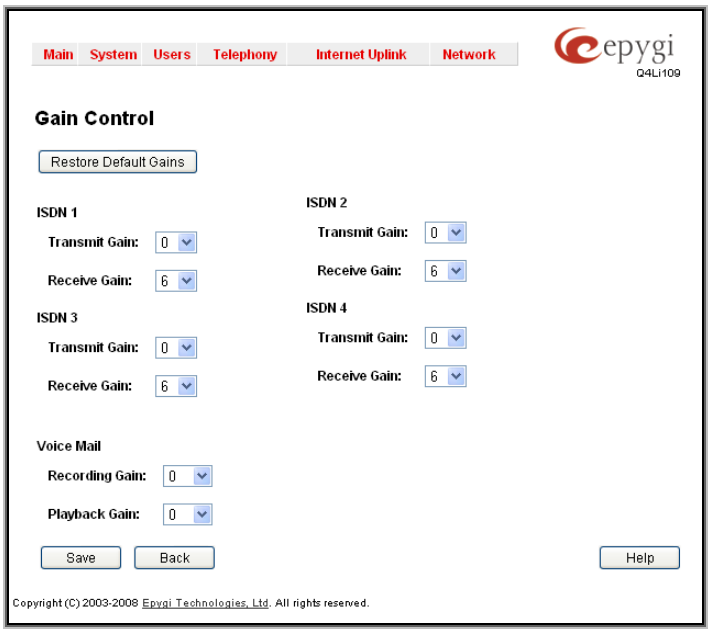


Fig. II-128: Gain Control page

SIP Tunnel Settings

The **SIP Tunneling** service is used to build a tunnel between Quardos and to use that tunnel for routing the SIP calls through the remote Quadros. When this service is enabled, slave Quadros should be registered on the master Quadro with the corresponding username/password. With the appropriate configuration done on the master Quadro, the master device can use the slave Quadros for routing the SIP calls through them and accessing peers located behind the slave Quadro or recognized by it. This enables the master Quadro to locate the slave, even when the network settings, like IP address, SIP port and other settings are changed on the slave Quadro.

When the **SIP Tunneling** service is enabled, virtual tunnels between the master and its slaves are created. A possibility to use the created SIP tunnels will be automatically enabled in the Call Routing table.

Optionally, a SIP tunnel can be mutually established on two Quadros allowing to route SIP calls back and forth. A Quadro can be at the same time configured both as a slave and as a master to the same remote device, i.e. the slave Quadro can act as a master for the master device it is registered on. For example, the Quadro1 can act as a slave for the Quadro2. In its turn, the Quadro2 can act as a slave for the Quadro1. With this configuration and the corresponding routing rules added in the Call Routing table on both devices, the SIP calls will be routed from Quadro1 to Quadro2 and vice versa.

The **SIP Tunnel Settings** page is used to enable the Quadro as a slave or master device for SIP tunneling. The page consists of the following components:

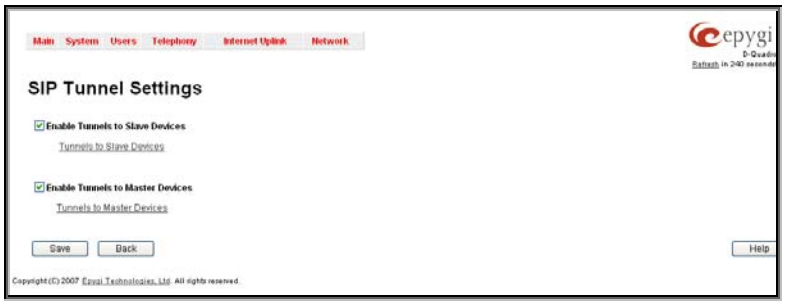


Fig. II-129: SIP Tunnel Settings page

The **Enable Tunnels to Slave Devices** checkbox enables the Quadro as a master device and allows you to configure the SIP tunnels to the slave Quadros. When this checkbox is enabled the **Tunnels to Slave Devices** table needs to be configured.

The link **Tunnels to Slave Devices** moves you to the page where a list of slave devices needs to be defined.

Fig. II-130: SIP Tunnel Settings – Tunnels to Slave Devices page

The **Tunnels to Slave Devices** page consists of a table where slave devices are listed with the corresponding authentication parameters.

Add functional button leads to the **Add Entry** page where a new slave device parameters needs to be provided.

The **Add Entry** page consists of the following components:

Fig. II-131: SIP Tunnel Settings – Tunnels to Slave Devices – Add Entry page

The **SIP Tunnel Name** text field requires the tunnel name for the corresponding connection. System suggests you to start the SIP tunnel name with the "SIP_Tunnel_" words, according to the automatic prefix used for the SIP tunnels on the Quadro, however this is not mandatory.

The **User Name** text field requires the authentication user name. The field in front of this text field displays the default non-editable prefix for SIP tunnels: "SIPTunnel_".

The **Password** text field requires the authentication password.

Please Note: The **User Name** and **Password** should match both on master and slave Quadros for the successful SIP tunnel establishment.

The **Symmetric NAT** checkbox should be selected when the slave Quadro is located behind the symmetrical NAT.

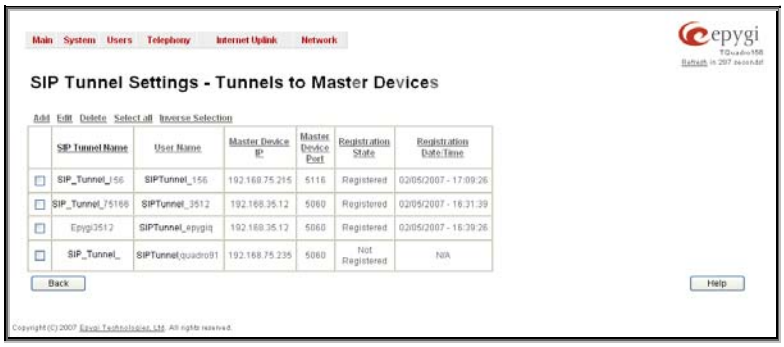


Fig. II-132: SIP Tunnel Settings – Tunnels to Master Devices page

The **Enable Tunnels to Master Devices** checkbox enables the Quadro as a slave device and allows connecting to the master Quadro via SIP tunnel. When this checkbox is enabled the **Tunnels to Master Devices** table needs to be configured.

The link **Tunnels to Master Devices** moves you to the page where a list of master devices needs to be defined.

The **Tunnels to Master Devices** page consists of a table where master devices are listed with the corresponding authentication parameters.

Add functional button leads to the **Add Entry** page where a new master device parameters needs to be provided.

The **Add Entry** page consists of the following components:

The **Enable Registration** checkbox selection is used to enable the registration to the corresponding master device.

The **Tunnel Name** text field requires the SIP tunnel name for the corresponding connection. System suggests you to start the SIP tunnel name with the "SIP_Tunnel_" words, according to the automatic prefix used for the SIP tunnels on the Quadro, however this is not mandatory.

The **User Name** text field requires the authentication user name. The field in front of this text field displays the default non-editable prefix for SIP tunnels: "SIPTunnel_".

The **Password** text field requires the authentication password.

Please Note: The **User Name** and **Password** should match both on master and slave Quadros for the successful SIP tunnel establishment.

Fig. II-133: SIP Tunnel Settings – Tunnels to Master Devices – Add Entry page

The **Master device IP** text field requires the IP address of the master device.

The **Master device port** text field requires the SIP port number of the master device.

The **Registration State** field displays information whether the slave device is registered on the master or not.

The **Registration Date/Time** field displays the time and the date of last registration on the master's device.

Call Routing

The **Call Routing** service simplifies the calling procedure for Quadro users, i.e., different types of calls (internal, SIP, PSTN or IP-PSTN) can be placed in the same way. SIP registration is not needed for extensions to make routing calls.

The **Call Routing** page offers the following components:

When the **Route all incoming SIP calls to Call Routing** checkbox is disabled, for all incoming SIP calls Quadro will first search the incoming SIP address in the Extensions Management table. If found, the incoming SIP call will ring on the corresponding extension. If not found, Quadro will look for a matching routing rule in Call Routing table.

When the **Route all incoming SIP calls to Call Routing** checkbox is enabled, for all incoming SIP calls Quadro will directly look for a matching routing rule in Call Routing table and will ignore the possible matches in the Extensions Management table.

The **Call Routing Table** link leads to the **Call Routing** table where routing patterns may be manually defined.

The **Local AAA Table** link leads to the page where local AAA (Authentication, Authorization, and Accounting) database can be managed.

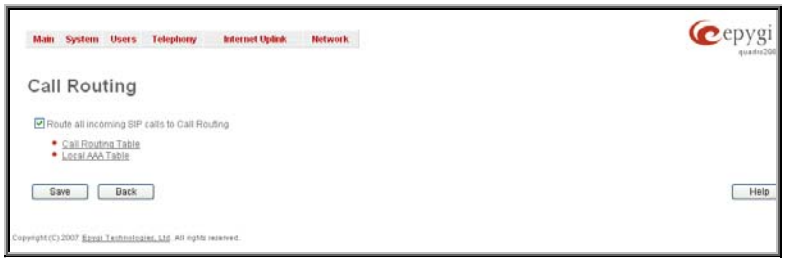


Fig. II-134: Call Routing page

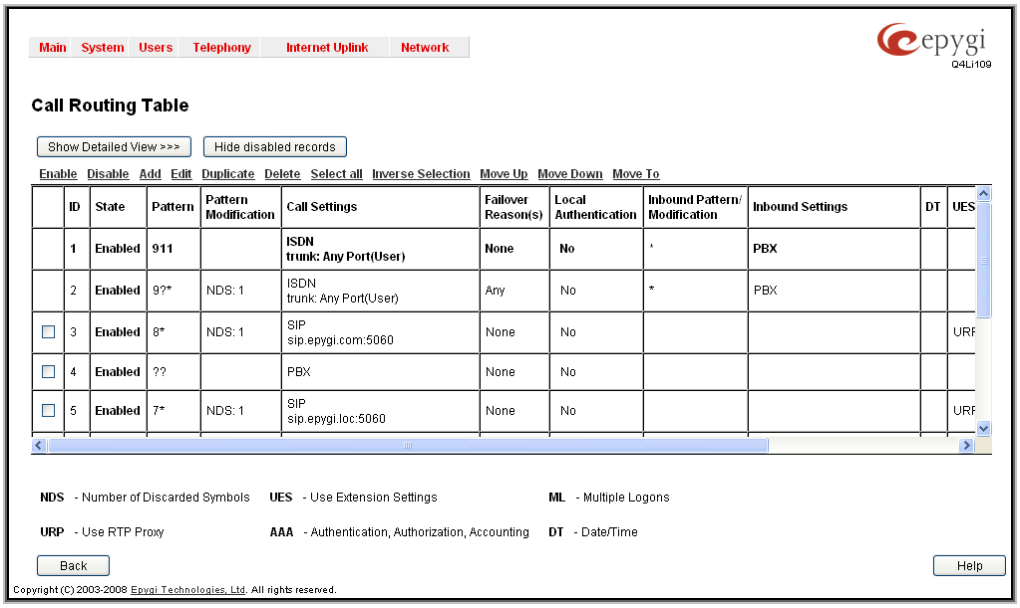


Fig. II-135: Call Routing table – brief preview

Defining patterns in the **Call Routing Table** avoids registering Quadro at the routing management server and gives you an option to establish a direct connection to the destination or to use a SIP server for call routing.

The **Call Routing Table** lists manually defined routing patterns along with their parameters (pattern number, state, routing and inbound caller settings, RTP Proxy and Date/Time period settings, metric and description), as well as automatically created and undeletable patterns created from the System Configuration Wizard.

The alternating **Show Detailed View** and **Show Brief View** buttons are used to display entries in the Call Routing table in detailed and brief views correspondingly. The brief view displays the most important settings of the routing rules. The detailed view displays all settings of the routing rules as they are configured in the Call Routing Wizard (see below).

The alternating **Hide disabled records** and **Show all records** buttons are used to respectively hide or show disabled records in the Call Routing table. The system does not consider the disabled records when parsing the table for the call route.

If the route has an **Authentication** or an **Authentication&Accounting** selected from the **AAA Required** checkbox group, it will have a link to the **Users List** in the **Call Routing table**. The **Users List** page contains a list of authorized users defined from the **Local AAA Table** and gives the option to enable/disable authentication of each user for a particular route.

Since the **Call Routing Table** may have multiple entries that could match to same pattern, the table will be internally rearranged according to the rules with the following consequences:

- The pattern matching best to the
- Best Matching Algorithm will have the higher position in the rearranged list
- If multiple patterns equally match to the
- Best Matching Algorithm, the pattern with the lower metric will get the higher position in the rearranged list
- If the multiple patterns with the same metric have been matched to the
- Best Matching Algorithm, the pattern in the higher position in the table will get the higher position in the rearranged list.

The pattern in the highest position of the rearranged list will be considered as the preferred one. The second and subsequent matching patterns will be used, if the destination refused the call due to the configured Fail Reason.

The **Enable/Disable** functional buttons are used to enable/disable the selected route(s). Disabled routes will have no effect. Enabled routes will be parsed when initiating routing calls. The **State** column in the **Call Routing Table** displays the current state of the routes (enabled/disabled).

Add starts the **Call Routing Wizard** where a new routing pattern may be defined. The **Call Routing Wizard** is divided into several pages. Page 1 displays the following components:

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

The **Pattern** text field specifies calls to which the rule should be applied. If a call, either inbound or outbound, has a destination number that matches the specified pattern, it will be completed according to the current rule. A routing pattern may contain wildcards. The complete list of characters and wildcards allowed in this text field is given in the chapter Allowed Characters and Wildcards.

Number of Discarded Symbols (NDS) requires the number of symbols that should be discarded from the beginning of the routing pattern. The field should be empty if digits do not need to be discarded. Only numeric values are allowed for this field, otherwise the error message "Error: Number of Discarded Symbols is incorrect - digits allowed only" will appear.

Prefix requires entering the symbols (letters, digits and any characters supported in the SIP username) that will be placed in front of the routing pattern instead of the discarded digits. The following tags can be used for this field:

- <callerid:range> - used to apply the complete or a part of caller ID (the caller's number detected during the call) as a prefix. For example, <callerid:1-3> indicates that the first 3 digits of the caller ID will be considered as a prefix, <callerid:3-end> indicates that the caller ID from its 3rd digit and up to the end will be applied as a prefix. This tag can be used in combination with other digits at the beginning or at the end, as well as with wildcards.
- <dialednum:range> - used to apply the complete or a part of dialed number (the number dialed by the caller to place a call) as a prefix. For example, <dialednum:1-3> indicates that the first 3 digits of the dialed number will be considered as a prefix, <dialednum:3-end> indicates that the dialed number from its 3rd digit and up to the end will be applied as a prefix. This tag can be used in combination with other digits at the beginning or at the end, as well as with wildcards.

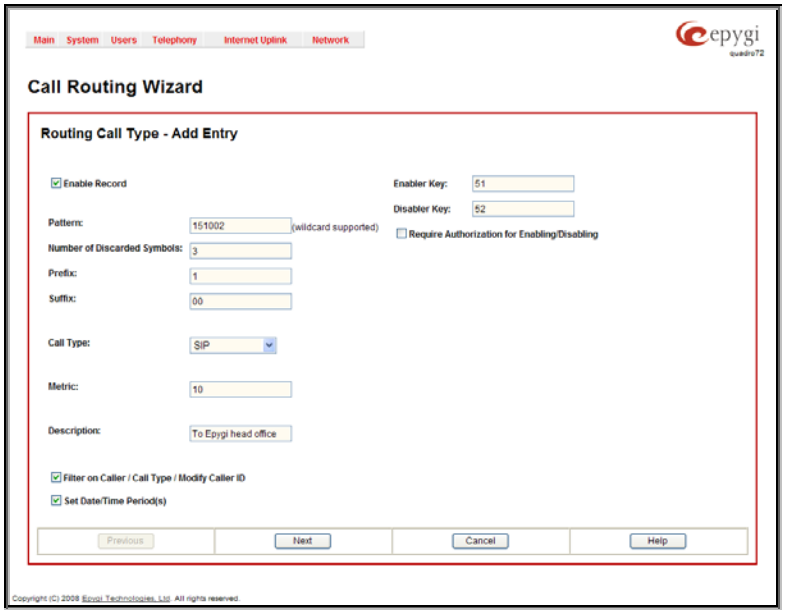


Fig. II-136: Call Routing Wizard - page 1

A two-stage dialing allows successive numbers to be dialed one after another with a delay in-between. For example, 11,,,11018 will call 11, wait until the call is established, wait for three seconds and then dial 11018. The capability of automatically dialing successive numbers allows the caller to bypass the IVR system on the call path and establish a direct call. The two-stage dialing is available for PBX, ISDN, and E1/T1 (if available on the model) call types.

Suffix requires entering the symbols (letters, digits and any characters supported in the SIP username) that will be placed in the end of the routing pattern. For example, if the routing **Pattern** is 12345, the **Number of Discarded Symbols** is two, and the **Prefix** is 909 and **Suffix** is 0a, the final phone number will be 9093450a.

Call Type gives you the option to select the call type. The following call types are available:

- PBX - local calls to Quadro's extensions
- PBX-Voicemail **-** calls directly to the voice mailbox of the local PBX extension
- PBX-Intercom - local calls to PBX extensions with the request of Intercom service (see Manual III – Extension Users Guide)
- SIP – calls through a SIP server
- ISDN - calls to a ISDN global telephone network.

Metric allows entering a rating for the selected route in a range from 0 to 20. If a value is not inserted into this field, 10 will be used as the default. If two route entries match a user's dial string, the route with the lower metric will be chosen.

The **Description** text field requires an optional description of the routing pattern.

The **Filter on Caller / Call Type / Modify Caller ID** checkbox selection allows limiting 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 **Call Routing Wizard**.

The **Set Date / Time Period(s)** checkbox selection allows you to define a validity period(s) for current routing patterns to take place and to define pattern date/time rules. When this checkbox is enabled, the **Call Routing Wizard** - Page 5 will be displayed.

Require Authorization for Enabling/Disabling checkbox is used to enable administrator's password authentication when enabler/disabler keys are configured for the routing rule. The service can be used locally from the handset (see Feature Codes in Manual III - Extension Users Guide) or remotely from Auto Attendant (see Auto Attendant Services in Manual III - Extension Users Guide). When this checkbox is selected, administrator's password will be requested to enable/disable the certain routing rule(s). If the administrator's password has been inserted incorrectly for 3 times, no status changes will be applied to any of the routing record(s), even to those which have no authorization enabled.

Enabler Key and **Disabler Key** text fields request digit combination which should be dialed from the handset or Auto Attendant to enable or disable the certain routing rules in the Call Routing Table. You can set the same Enabler/Disabler Key for multiple routing rules (the same key may be used as enabler for one routing rule, and as disabler for another one) - this will allow managing several routing rules with the single key.

The second page of the **Call Routing Wizard** offers different components depending on the **Call Type** selected on the previous page.

Use Extension Settings drop down list is applicable to SIP and IP-PSTN call types and allows you 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 an entry is not selected from this list, the original caller information will be kept. When **Keep original DID** checkbox is selected, the called destination will receive the original caller's information and not the information of the extension selected from the **Use Extension Settings** list.

When the checkbox **Add Remote Party ID** is selected, the Remote-Party-ID parameter is being delivered to the destination side upon call establishment procedure.

SIP Tunnel drop-down list appears only when the "SIP_Tunnel" **Call Type** is selected on the previous page. The list is used to select the particular SIP tunnel to route the calls through the corresponding Quadro.

Destination Host requires the IP address or the host name of the destination (for a direct call) or the SIP server (for calls through the SIP server).

Destination Port requires the port number of the destination or of the SIP server.

User Name and **Password** require the identification settings for the public SIP server or servers requiring authentication.

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).

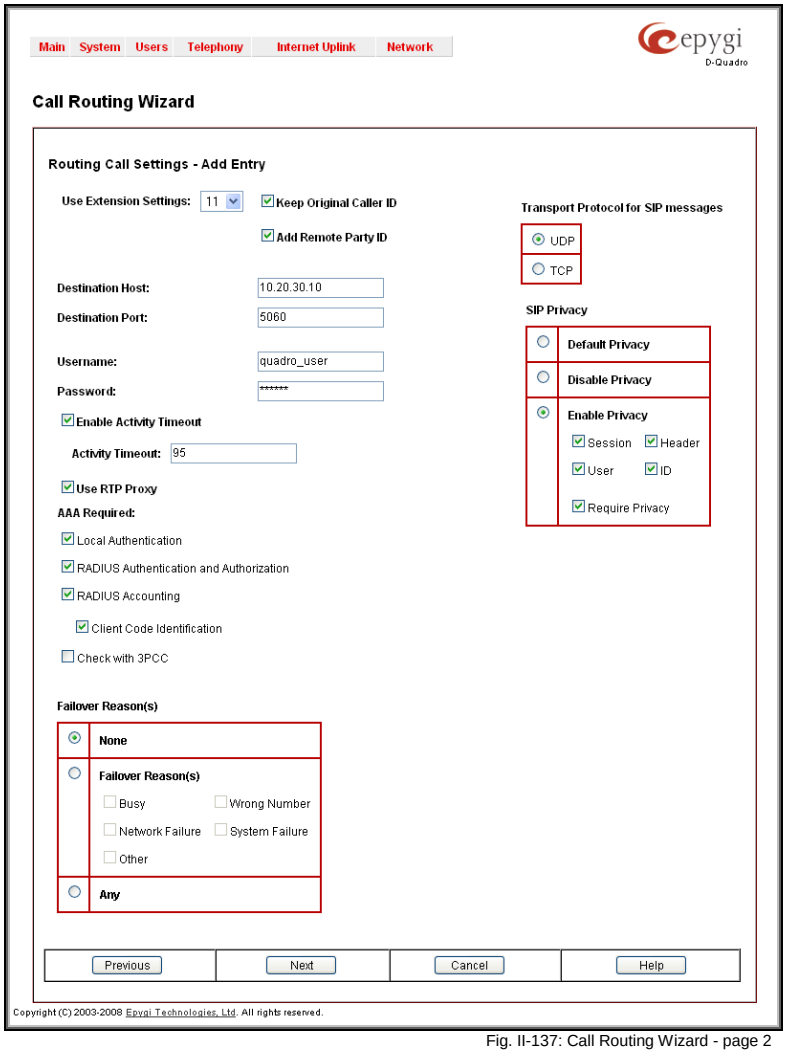


Fig. II-137: Call Routing Wizard - page 2

The **Multiple Logons (ML)** checkbox is only available for the IP-PSTN call type and allows/denies multiple logon to the public SIP server with the same username at the same time. The **Allowed Call Count** text field that allows you to limit the number of multiple logons to the public SIP server. The field requires information in a range from 2 to 20. If you leave this field empty, no limitation will apply to the number of simultaneous logons.

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

The **AAA Required** checkboxes are used to choose one or more of the following Authentication, Authorization, and Accounting (AAA) settings:

- **Local Authentication** – with this checkbox selected, callers will need to pass authentication through the Local AAA table (see below) when dialing the current pattern.
- **RADIUS Authentication and Authorization** – this checkbox is present when a RADIUS client is enabled. With this checkbox selected, callers will need to pass the authentication through RADIUS server (see above) when dialing the current pattern.
- The **RADIUS Accounting** checkbox is accessible when the RADIUS Client is enabled. With this checkbox selected, no authentication will take place, but CDRs (call detail reports) of the calls made through this routing record will be sent to the RADIUS server. This checkbox selection enables the **Client Code Identification** checkbox.
  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.
- The **Client Code Identification** checkbox selection activates the code identification feature: a caller, after dialing the destination phone number, may optionally enter "*" and then an **Identity Code**. An **Identity Code** is an arbitrary digit string entered by the user to identify a specific call or call group. The **Identity Code** is sent with CDR to the RADIUS server and might be used by a billing program for grouping the calls having the same Identity Code.

The **Check with 3PCC** checkbox is used to request a 3PCC approval before placing a call with the specific routing rule. When this checkbox is selected and the corresponding routing rule is used to place a call, Quadro sends a request to the call controlling application for the managing person to accept or reject the specific call (it can be a popup window or any other type of dialog box, depending on the call controlling application). If the request is accepted, the call will be placed. Otherwise, if the request is rejected, the call will be skipped. In case of no feedback from the call controlling application, the call will be accepted after a timeout defined in the configuration of the call controlling application.

The **Failover Reason(s)** radio buttons indicate whether the system should use the next matching pattern if call setup with the current routing rule fails and allows choosing the reasons to be considered as a failover.

- **None** - indicates that matching patterns should not be used regardless of the failover reason.
- **Failover Reason(s)** - indicates possible failure reasons. Failure reasons vary depending on the call type selected on the previous page. If the call cannot be established due to selected Failure Reasons, the call routing table will be parsed for the next matching pattern and, if found, the call will be routed to the specified destination.
  - **Cannot Establish Connection** - failure reason is available for ISDN calls and indicates cases when connection cannot be established.
  - **Busy** - available for PBX, SIP, SIP Tunnel, and IP-PSTN call types and indicates cases when the dialed destination is busy.
  - **Wrong Number** - available for PBX, SIP, SIP Tunnel, and IP-PSTN call types and indicates cases when the dialed number is wrong.
  - **Network Failure** - available for SIP, SIP Tunnel, and IP-PSTN call types and indicates cases when system overload, network failure or timeout expiration occurred.
  - **System Failure** - available for SIP, SIP Tunnel, and IP-PSTN call types and indicates cases indicated in **Network Failure** and **Other** fail reasons.
  - **Other** - available for SIP, SIP Tunnel, and IP-PSTN call types and indicates cases when authorization, negotiation, not supported or request rejected or other unknown errors occur.
- **Any** stands for all failure reasons mentioned in the **Failover Reason(s)** group.

The **Custom Profile** text field is present if the **PBX-Voicemail** call type has been selected on the first page of the Call Routing Wizard. This field requires the **Voice Mail Profile** name to activate the custom voice mail settings (see Voice Mail Profiles) on the extension when the corresponding routing rule will be used.

Please Note: If an extension does not have a profile specified here or the specified profile name is incorrect, the default Voice Mail Settings of the extension will be 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.

The **Port ID** drop down list is present for ISDN call types and contains ISDN trunks. **Any Port** selection allows to route calls via the first available ISDN trunk.

The **Call Routing Wizard** - Page 3 appears if the **Fill Call Source Information** checkbox had been enabled on Page 1 of the **Call Routing Wizard.** It will require information about the inbound caller.

The **Inbound Caller Pattern** field requires the caller address for which the current route will be applied. The complete list of characters and wildcards allowed in this text field is given below.

The **Inbound Call Type** drop down list gives you the option to select the call type (PBX, SIP, ISDN, Any) used by the inbound caller to reach the Quadro.

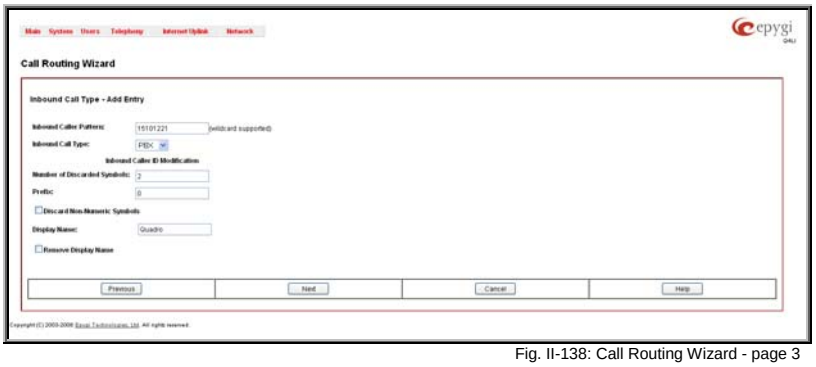


Fig. II-138: Call Routing Wizard - page 3

The settings in the **Inbound Caller ID Modification** group allow Caller IDs of inbound calls to be modified.

- The **Number of Discarded Symbols (NDS)** text field requires the number of digits that should be discarded from the beginning of the **Inbound Caller Pattern**. The field should be empty if digits do not need to be discarded. Only numeric values are allowed for this field, otherwise the error message “Error: Number of Discarded Symbols is incorrect - digits allowed only” will appear.
- The **Prefix** text field requires entering the symbols (alphanumerics and any characters supported in the SIP username) that will be placed in front of the **Inbound Caller Pattern** instead of the discarded digits. (For example, if the routing pattern is 12345, the Number of Discarded Symbols is two, and the prefix digits are 909, the final phone number will be 909345.) Wildcards are allowed here.

- The **Discard Non-Numeric Symbols** checkbox is used to discard any non-numeric symbols from the **Inbound Caller Pattern**.
- The **Display Name** text field allows you to replace an original caller's ID with the custom display name for the corresponding routing rule. This field is optional and when it is left empty, an original caller ID will be displayed on the called destination's phone, otherwise the name inserted here will appear on the phone. This field is not available for PBX-Voicemail call type routing rules.
- The **Remove Display Name** checkbox is used to remove caller IDs from calls made with this routing rule. This field is not available for PBX-Voicemail call type routing rules.

The **Next** button will open the **Call Routing Wizard** - Page 4 where different information about Inbound Caller will be required depending on the selected **Inbound Call Type**. For the **SIP** Inbound Call Type, the **Inbound Host** text field will require one or more IP addresses or host names of the SIP server where the caller is registered, or the caller's device if they are direct calls, separated by a space. In case of **ISDN** Inbound Call Types selected, **Inbound Port ID** drop down list will require to select the Trunk number, and on the next step, a list of timeslot(s) used to receive calls from the defined caller.

The **Call Routing Wizard** - Page 5 appears if the **Set Date / Time Period(s)** checkbox previously had been enabled on Page 1 of the **Local Call Routing Wizard**. It will require information about the pattern validity period(s).
This page provides selection between **Typical** and **Custom** date/time rule definitions.

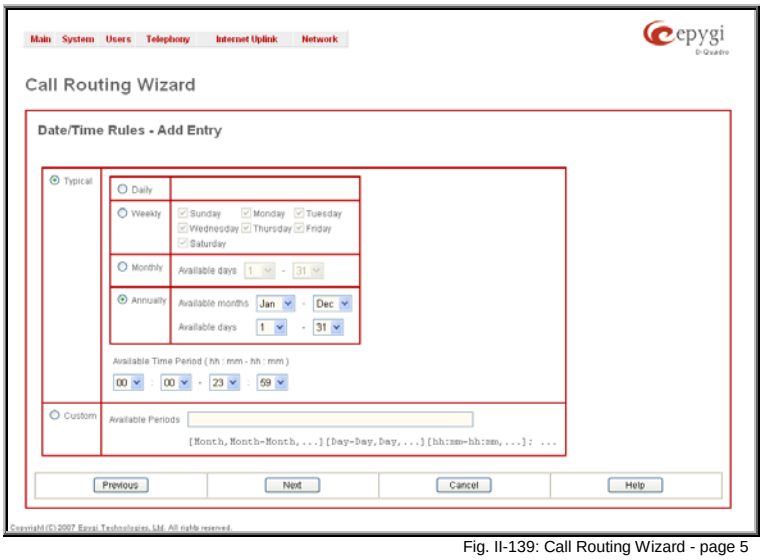


Fig. II-139: Call Routing Wizard - page 5

The **Typical** selection contains the following group of radio buttons that are used to select the frequency of the corresponding routing pattern that is to take place:

- **Daily**
- **Weekly** – the preferred weekday(s) should be selected for this option.
- **Monthly** – the calendar day should be selected for this option.
- **Annually** – the calendar day and month should be selected for this option.

In the **Available Time Period** drop down lists, the time range of the pattern validation should be defined. Any time selected in this field will be considered corresponding to the Quadro's Time/Date Settings.

The **Custom** selection provides the option to manually define the validity period(s). Use the following format to insert pattern date/time rule(s):
[Month,Month-Month,...][Day-Day,Day,...][hh:mm-hh:mm,...]; ...
Please Note: Established patterns based on the **Emergency Codes and PSTN Access Codes Settings** in the System Configuration Wizard will be marked in bold and will be placed in the first position in the Call Routing Table. Additionally, they cannot be modified and deleted from the Call Routing Table.

The **Duplicate** functional button is used to create a routing pattern with the settings of an exiting one. This is to avoid configuring a new routing entry completely by duplicating an existing entry with different settings. To use the **Duplicate** button only one record may be selected, otherwise the error message "One row should be selected" will appear. The **Duplicate** button opens the **Call Routing Wizard** where all fields except the **Pattern** field are already filled in. A **Pattern** for the new route will be required anyway.

The **Move Up/Move Down** buttons are used to move call routing patterns one level up or down within the **Call Routing** table. The sequence of the routing patterns is important when making routing calls because the **Call Routing** table is parsed from the top down and routing will take place according to the first pattern that matches the dialed number. The **Move To** button is used to move the selected entry to a different position in the Call Routing Table. This will increase or decrease the selected pattern's priority. Pressing the button will open the page where a row number should be specified together with the position the selected entry is to be placed (before or after the defined row).

The **Local AAA Table** page allows you to manage local authentication and the authorization database. Callers dialing the routes which have an AAA (Authentication, Authorization, and Accounting) option enabled, will pass the authorization on the **Local AAA Table** by using a phone number or username/password, depending on the corresponding entry configuration on this page.

Fig. II-140: Local AAA Table page

The caller passes authorization automatically if the detected phone number of the caller dialing a route has the AAA option enabled and is registered in the **Local AAA Table**. If the caller ID service is disabled or the caller's phone number is not registered, the caller is asked to enter a registration user name and password.

The **Add** functional button opens the **Call Routing – Local AAA Table - Add Entry** page where a new local AAA record can be created.

The **Call Routing – Local AAA Table - Add Entry** page offers a group of manipulation radio buttons to select the type of authorization and the following other parameters:

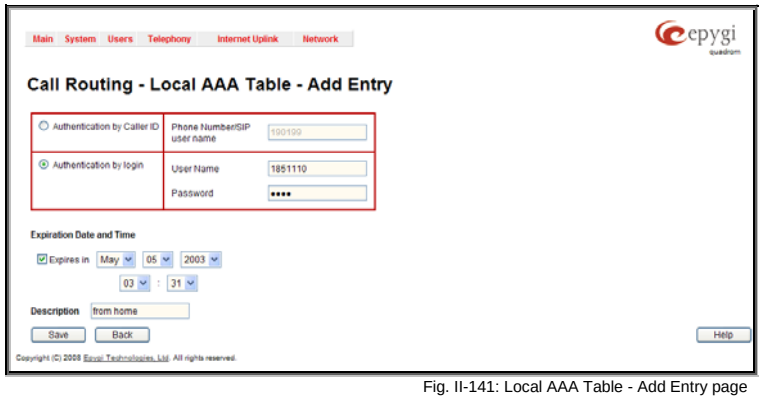


Fig. II-141: Local AAA Table - Add Entry page

- **Authentication by Caller ID** – this selection is used to set the authentication based on the caller's phone number (which is considered to be automatically detected). The **Phone Number/SIP User Name** text field requires the caller's phone number or the SIP username. Only numeric and wildcard characters are allowed for this field. '[' , ']' , ',', '-', '{', '}' are used to define a range or a quantity of numbers. For example, 2{13-17, ww, a-c} means that the dialed number may be 213, 214, 215, 216, or 217, 2ww, 2a, 2b and 2c to match the specified phone number; in the case of 2[3,7], the dialed number may be 23 or 27 to match the specified phone number. The {11, 15, 23, 38, 45} pattern means that the dialed number may be 11, 15, 23, 38 or 45 to match the pattern.
- **Authentication by Login –** this selection is used to set the authentication based on the username and password inserted by the user upon login. The **Username** text field requires the authentication username. Only numeric values are allowed for this field, otherwise the error message "Incorrect Username - digits allowed only" will appear. The **Password** text field requires the authentication password. Only numeric values are allowed for this field, otherwise the error message "Incorrect Password - digits allowed only" will appear.

The **Expiration Date and Time** drop down-lists are used to set the date and time when the registration will expire.

The **Expires in** checkbox is used to enable the **Expiration Date and Time** feature.

The **Description** text field requires an optional description about the calling party.

Edit opens the **Edit Entry** page to modify the local AAA entry.
Delete removes the selected local AAA entry from the Local AAA Table.
Select all selects all records of the table.
Inverse selection inverses the current selection (if no records are selected, clicking on inverse selection will check all records).

To create a new Call Routing rule

1. Click on the **Call Routing Table** link on the **Call Routing** page.
2. Press the **Add** button on the **Call Routing** page.
3. Specify the **Pattern** in the corresponding field.
4. Select the **Number of Discarded Symbols** and **Prefix** if required.
5. Select the **Call Type** from the drop down list.
6. Define the **Metric** or leave the default.
7. Enter a **Description** if needed.
8. Enable the **Filter on Caller / Call Type / Modify Caller ID** checkbox, if the route functionality should be limited. This is dependent on the inbound caller information.
9. Enable the **Set Date/Time Period(s)** checkbox if a route should be functional within certain time/date intervals.
10. Press **Next**.
11. Select the user or attendant extension from the **Use Extension Settings** drop down list that the call will be placed on.
12. Specify the **Destination Host** and **Port Number**, **Username** and **Password** if an **IP** or **IP-PSTN** call type has been selected. For the **IP-PSTN** call type, enable **Multiple Logons** if necessary. Enable the **Use RTP Proxy** checkbox if needed.
13. Choose the Authentication and Accounting method from the **AAA Required** drop down list.
14. Choose a **Fail Reason** from the corresponding drop down list.
15. Configure **Transport Protocol for SIP messages** and **SIP Privacy** parameters as needed.
16. Press the **Next** button.
17. If the **Filter on Caller / Call Type / Modify Caller ID** checkbox has been previously enabled, fill in the **Inbound Caller Pattern** into the corresponding text field. Choose the needed value from the **Inbound Call Type** drop down list, as well as the **Number of Discarded Symbols** and **Prefix** values.
18. Press the **Next** button.
19. If **IP** has been selected on the previous step in the **Inbound Call Type** drop down list, then **Inbound Host** should be inserted in the current page. If **ISDB** has been selected in the **Inbound Call Type** drop down list, then the ISDN port number should be selected here.
20. If the **Set Date/Time Period(s)** checkbox has been selected on the first page, pressing **Next** will open the **Date/Time Rules** page where route validity should be defined.
21. Press the **Finish** button to establish a local route with the inserted settings.

To create a local AAA entry

1. Click on the **Local AAA Table** link on the **Call Routing** page.
2. Press the **Add** button on the **Local AAA Table** page.
3. Choose the Authentication type.
4. Enter the **Phone Number** or the **Username** and **Password** depending on the selected Authentication type.
5. Use the **Expiration Date and Time** checkbox to enable the expiration timeout.
6. Select the **Expiration Date and Time** from the corresponding drop down lists.
7. Press **Save** to apply these settings.

Allowed Characters and Wildcards

The following is the set of characters and wildcards allowed in the **Pattern** and **Inbound Caller Pattern** text fields of the Call Routing Wizard:

Characters:

0…9

a…z

A…Z

+ = $; / ~ _ - . & ( ) ' ! * ? {} , [ ]

Please Note: The symbols * and ? should be prefixed with a slash (\) if they are used as ordinary characters; otherwise the system will interpret them as wildcards.

Please Note: The symbols !, {, }, [,], - and , are used to define a range of characters and cannot be used as ordinary characters.

Wildcards:

* Any number of any characters

? Any single character

{ } A character or a string from the specified set of characters and strings.

The following control symbols are used to specify a set:

- Use a comma (,) to separate the elements of a set.

  Please Note: No spaces are allowed within braces.

  Example:

  The pattern is **9{1,3,11,a}**.

  Numbers matching the pattern are **91, 93 , 911, 9a.**

- Use a minus sign (-) to specify a range of characters. Each successive element of the range is obtained by increasing the previous element (the element code) by one.

  Example:

  The pattern is **2{11-15,a-d}5**.

  Numbers matching the pattern are **2115, 2125, 2135, 2145, 2155, 2a5, 2b5, 2c5, 2d5**.

- Use an exclamation point to exclude a character or a string from a set.

  Example:

  The pattern is **2{11-15,a-d,!14,!c}5**.

  Numbers matching the pattern are **2115, 2125, 2135, 2155, 2a5, 2b5, 2d5**.

  Please Note: You can use the wildcard ? within the braces, but not *. Thus, **{12-104,15?,36?}** is a valid pattern, whereas **{15*,36*}** is not.

  Please Note: The symbol ! cannot be used to exclude a range of symbols. For example **2{15-60,!23-32}** or **2{15-60,!23-!32}** are not valid patterns. To valid pattern will be to **2{15-22,33-60}**.

[] The same as above with the exception that character ranges can include single-digit/character elements only.

Example:

The pattern is **2[1-5, a-c]5**.

Numbers matching the pattern are **215, 225, 235, 245, 255, 2a5, 2b5, 2c5**.

**** Precedes a control symbol (*, ?, -, ! and ,) to indicate that it is used as an ordinary character, not a wildcard.

Example:

The pattern is **1*[1-3]**

Numbers matching the pattern are: **1*1, 1*2, 1*3**

Please Note: Patterns cannot be prefixed with the * symbol. The system considers the patterns starting with * as feature codes and does not parse them through the Call Routing table.

Best Matching Algorithm

All calls through and within a Quadro are made according to call routing patterns that specify a destination based on a dialed number. When a user dials a number to make a call, the Quadro matches the dialed number against the existing patterns that are specified in the Call Routing table. If the dialed number matches only to a single pattern, this pattern will be used to set up a call. If several patterns have been found to match the number, the Quadro uses the Best Matching Algorithm to prioritize the matching patterns. Once the patterns are prioritized, the pattern with the highest priority will be used as a preferred route for call setup. The successive patterns will be used only if the destination specified by a higher priority pattern is unreachable.

To prioritize the matching patterns, the following criteria are sequentially applied to matching patterns. The criteria are ordered by their priorities: Each consecutive criterion is calculated only for the patterns that take the same value for the preceding criteria: that is Criterion 3 is calculated only for patterns that take the same value for Criterion 1 and Criterion 2.

Criterion 1	**The presence of asterisks (“*”) in a pattern** The patterns without “*” have a higher priority.
Criterion 2	**The total number of matching digits/symbols inside and outside the braces/brackets** The more matching digits a pattern contains, the higher its priority.
Criterion 3	**The number of matching digits/symbols outside the braces/brackets** The more matching digits outside braces/brackets a pattern contains, the higher its priority. **Please Note:** This criterion is used only if several patterns take an equal but non-zero value for Criterion 2.
Criterion 4	**The total number of question marks (‘?’) inside and outside the braces/brackets** The more question marks a pattern contains, the higher its priority.
Criterion 5	**The number of question marks (“?”) outside braces/brackets** The more question marks outside braces/brackets a pattern contains, the higher its priority. **Please Note:** This criterion is used only if several patterns take an equal but non-zero value for Criterion 4.
Criterion 6	**The number of square brackets (“[]”)** The more brackets a pattern contains, the higher its priority.
Criterion 7	**The number of braces (“{}”)** The more braces a pattern contains, the higher its priority.
Criterion 8	**The number of asterisks (“*”)** The fewer asterisks a pattern contains, the higher its priority.
Criterion 9	**The value of the metric** The lower the metric of a pattern is, the higher its priority.
Criterion 10	**The position in the routing table** The higher the position of a pattern in the routing table is, the higher its priority.

Example. The user has dialed 1231 and the following matching patterns have been found.

The list of patterns
1
123*
{11-15}3*
??1
123?
[1-3]*
[1-3]???
{100-150, asd, *\?}1
12*31
1[1-3]3[0-8]
1231
*2*1
*

Step 1: The list is split into two groups separating the patterns with "*" from those without (Criterion 1). The patterns with "*" form a group with a lower priority and are pushed back to the end of the list.

Criterion 1

The list split into two subgroups
??1
123?
[1-3]???
{100-150, asd, *\?}1
1[1-3]3[0-8]
1231
1
123*
{11-15}3*
[1-3]*
12*31
*2*1
*

Step 2: The two groups of patterns are arranged separately from each other by the total number of matching digits inside and outside the braces/brackets in the descending order (Criterion 2). The patterns that contain the same number of matching digits are grouped into sub-lists.

Criterion 2

The list of patterns	Matching digits
?**2**?**1**	2
123?	3
[**1**-3]???	1
{**100-150**, asd, *\?}**1**	4
1[**1-3**]**3**[**0-8**]	4
1231	4
1	1
123*	3
{**11-15**}**3***	3
[**1-3**]*	1
12*31	4
***2*1**	2
*	0

N	The list of patterns	Matching digits
1	1[1-3]3[0-8]	4
	1231	4
	{100-150, asd, *\?}1	4
	123?	3
	??1	2
	[1-3]???	1
	12*31	4
3	123*	3
	{11-15}3*	3
	*2*1	2
4	*1*	1
	[1-3]*	1
	*	0

Step 3: The new sub-lists are arranged separately from each other by the number of matching digits outside the braces/brackets (Criterion 3). The patterns that contain the same number of matching digits are grouped into sub-lists.

Criterion 3

The list of patterns	Matching digits
1[1-3]**3**[0-8] **1231** {100-150, asd, *\?}**1**	2 4 1
123?	-
??1	-
[1-3]???	-
12*31	-
123* {11-15}**3***	3 1
*2*1	-
1 [1-3]*	1 0
*	-

The list of patterns	Matching digits
1231 1[1-3]3[0-8] {100-150, asd, *\?}1	4 2 1
123?	-
??1	-
[1-3]???	-
12*31	-
123*	3
{11-15}3*	1
*2*1	-
1	1
[1-3]*	0
*	-

The Best Matching Algorithm will stop after executing step 3 as no new sub-lists are formed. The resultant list of prioritized patterns will be the following:

The prioritized list
1231 1[1-3]3[0-8] {100-150, asd, *\?}1 123? ??1 [1-3]??? 12*31 123* {11-15}3* *2*1 *1* [1-3]* *

VoIP Carrier Wizard

The **VoIP Carrier Wizard** is used to define access codes for available VoIP Carrier accounts which will particularly allow you to reach users over IP-PSTN providers or to call to the peers registered on the certain SIP servers by dialing simple digit combinations.

For each configured VoIP carrier, the wizard creates a specific IP-PSTN routing rule in the Call Routing table. This entry is available to PBX users only, which means only PBX users can make calls to the corresponding VoIP carrier. Additionally, a virtual extension automatically generated in

Extensions Management will be registered on the defined VoIP Carrier's SIP server. The settings of that extension will be used to make calls from Quadro's users towards the created VoIP Carrier will be placed.

Fig. II-142: VoIP Carrier Wizard page 1

VoIP Carrier Wizard – Page 1 provides a following option of describing the VoIP carrier:

When predefined carrier is selected in the **VoIP Carrier** drop down list, the SIP Server and Port will be already predefined in the next page. **Manual** selection allows you to manually set up the VoIP Carrier settings.

The **Description** field allows you to insert an optional description of the VoIP Carrier.

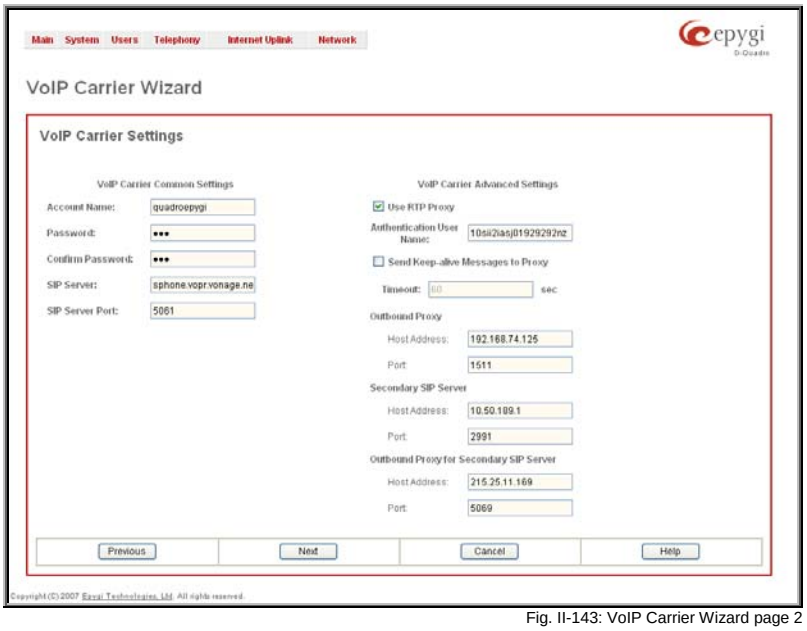


Fig. II-143: VoIP Carrier Wizard page 2

VoIP Carrier Wizard – Page 2 is used to define VoIP Carrier Settings. The page contains following components:

1. VoIP Carrier Common Settings

The **Account Name** text field requires a username for authentication on the defined SIP server.

The **Password** text field requires a password for authentication on the defined SIP server.

The **Confirm Password** text field requires a password confirmation. If the input is not corresponding to the one in the **Extension Password** field, the error message "Incorrect Password confirm" will appear.

The **SIP Server** text field requires an IP address or the hostname of the SIP server destination party it is registered on.

The **SIP Server Port** text field requires the port number of the SIP server destination party it is registered on.

2. VoIP Carrier Advanced Settings

The **Use RTP Proxy** checkbox is applicable only when a route is used for calls towards a configured VoIP Carrier from a peer located outside the Quadro. When this checkbox is selected, the RTP streams between external users will be routed through Quadro. When the checkbox is not selected, RTP packets will move directly between peers.

UserID requires an identification parameter to reach the SIP server. It should have been provided by the SIP service provider and can be requested only for certain SIP servers. For others, the field should be left empty.

Send Keep-alive Messages to Proxy enables the SIP registration server accessibility to the verification mechanism. **Timeout** indicates the timeout between two attempts of SIP registration server accessibility verification. If a reply is not received from the primary SIP server within this timeout, the secondary SIP server will be contacted. When the primary SIP server recovers, SIP packets will continue to be sent to the server.

A group of **Host address** and **Port** text fields respectively require the host address (IP address or the host name), the port number of the **Outbound Proxy**, **Secondary SIP Server** and the **Outbound Proxy for the Secondary SIP Server**. These settings are provided by the SIP servers' providers and are used by Quadro to reach the selected SIP servers.

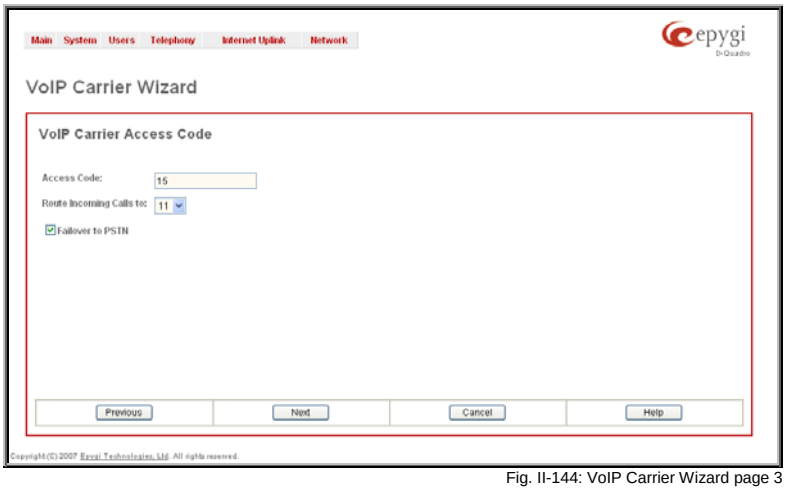


Fig. II-144: VoIP Carrier Wizard page 3

VoIP Carrier Wizard – Page 3 contains the following VoIP Carrier access code selection components:

The **Access Code** text field requires a digit combination by dialing, which the corresponding VoIP Carrier will be reached.

The **Route Incoming Calls To** drop down list allows you to select an extension (or Auto Attendant) on the Quadro where incoming calls from the configured VoIP Carrier should be routed to. For the selected extension there will be an unconditional forwarding set up which will care for incoming calls forwarding from the VoIP carrier to the corresponding extension.

The **Failover to PSTN** checkbox selection will route the call to the PSTN through local ISDN lines in case the VoIP Carrier is not available. When this checkbox is selected, an additional entry will be added to the Call Routing table. This maintains digit transmission to the local PSTN when an IP call towards the configured VoIP Carrier cannot be established.

Please Note: A warning message will appear when the defined **Access Code** already exists in the Call Routing table or causes a conflict with entries already in the Call Routing table. In this case, when continuing through the **VoIP Carrier Wizard**, the existing entry in the Call Routing table will automatically be overwritten by the new settings.

RADIUS Client Settings

RADIUS (Remote Authentication Dial In User Service) specifies the RADIUS protocol used for authentication, authorization and accounting, to differentiate, to secure and to account for the users. The RADIUS Server provides the option for a caller from/through Quadro to pass authentication and to be able to dial a specific number.

When a RADIUS client is enabled on the Quadro, and according to the configuration of **AAA Required** option (see Call Routing table), the RADIUS server will be used to authenticate user and/or to account for the call. This can be accomplished by automatic detection of the caller's number or a customized login prompt where the caller is expected to enter a username and password.

Transactions between the client and the RADIUS server are authenticated through the use of a shared Secret Key, which is never sent over the network. In addition, user passwords are encrypted when sent between the client and RADIUS server to eliminate the possibility of a party viewing an unsecured network where they could determine a user's password. If no response from the RADIUS Server is returned after the Receive Timeout expires, the request is resent numerous times as defined in the Retry Count list. The client can also forward requests to an alternate server(s) if the primary server is down or unreachable. An alternate server can be used after a number of failed tries to the primary server.

Once the RADIUS server receives the request, it determines if the sending client is valid. A request from a client that the RADIUS server does not recognize must be silently discarded. If the client is valid, the RADIUS server consults a database of users to find the user whose name matches the request. The user entry in the database contains a list of requirements (username, password, etc.) that must be met to give access to the user. If all conditions are met, the user gets access to the Quadro Network.

The **RADIUS Client Settings** page contains the **Enable RADIUS Client** checkbox that enables RADIUS client on the Quadro.

Please Note: The RADIUS Client cannot be disabled if there is at least one route with **RADIUS Authentication and Authorization** or **RADIUS Accounting** values configured in the **AAA Required** drop down list at the Call Routing table. In order to be able to disable the RADIUS Client on the Quadro, appropriate routes should be removed first.

The other RADIUS Client settings are divided into three groups:

1. Registration Settings

The **Primary Server** requires the IP address of the primary Radius Server.

The **Secondary Server** requires the IP address of the secondary Radius Server.

NAT Station IP text fields require the NAT PC WAN IP address. If no NAT Station is specified here, Quadro's IP address will be sent to the RADIUS server.

Secret Key is used to insert the secret key between the Radius client and the server. Contact the Radius server administrator to get the secret key for your Quadro.

The **Confirm Secret Key** field is used to verify the secret key. If the entered **Secret Key** does not correspond to the one in the **Confirm Secret Key** field, the error message "The Secret Key does not match. Please try again" will appear.

Retry Count allows you to select the number of attempts authorized before canceling the registration.

Receive Timeout allows you to select the timeout (in seconds) between two attempts to register.

Encoding Type allows you to select the encoding type (PAP or CHAP) that should be unique on both the client and the server sides for the establishment of a successful connection. Encoding type should also be requested from the Radius Server administrator.

The **Authorization Port** text field requires the port number on the RADIUS server where Quadro is to send the authentication requests.

The **Accounting Port** text field requires the port number on the RADIUS server where Quadro is to send the accounting messages.

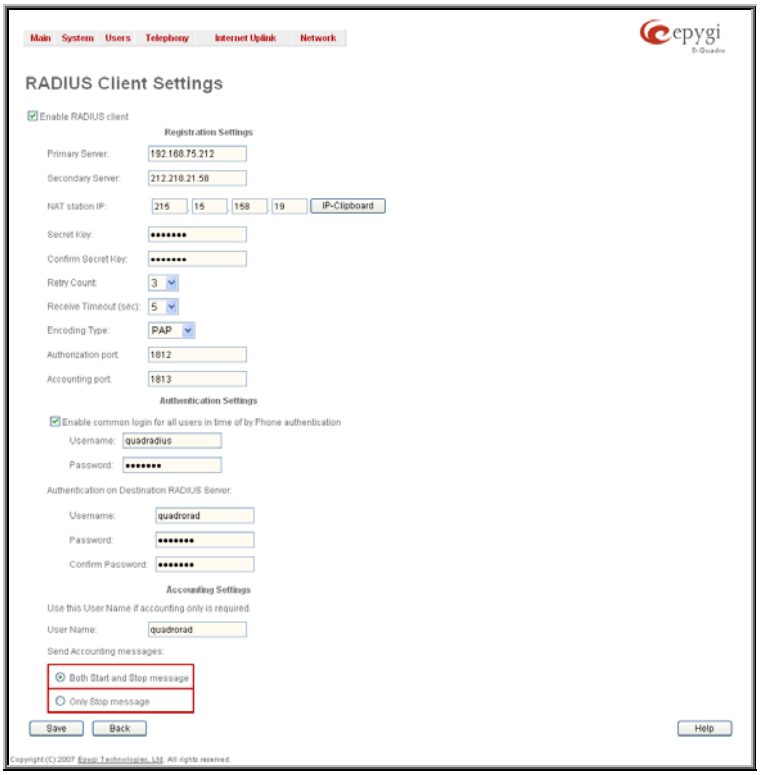


Fig. II-145: Radius Client Settings page

2. Authentication Settings

The **Enable common login for all users in time of by Phone authentication** checkbox enables custom settings for the callers who passed an authorization by phone on the Quadro. This checkbox enables **Username** and **Password** text fields to insert the custom settings that will stand instead of the source caller's settings when being delivered to the RADIUS server.

The **Authentication on Destination RADIUS Server** parameters group is used to insert a **Username** and a **Password** (followed by the password confirmation) to pass authentication on the RADIUS Server of the destination Quadro. If these fields are left empty, the original authentication settings that users enter for authentication will be used.

3. Accounting Settings

The **Username** field is dedicated for accounting services only. It is used to insert an identification username for accounting purposes. When no username is specified in this field, the source username will be used for accounting.

The **Send Accounting messages** manipulation radio buttons group is used to select sending both **Start** and **Stop** accounting messages or only **Stop** accounting message.

Voice Mail Recording Codec

The **Voice Mail Recording Codec** page is used to configure the codec for the Voice Mail recording.

This page offers the following components:

The **Recording Codec** drop down list contains the existing codecs for voice mail compression. Changing the Voice Mail recording codec will directly affect the allocated memory size for users.

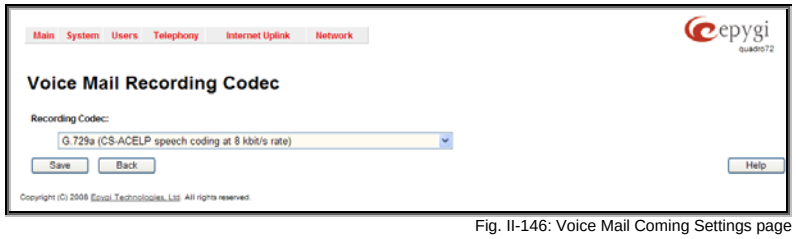


Fig. II-146: Voice Mail Coming Settings page

Dial Plan Settings

The **Dial Plan Settings** page is used to adjust the dialing timeout setting.

The **Routing Dial Timeout** setting specifies a period of time after the last dialed digit that the system identifies as a completion of dialing. If the user does not press any key within the specified timeout, the system assumes that the dialing is complete and starts calling the dialed number. Only predefined values included in the drop-down list can be used for this setting.

Fig. II-147: Dial Plan Settings page

The **Routing Dial Timeout** setting will also be applied to all the supported IP phones that are auto-configured with the Quadro and provide the possibility of changing this setting through the auto-configuration file. The modified value of the setting will take effect after rebooting the IP phones.

3PCC Settings

The **3PCC Settings** page is used to adjust the third party call controlling settings. 3PCC service on the Quadro allows call controlling applications to remotely initiate and handle calls on the Quadro and to subscribe for certain event notifications from the Quadro.

This page consists of the following components:

The **Secure Connection** checkbox is used enable a secure encrypted connection between the call controlling application and the Quadro.

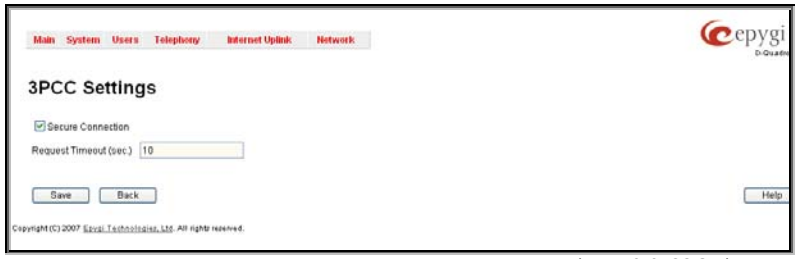


Fig. II-148: 3PCC Settings page

Please Note: For successful connection, this option should be set up in the same way on both sides (enabled or disabled on both sides).

The **Request Timeout** text field requires the timeout (in seconds) during which the Quadro should receive a response to the request from the call controlling application. If the response is not received during this timeout, Quadro will perform a request dependent default action. For example, if the call controlling application is configured to handle incoming calls on the Quadro. Once the incoming call occurs, Quadro is trying to transfer the call to the call controlling application. If the call controlling application does not response within the mentioned timeout, Quadro will answer the call or perform an action configured for unanswered incoming calls. This setting is dependent on the network conditions therefore consult with your network administrator before changing the default value.

The read-only **Feature Key** text field indicates whether the feature key for the 3PCC Support is installed on the system. The system will not accept connections from 3PCC applications if no key is found. The 3PCC support is an optional feature and can be activated with a feature key from the Features page.

The read-only **WAN Port** text field indicates whether there is a filtering rule specified for the Call Control Access. If a third-party call control application connects to the Quadro from the WAN interface, a filtering rule for the corresponding host should be created on the Call Control Access page to allow the application a remote access. Creating a filtering rule is not required if the firewall is not setup on the Quadro. The field shows **Opened** if there is at least one enabled filtering rule for the Call Control Access.

Key System Emulation

The Key System Emulation is a widely used service in legacy PBXs simplifying the direct connection to the available PSTN lines. On the Quadro, the usage of Key System Emulation services is limited to the IP phones attached to the Quadro through the available IP lines and provides direct connection to the available PSTN lines and SIP networks. In its turn, the IP phones are limited to the following models with the perspective to enlarge the list of recommended IP phones in the future:

- Aastra 480i
- Aastra 9133i
- Aastra 55i
- Aastra 57i
- Snom 320
- Snom 360
- Snom 370

The Key System Emulation feature allows to:

- Have a direct connection to the available PSTN lines and SIP networks behind the Quadro by pushing the programmable keys on the IP phone.
- Monitor the availability and status of all configured external lines via programmable keys on the IP Phones.
- Place the call on hold from one IP phone and pick it from another IP phone attached on the Quadro.

How Key System Emulation works:

Depending on the model, the IP phone has a number of programmable keys available. Basically, all programmable keys should have an LED, which can be switched ON, OFF or blinking. If an IP phone has a display, the programmable keys may also have an additional description (like what the particular programmable key does or just a name) displayed on it.

On the Quadro, Shared Line Appearance (SLA) lines act as an intermediate link between the external PSTN lines or SIP servers on one end and the programmable keys on the IP phones. The SLA lines should be first configured on the Quadro from the Key System Emulation page. Each SLA line can correspond to one of the external PSTN lines or be a direct connection to a SIP server. Once configured, SLA lines can be assigned to the programmable keys on the IP phones. For the incoming and outgoing calls to be handled, each programmable key will correspond to the particular PSTN line or SIP network (server). The same PSTN line or SIP network can be configured on the different programmable keys for different IP phones.

When the incoming call comes to an SLA line (from PSTN or SIP user), all IP phones that use the Key System Emulation are starting to ring and the programmable key assigned to the corresponding SLA line is beginning to blink on all IP phones. To pick the incoming call push the blinking programmable key on any of the ringing IP phones. The corresponding programmable key will stop blinking on all other IP phones, the IP phone rings stop and the programmable keys go to the state ON indicating that the line is busy.

If a user of one IP phone holds an active call performed on the SLA line, the programmable key is starting to blink on all IP phones. The user who has held the call can then inform the other IP phone to pick up the held call. To pick the held call, the user of the other IP phone should simply push the blinking programmable key on his IP phone. Once the call is picked, the corresponding programmable key will show solid light (busy) on all other IP phones.

To make an external call through the certain SLA line, the programmable key assigned to that SLA line should be in the idle state. The IP phone user should then push the corresponding programmable key, depending on what line he needs to get, and wait for a dial tone. Once the dial tone is heard, user can dial the number and the push the OK/Dial button on his IP phone. The call will be placed through the corresponding SLA line. During the call, the programmable keys assigned to that SLA line on all other IP phones goes to the state ON indicating that the line is busy.

Please Note: If the IP phone is configured through the Plug-and-Play option while connecting to the Quadro, the first few programmable keys on the IP phone will be by default assigned to the first SLA lines on the Quadro in the consequent order.

The **Key System Emulation** page is used to configure and setup the Shared Line Appearance (SLA) lines on the Quadro. The available SLA lines and their configuration parameters are listed in the table on this page.

The Quadro4Li product has 8 SLA lines.

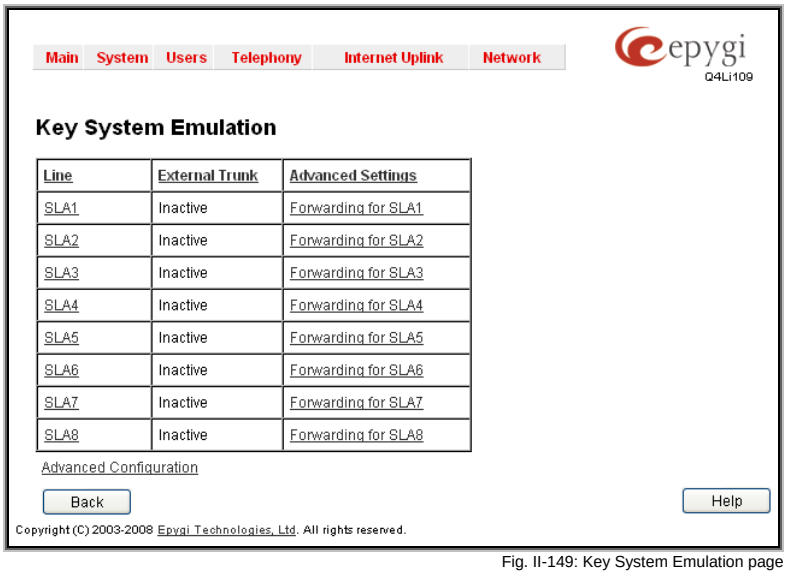


Fig. II-149: Key System Emulation page

Pressing on the SLA# link will open the corresponding SLA line settings (see below).

The **Advanced Configuration** link moves to the **Key System Advanced Settings** page that is used to enable/disable the blind transfer service from SLA lines to extensions or their voice mailboxes.

Key System Emulation - SLA#

The **Key System Emulation - SLA#** page is used to configure the corresponding SLA line on the Quadro and contains the following components:

The **SLA Name** text field is used to insert the preferred name for the corresponding SLA line. On the IP phones with the display available, this name is visible on the display next to the programmable key.

A group of manipulation radio buttons allow you to configure the SLA line:

Inactive - disables the corresponding SLA line.
PSTN - allows you to assign the SLA line to the available PSTN lines on the Quadro. This selection disappears when there are no more unassigned PSTN lines available.
Attention: By assigning a PSTN line to an SLA line, it becomes unavailable for calls through Auto Attendant or Call Routing Table.
SIP - used to assign the SLA line to the certain SIP server. This selection has two sub-selections:

- **Custom Settings** - used to define a SIP server and SIP registration parameters. The following parameters are required for this selection:

  Username - the registration username on the SIP server.

  Password - the registration password on the SIP server.

  SIP Server - the IP address or the host name of the SIP server.

  SIP Port - the port of the SIP server.

  Authentication User Name - an identification parameter to reach the SIP server. It should be provided by the SIP service provider and can be requested for some SIP servers only. For others, the field should be left empty.

  Outbound Proxy Host Address and **Port** - the IP address or the host name and the port number of the outbound proxy SIP server. For more details see Extensions Management.

- **Use SLA Settings** - choose this selection to use the SIP settings of another SLA line. This selection is also used to allow multiple line appearances on the same ITSP provider. The SLA drop down list is used to select the SLA line whose SIP settings will be used for the corresponding SLA line.
  The **DID** text field requires an optional identification number used by some ITSP providers to differentiate between the call appearances on the selected line.
  The **Use DID for outgoing calls** indicates whether the specified DID number should be included in the Caller ID of calls initiated from the SLA. If this checkbox is enabled, the DID number will be sent along with the SIP username. This checkbox should be enabled if the IP-PSTN provider authorizes the users by their DIDs.

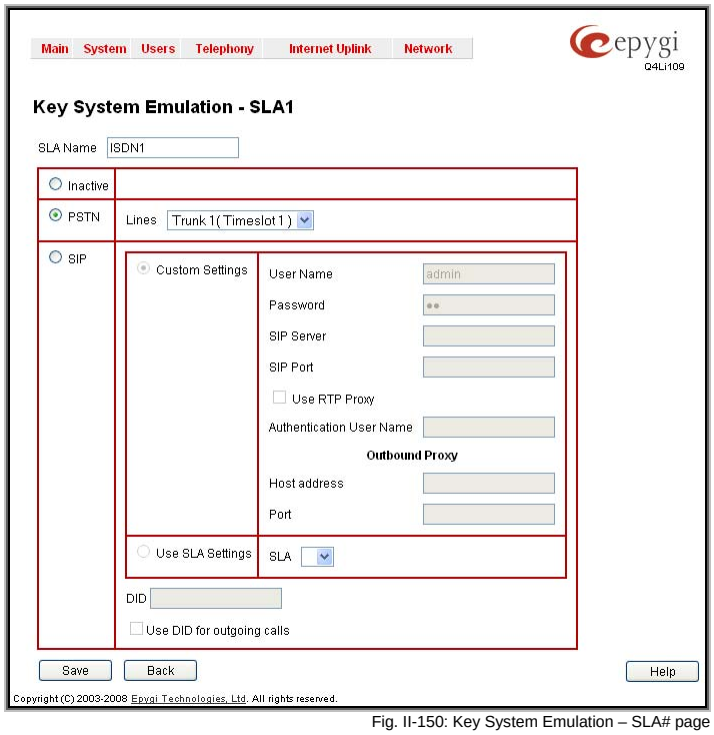


Fig. II-150: Key System Emulation – SLA# page

The **Forwarding for SLA#** links in the **Advanced Settings** column refer to the **Advanced Settings for SLA#** page where the unconditional or no answer call forwarding can be configured for each SLA line.

The **Advanced Settings for SLA#** page is used to configure the unconditional or no answer call forwarding for each When the forwarding is enabled, all incoming calls to the corresponding SLA line will be redirected to the defined destination. If the call forwarding is activated, the programmable key assigned to the corresponding SLA line will remain in the ON state until the call is disconnected.

The following ways of Call Forwarding are available for the SLA lines:

Unconditional - all incoming calls to the corresponding SLA line will be forwarded to the specified destinations.
No Answer - incoming calls will be forwarded to the specified destinations if the corresponding SLA line is not answered within 20 seconds.
The **Enable Service** checkbox selection on the related page activates corresponding call forwarding service on the current SLA line.

Attention: The following rules are applicable to all call forwarding types:

- PSTN destinations (with **PSTN** or **Auto** call type) have priority in **Forward to** list. If there are different destinations in the Forward to list, the call will be forwarded to PSTN destination (in the same time any available SIP or PBX destinations will receive a short ring). If the PSTN destination was not successful, the next PSTN destination will be dialed, otherwise if there are no more PSTN destinations in the table, the call will be forwarded to any available SIP and PBX destinations simultaneously.
- If there are multiple entries with any combination of PBX or SIP call types, then all destinations will ring simultaneously and the call will be established with the destination that will pick up the call the first.

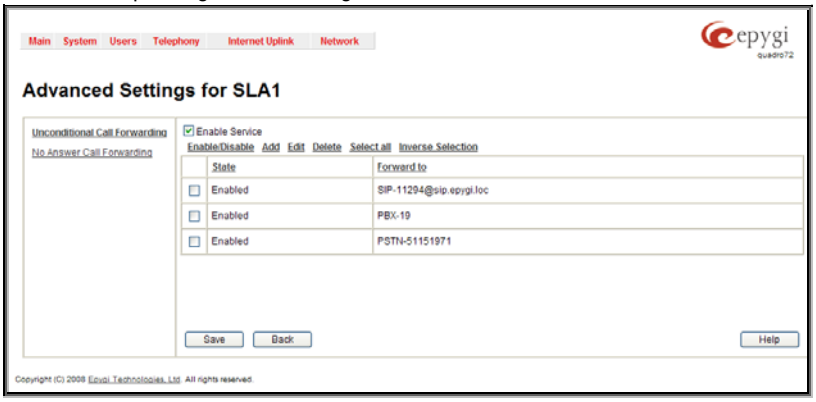


Fig. II-151: Advanced Settings for SLA# page

- Unconditional call forwarding service has higher priority versus to other forwarding types, i.e. when Unconditional Call Forwarding is enabled, No Answer Forwarding services will not work even if they are enabled.

The table displayed in each page of Call Forwarding configuration lists the destinations where incoming calls addressed to the corresponding SLA line will be forwarded.

Enable/Disable functional button is used to enable/disable the corresponding forwarding destinations. This is helpful to avoid removing forwarding destination(s) if they are not applicable at the moment.

Add opens an **Add Entry** page where a new forwarding destination may be specified by its Call Type (PBX, SIP, PSTN or Auto) and depending on this call type, by its extension number, SIP address or PSTN number in the **Forward to** text field. Only a SIP registration username can be inserted here to forward calls to the user registered at the same SIP server as the current extension is registered at, i.e. if the SIP server hostname is left empty, the system will automatically set the current extension's registration server hostname. The extension number should be inserted in the **Forward to** text field for the **PBX** call type. The **PSTN** number length depends on the area code and phone number. When **Auto** is selected as a Call Type, routing pattern will be considered here and parsed through Call Routing table.

Fig. II-152: Advanced Settings for SLA# page

Please Note: System allows you to forward incoming calls to the Quadro PSTN lines, thus giving callers a possibility to make calls through remote Quadro's PSTN lines. To do so, select **PSTN** from the **Call Type** drop down list and type **pstn** (capital and lower case letters allowed) in the **Forward to** text field. Caller will connect to the available PSTN line, get the dial tone and be free to dial the PSTN number.

Key System Advanced Configuration

The **Key System Emulation - Advanced Configuration** page is used to enable/disable the blind transfer service from SLA lines to extensions or their voice mailboxes.

The page consists of the following settings:

- The **Enable blind transfer to VM** checkbox indicates whether a call received to an SLA can be blind transferred to extensions' voice mailboxes. Selecting the checkbox will enable the blind transfer functionality and will require a **prefix** (digits only) that should precede the calls to voice mailboxes. To call a voice mailbox, the user should dial the specified prefix followed by the extension number.
- The **Enable blind transfer to extension** checkbox indicates whether a call received to an SLA can be blind transferred to extensions. Selecting the checkbox will enable the blind transfer functionality to extensions. You may optionally specify a **prefix** that should precede the calls to extensions. Specifying a prefix is mandatory if the extension numbers have the same length as the SIP usernames on the SIP server on which the SLA is registered.

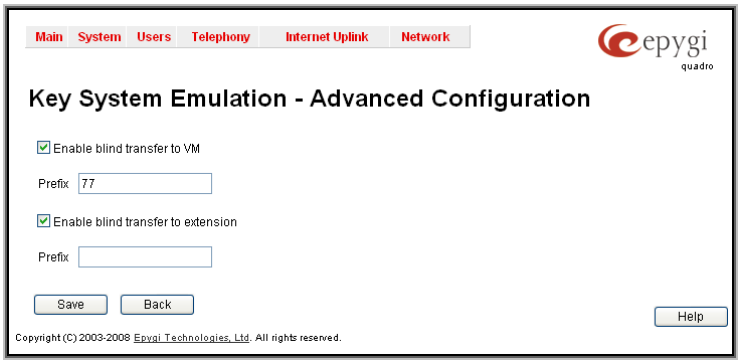


Fig. II-153: Key System Emulation - Advanced Configuration page

Please Note: If the **Enable blind transfer extension** checkbox is disabled, all calls initiated from SLAs are routed to the SIP server on which the SLA is registered (if any). If the checkbox is enabled but no prefix is specified, outgoing calls will be routed to the SIP server only if the number of dialed digits does not math the extension length specified on the system.

RTP Streaming Channels

The **RTP Streaming Channels** page is used to configure channels where the broadcast RTP streams are transmitted. These channels may be then configured to be used as hold music (see Manual III – Extension User's Guide) or any other type of music played to the caller.

Fig. II-154: RTP Streaming Channel page

The **RTP Streaming Channels** page consists of a table where RTP channels are listed.

Add opens the **Add Entry** page where a new RTP channel can be added.

The **Add Entry** page includes the following text fields:

The **RTP Channel Name** text field requires the name or the number of the RTP channel.

The **Port Number** text field requires the broadcasting RTP port number.

The **Description** text field requires optional information related to the RTP streaming channel.

Fig. II-155: RTP Streaming Channel – Add Entry page

Internet Uplink Menu

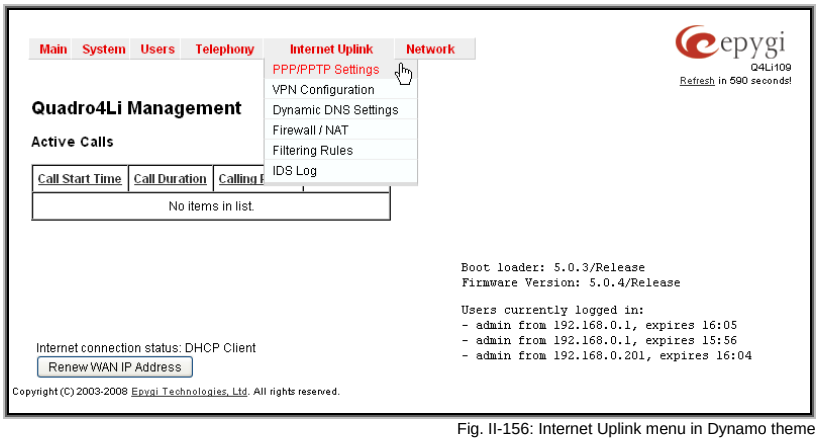


Fig. II-156: Internet Uplink menu in Dynamo theme

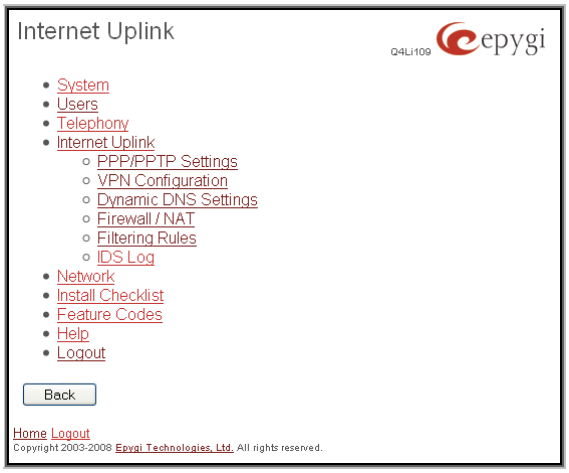


Fig. II-157: Internet Uplink menu in Plain theme

PPP/ PPTP Settings

The **PPP/PPTP Settings** page is used to establish a connection over the DSL link, or any other type of uplink, to the ISP. A connection is needed to set up and make or receive calls through PPP over Ethernet. The connection may be configured for manual setup or always up. Once a connection has been established between the Quadro and the provider, Quadro users will be able to make and receive calls at any time.

The **PPP/PPTP Settings** page offers the following components:

The Advanced PPP Settings link refers to the same named page where certain parts of the negotiation process during connection establishment can be adjusted. This link is not available when accessing this page through the Internet Configuration Wizard.

The **PPTP Server** text fields are only enabled when Quadro is running with the PPTP interface and require the IP address of the PPTP server.

The **Encryption** drop down list is only enabled when Quadro is running with the PPTP interface and it is used to select the encryption for the traffic over the PPTP interface.

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

Dial Behavior radio buttons enables the following selections:

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 always being online in the network.

IP Address Assignment radio buttons are used to define the IP address assignment for the PPP interface with the following options:

Dynamic IP Address – the IP address to the PPP interface will be assigned dynamically by the DHCP server.

Fixed IP Address – the fixed user defined IP address will be assigned to the PPP interface.

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

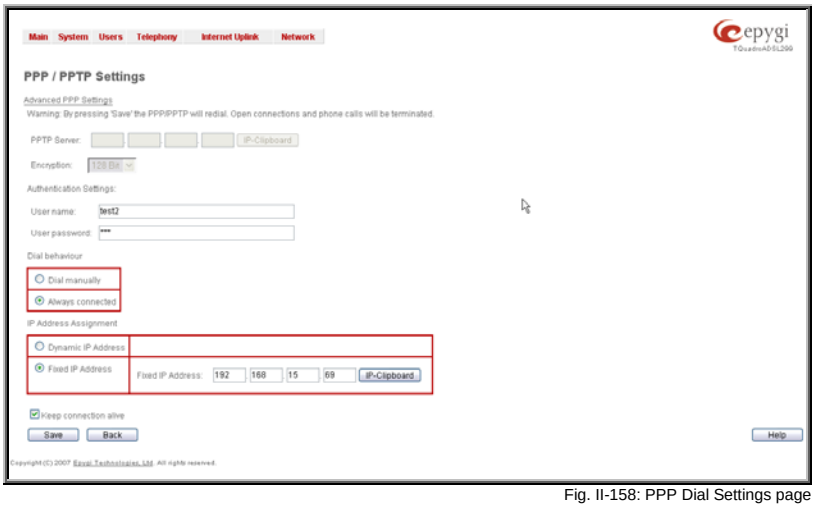


Fig. II-158: PPP Dial Settings page

Advanced PPP Settings

The **Advanced PPP Settings** are used to enable/disable certain parts of the negotiation process during connection establishment. These settings are available only if Quadro has a PPPoE WAN interface.

Attention: Disabling any of the services below may cause problems when establishing a connection including the complete connection failure. The default settings should be changed only if the ISP (Internet Service Provider) specifically requires it or if the peer system has problems with one of the services listed below. More information about these services can be found at: http://www.protocols.com/pbook/ppp.htm.

The **Advanced PPP Settings** page offers the following group of checkboxes:

Enable automatic PPP restart at checkbox is used to select the time when the PPP connection will automatically be restarted. The checkbox selection enables **LCP echo failures** text field that indicates the number of the LCP echo failure packets received before the PPP connection will be considered as dead and will be restarted.

Disable CCP (Compression Control Protocol) negotiation - this option should only be selected if the peer system is not working properly. For example, if it is not accepting the requests from the PPPD (Point-to-Point Daemon) for CCP negotiation.

Disable magic number negotiation - with this option, PPPD cannot detect a looped-back line. This option should only be selected if the peer is not working properly.

Disable protocol field compression negotiation in both the receive and the transmit direction – with this option, no protocol field compression will take place.

Disable Van Jacobson style TCP/IP header compression in both the transmit and the receive direction – with this option, no negotiation of TCP/IP header compression will take place and the header will always be sent uncompressed.

Disable the connection-ID compression option in Van Jacobson style TCP/IP header compression - with this option, PPPD will not compress the connection-ID byte from Van Jacobson and will not ask the peer to do so.

Disable the IPXCP and IPX protocols - this option should only be selected if the peer is not working properly and cannot handle requests from PPPD for IPXCP negotiation.

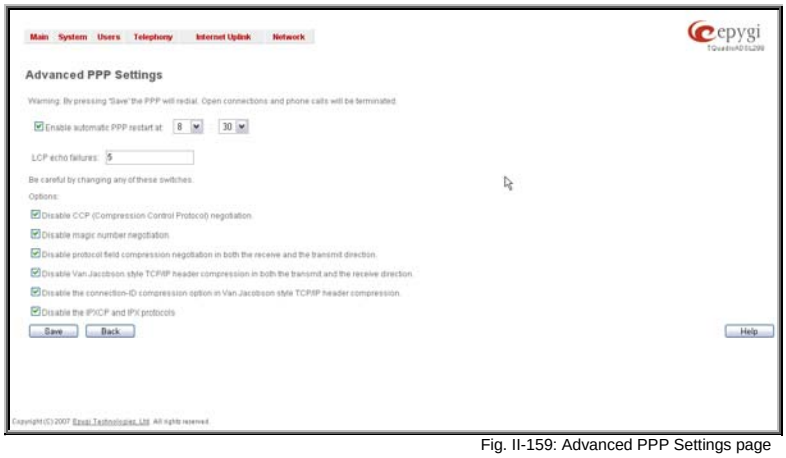


Fig. II-159: Advanced PPP Settings page

VPN Configuration

A **VPN (Virtual Private Network)** is established to connect two local networks (intranets) securely over the Internet securely. The VPN routers manage authentication between servers and clients and handle data encryption for the connection. Only authorized users may access the network and the data exchange cannot be intercepted.

VPN connections are, in many ways, like every Internet connection, they are based on IP addresses, which means, the concerned VPN gateways must authenticate the IP addresses of their respective partner's VPN gateways. Each time a specific VPN is to be established, usually the same IP addresses are expected. This will not create problems if both VPN partners have fixed WAN IP addresses. There may be circumstances reasons to prefer dynamically allocated IP addresses. To enable devices that use a variable IP address as part of a VPN, they are turned into "Road Warriors". For example, at this point they are able to reach their corporate network via authentication at the company's VPN gateway device. This VPN gateway device must have a fixed IP address for Internet access. Every VPN needs at least one VPN gateway with a fixed IP address.

The partner devices of a VPN must have different WAN IP addresses, and if they are connected to local area networks, these LAN's must have different IP addresses. As all Quadro devices have the same default IP addresses on delivery, at least one of them must be reconfigured in order to set a new IP address.

Quadro supports several kinds of VPN connections such as **IPSec**, **L2TP** and **PPTP**.

The **VPN Configuration** page offers IPSec Configuration and PPTP/L2TP Configuration links that lead to the corresponding feature settings pages.

Attention: It is strongly recommended not to run different types of VPN tunnels between the same endpoints simultaneously.

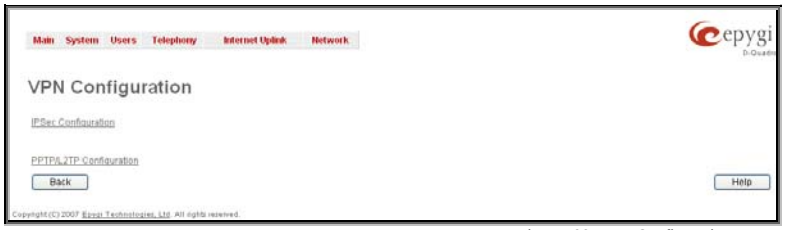


Fig. II-160: VPN Configuration page

An IPSec connection includes authentication and encryption to protect data integrity and confidentiality. VPNs are "virtual" in the sense that individuals can use the public Internet as a means of securely accessing an internal network. Once the IPSec connection is established, users have access to the same network resources, addresses, and so forth as if they were connected locally. VPNs are "private" because the data is encrypted between two VPN gateways. Encryption makes it very difficult for anyone to intercept data and capture sensitive information such as passwords. The Quadro can be set up to act as a VPN router when connected to the Internet with a fixed IP address or as an IPSec connection Road Warrior when using dynamic IP addresses.

Establishing an IPSec connection normally requires the functionality of a VPN gateway on each side of the communication line. An intelligent Internet access router, for example Quadro, delivers this function but also PCs or workstations may also be equipped with VPN gateway functionality. Home offices typically prefer dynamically allocated IP addresses.

When Quadro is connected to the Internet with a fixed IP address, it will be set up to act as a VPN gateway. Quadro is then prepared to establish an IPSec connection with another VPN gateway device, but also allows access to Road Warriors. A notebook /laptop used by a traveling employee could also be a Road Warrior. Access to their company's intranet via an IPSec connection can be obtained regardless of their location.

Quadro can also be set up to act as a Road Warrior. If a home office is connected to the Internet via Quadro with PPPoE (Point-to-Point Protocol) and dynamic IP addressing, setting up Quadro as a Road Warrior will allow an IPSec connection to the corporate network.

For the encryption and decryption of the data transmitted via the IPSec connection, a key is used. **RSA** used by Quadro is an asymmetric key system. It has to be available on both sides of the IPSec connection and will generate a different pair of keys on each side, a private key and a public key. During the connection establishment, some data is encrypted with the remote party's public key. They can be decrypting the data with their private key and the data encrypted there with Quadro's public key can be decrypted with Quadro's private key. Since the private key is never transmitted, it stays completely unknown to everyone, thus the system remains safe. Even if someone gets the public key, decryption cannot be possible without the private key. Quadro generates such a pair of keys automatically when it is set up. The user cannot see the private key, but must know the public key because their IPSec connection partner will need it.

Please Note: A pair of keys will always be generated, a public one and a private one. The previously generated pair of keys will become invalid as well as all existing IPSec connections that use RSA keying.

The **IPSec Configuration** link refers to the **IPSec Connection Settings** page. This page provides an overview of all existing IPSec connections characterized by their **Connection Name**, the **Remote Gateway** (the IP address or the hostname of the IPSec connection partner), the **State** of the IPSec connection (Stopped, Connecting, Activated, Waiting or Connected) and the dedicated **Keying Type** (the encryption type). The content of the table can be sorted in ascending or descending order by clicking on the header of the respective column. There is a checkbox for every IPSec connection to select it for further editing.

Start activates the connection establishment of the selected IPSec connection. The **State** of the IPSec connection will change into "Connected" or "Activated" depending on the IPSec connection type. If no record is selected, the error message "One Record should be selected" appears.

Attention: It is not recommended to simultaneously start a static and a dynamic connection configured to use the same secret key. A dynamic connection may capture the static connection peer and vice versa, depending on which connection established first.

Stop disconnects the selected IPSec connection. The state of the IPSec connection will change into "Stopped". If no record is selected, the error message "One Record should be selected" will appear. More than one record may be selected at a time to be stopped.

Fig. II-161: IPSec Connection Settings page

Add leads to the **Add IPSec Connection** wizard where a new IPSec connection can be defined and specified. The wizard provides several pages.

Edit leads to a set of **IPSec Connection Properties** pages to modify the parameters of the selected IPSec connection. The page includes the same components as the **Add IPSec Connection** page. To operate with **Edit**, only one record may be selected, otherwise an error message "One row must be selected" appears.

Restart all Connections restarts all active IPSec connections. The **State** of these IPSec connections will turn into **Connected** or **Activated** if the restart procedure has been successfully completed.

RSA Key Management leads to the **RSA Key Management** page to see the current RSA key, to generate a new one and to send it to the peer via e-mail.

The first IPSec Connection Wizard page **Add IPSec Connection** has the **Connection Name** text field that requires a new mandatory IPSec connection name. If the text field is not filled in, the error message otherwise an error will occur "Error: Incorrect connection name" will appear.

Please Note: The input in the **Connection Name** field should only be in Latin characters, otherwise an error occurs and IPSec connection cannot be created.

The **Peer type** drop down list is used to choose the remote machine type for the IPSec Connection to be established. If the list does not include the required type of machine, choose **Other**.

The **VPN Network Topology** drop down list allows you to select the location of the peers participating to the VPN connection. The following options are present in the list:

- Quadro<>Peer – direct connection between Quadro and a peer.
- Quadro<>[Internet]<>Peer – connection between Quadro and peer over Internet.
- Quadro<>NAT<>[Internet]<>Peer – connection between Quadro and peer over Internet through Quadro provider's NAT.
- Quadro<>[Internet]<>NAT<>Peer – connection between Quadro and peer over Internet through peer provider's NAT.

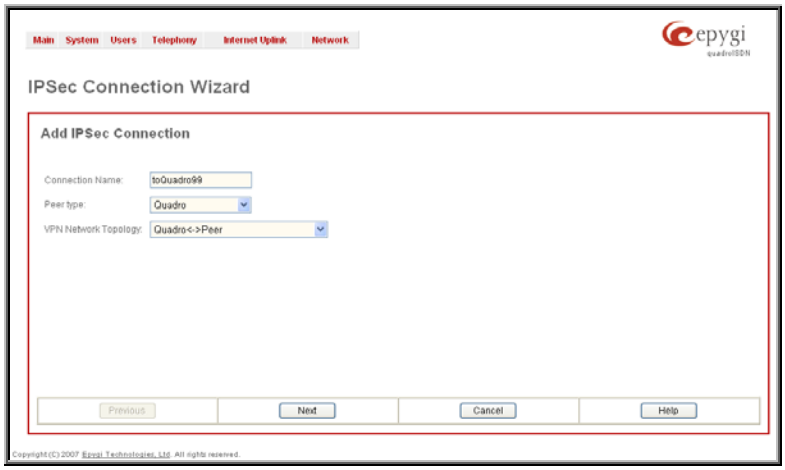


Fig. II-162: IPSec Connection Wizard - Add IPSec Connection

The second page of the IPSec Connection Wizard, **IPSec Connection Properties** serves to specify the members of the IPSec Connection and to set the basic parameters for encryption.

A group of radio buttons are used with **Dynamic IP/Road Warrior** and **Static IP/ Remote Gateway** to select if the remote Quadro (or another VPN gateway device) is connected to the Internet with a dynamic IP address and is acting as a **Road Warrior**, or is connected to the Internet with a fixed IP address and is acting as a **VPN Gateway**.

If **Dynamic IP / RoadWarrior** is selected, the **Remote Gateway IP Address** text field will automatically generate the value "any", to allow access independent from the sending IP address.

Selecting **Static IP / Remote Gateway** requires entering the IP address or the hostname of the remote Quadro (or another VPN gateway device) in the **Remote Gateway** text field.

Please Note: The **Static IP/ Remote Gateway** selection is not possible if this Gateway is positioned behind NAT, since the IP-address of the remote gateway is not reachable directly in this case.

Quadro <> Remote Gateway allows access from the local Quadro to the remote VPN gateway (local subnet and remote subnet are not included). This includes management access. The checkbox is disabled when "Quadro<>NAT<>[Internet]<>Peer" or "Quadro<>[Internet]<>NAT<>Peer" the is selected from the **VPN Network Topology** drop down list on the first page of the **IPSec Connection Wizard**.

Local Subnet <> Remote Gateway allows access from all stations connected to the local network to the remote VPN gateway device (local Quadro and remote subnet are not included). The checkbox is disabled when "Quadro<>[Internet]<>NAT<>Peer" is selected from the **VPN Network Topology** drop down list on the first page of the **IPSec Connection Wizard**.

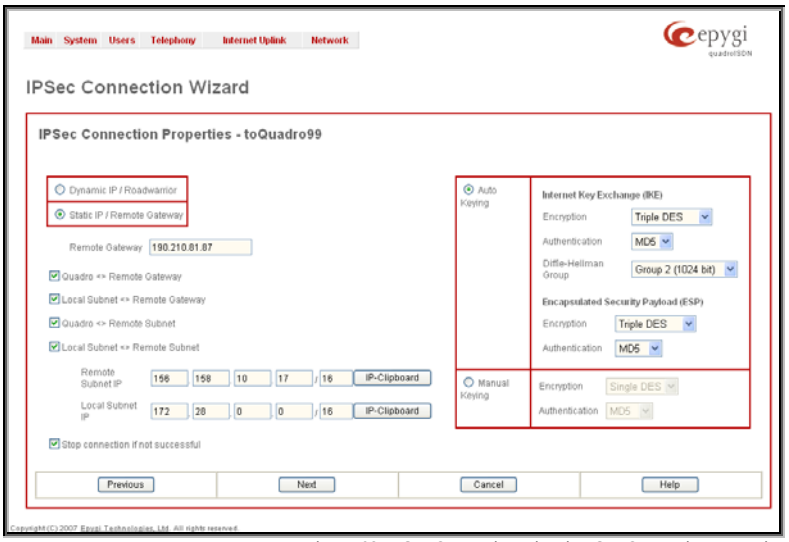


Fig. II-163: IPSec Connection Wizard -IPSec Connection Properties

Quadro <> Remote Subnet allows access from the local Quadro to all stations of the remote LAN (local subnet and remote VPN gateway devices are not included). The checkbox is disabled when "Quadro<>NAT<>[Internet]<>Peer" is selected from the **VPN Network Topology** drop down list on the first page of the **IPSec Connection Wizard**.

Local Subnet <> Remote Subnet allows access from all stations of the local network to all stations of the remote LAN (VPN gateway devices are not included). In this case, the local and remote subnet IP addresses and subnet masks have to be entered in the corresponding text fields **Local Subnet IP** and **Remote Subnet IP**.

More than one of the above checkboxes may be selected to specify the desired communication relations.

The **Stop Connection if not successful** checkbox allows you to stop the IPSec connection attempts if the partner is still unreachable after the timeout period. If the checkbox is not selected, the system will continue to try to reach the IPSec connection partner.

The right side of the page offers the following security settings for key exchange, data encryption and authentication:

The area **Keying Type** offers the choice between automatic and manual keying. To use manual keying, the **Static IP / Remote Gateway** needs to be selected.

Auto Keying requires the **ESP** (Encapsulated Security payload) and **IKE** (Internet Key Exchange) settings (in addition to **Diffie-Helman Group** settings) to be selected for the automatic keying exchange. **Encryption** and **Authentication** parameters should be defined for each of these standards, as well as for the **Manual Keying**.

The **Encryption** drop down list offers the following standards for selection:

DES (Data Encryption Standard) is a block cipher algorithm with 64-bit blocks and a 56-bit key. This algorithm is considered to be unsecure for sensitive information.

3DES (Triple DES) uses three DES encryptions on a single data block with three different keys to achieve a higher security than is available from a single DES pass.

AES (Advanced Encryption Standard) is a computer security standard, which became effective on May 26, 2002 by NIST to replace DES. The cryptography scheme is a symmetric block cipher, which encrypts and decrypts 128-bit blocks of data. Lengths of 128, 192, and 256 bits are standard key lengths used by AES.

The area **Authentication** offers the following parameters to be selected:

SHA (Secure Hash Algorithm) is a strong digest algorithm proposed by the US NIST (National Institute of Standards and Technology) agency as a standard digest algorithm and is used in the Digital Signature standard, FIPS number 186 from NIST. SHA is an improved variant of MD4 producing a 160-bit hash. SHA and MD5 are the message digest algorithms available in IPSEC.

SHA1 is an enhanced version of SHA. It works with checksums like MD5 does, but it makes a longer hash.

MD5 (Message Digest) is a hash algorithm that makes a checksum over the messages. The checksum is sent with the data and enables the receiver to notice whether the data has been altered.

The **Diffie-Hellman** parameter is used to determine the length of the base prime numbers used during the key exchange process. The cryptographic strength of any key derived depends, in part, on the strength of the Diffie-Hellman group, which is based upon the prime numbers.

Group 2048 (high) is stronger (more secure) than Group 2 (medium), which is stronger than Group 1 (low). Group 1 provides 768 bits of keying strength, Group 2 provides 1024 bits, and Group 2048 provides 2048 bits. If mismatched groups are specified on each peer, negotiation fails.

Depending on whether the automatic keying type or the manual one has been selected, the button **Next** will lead you to the **Automatic Keying** or **Manual Keying** page.

The third page of the IPSec Connection wizard, **Automatic Keying**, is used to setup a type of password (**Shared Secret**) or the **RSA** public key to secure your IPSec Connection. The functionality of **Perfect Forward Secrecy** (PFS) can be added to both. Following ways of automatic keying are available.

- **Shared Secret** is a type of password consisting of any characters that both of the IPSec Connection partners must know. The authentication will be done with this shared secret. All encryption functions below will remain concealed.

  Please Note: It is also not recommended to start multiple road warrior connections with the **Shared Secret** automatic keying selected. For multiple road warriors to be started at the same time, it is recommended to use RSA keying with **Local ID** and **Remote ID** fields configured.

- **RSA** requires the public RSA key of your IPSec Connection partner.

Please Note: System prevents to start a connection with Shared Secret automatic keying selected if there is already a connection with RSA automatic keying started, and vice versa.

The **Local ID** requires an IP address, Quadro FQDN (Fully Qualified Domain Name) that is resolved to an IP address, or any @-ed string that is used in the same way.

Remote ID also requires an IP address, the IPSec Connection partner's FQDN (Fully Qualified Domain Name) that is resolved to an IP address, or any @-ed string that is used in the same way.

The **Local ID** and **Remote ID** text fields may have the values in one of the formats presented below:

IP address – example: 10.1.19.32.

Host name – example: vpn.epygi.com. This form requires additional resources to resolve the host name, therefore it is not recommended to use this format.

@FQDN – example: @vpn.epygi.com. This form is considered as a string, and is not being resolved. It is recommended to use this form for most applications.

user@FQDN - example: quadro@vpn.epygi.com. This form is also considered as a string, and is not being resolved. It has no advantages over the previous form.

Please Note: The **Local ID** and **Remote ID** values are mandatory for **RSA** selection and are optional for **Shared Secret** selection. However, it is recommended to define the **Local ID** and **Remote ID** values for multiple road-warrior connections.

Fig. II-164: IPSec Connection Wizard - Automatic Keying Settings page

PFS (Perfect Forward Secrecy) is a procedure of system key exchange, which uses a long-term key and generates short-term keys as is required. Thus, an attacker who acquires the long-term key can neither read previous messages that they may have captured nor read future ones.

Use IPSec Compression enables IPSec data compression. This option is displayed only if the IPSec-VPN partner supports it.

The **Manual Keying** page offers the following components:

Depending on the selected encryption and authentication services of the prior page (IPSec Connection Properties) you will get some of the following text fields:

- DES Encryption Key
- 3DES Encryption Key
- SHA1 Authentication Key
- MD5 Authentication Key

Manual keys must be entered in the hexadecimal format, otherwise the error message "Incorrect Encryption Key" will appear.

The **SPIs** (Security Parameter Index) are indices to keep the IPSec Connection tunnels distinct. A security association (SA) is defined by destination, protocol and SPI. Without the SPI, connections to the same gateway using the same protocol cannot be distinguished.

Fig. II-165: IPSec Connection Wizard - Manual Keying Settings page

The public key is displayed in the **RSA Public Key** text field so that the user may inform their IPSec connection partner about it, for example, via fax.

The user has the option of generating a new pair of keys by specifying the key length with the corresponding radio buttons **Generate a new 1024bit RSA Key** and **Generate a new 2048bit RSA Key** and then clicking the **Generate** Button.

A valid RSA key should fit to following requirements:

- RSA key doesn't start with "0s"
- RSA key doesn't end with "=="
- RSA key contains symbols other than Alphanum, +, /, =

The **Email this to the peer** text field requires the mailing address of the IPSec connection partner. The **Send** button will insert Quadro's public RSA key into an e-mail and send it to the IPSec connection partner.

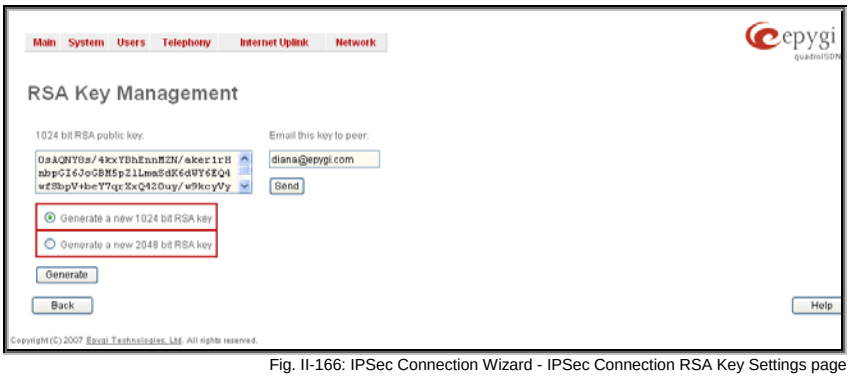


Fig. II-166: IPSec Connection Wizard - IPSec Connection RSA Key Settings page

PPTP (**P**oint-to-**P**oint **T**unneling **P**rotocol) is used to establish a virtual private network (VPN) over the Internet. Remote users can access their corporate networks via any ISP that supports PPTP on its servers. PPTP encapsulates any type of network protocol (IP, IPX, etc.) and transports it over IP. Therefore, if IP is the original protocol, IP packets ride as encrypted messages inside PPTP packets running over IP. PPTP is based on point-to-point protocol (PPP) and the Generic Routing Encapsulation (GRE) protocol. Encryption is performed by Microsoft's Point-to-Point Encryption (MPPE), which is based on RC4.

L2TP (Layer **2 T**unneling **P**rotocol) is a protocol from the IETF, which allows a PPP session to run over the Internet, an ATM, or frame relay network. L2TP does not include encryption (as does PPTP), but defaults to using IPSec in order to provide virtual private network (VPN) connections from remote users to the corporate LAN. Derived from Microsoft's Point-to-Point Tunneling Protocol (PPTP) and Cisco's Layer 2 Forwarding (L2F) technology, L2TP encapsulates PPP frames into IP packets either at the remote user's PC or at an ISP that has an L2TP remote access concentrator (LAC). The LAC transmits the L2TP packets over the network to the L2TP network server (LNS) at the corporate side. Large carriers also may use L2TP to offer remote POPs to smaller ISPs. Users at the remote locations dial into the modem pool of an L2TP access concentrator, which forwards the L2TP traffic over the Internet or private network to the L2TP servers at the ISP side, which then sends them on to the Internet.

For **PPTP** and **L2TP Connections**, two parties are required: a **Client** and a **Server**. The client is responsible for establishing the connection. The server is waiting for clients, it is not able to initiate the connection itself.

Attention: L2TP tunnels have no data encryption mechanism.

The **Host Name** and a **Password** specify each side. The client should know the server's name and password (the Quadro server has no password) and the server should set the client's host name and a password. The client and server settings have to match on both sides for successful connection establishment.

Clients and Servers are identified by their hostnames, which means that only one client can be connected to the server in the same network. Servers also define the range of IP addresses that are assigned to the Server and Client hosts participating in a connection.

The **PPTP/L2TP Configuration** link displays a page where a new PPTP and L2TP connection can be configured, as well as PPTP and L2TP server settings can be adjusted. The page consists of 3 sub-pages.

The **Connections** page lists all existing connections are listed, characterized by their **Connection Name**, **Type** of the connection (PPTP or L2TP), the **Client/Server** mode, the **State** of the connection and the **Remote Hostname IP** (the IP address or the hostname of the connection peer). The state of the PPTP and L2TP Connections, except for the "Stopped" state, is established as a link that refers to the page where logout information about the connection status is displayed. Logs can be useful to determine problems on PPTP or L2TP connections failure.

Add functional button leads to the **PPTP/L2TP Connection Wizard** page, where a new connection can be established.

Please note: After creating a PPTP server connection, PPTP connections between devices placed on the Quadro LAN and external devices will no longer be possible. The PPTP pass-through service for incoming and outgoing traffic will be automatically disallowed once a PPTP server connection is created.

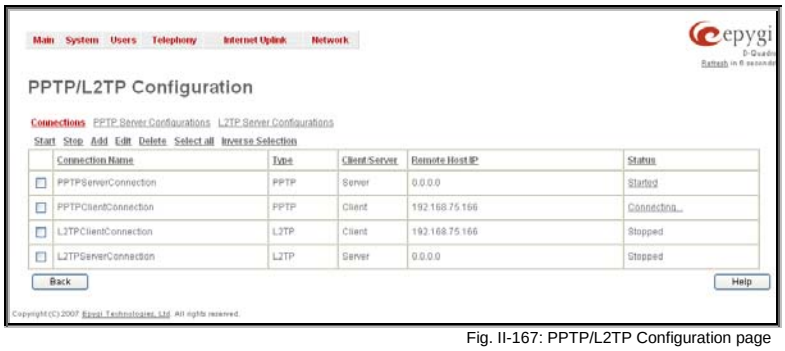


Fig. II-167: PPTP/L2TP Configuration page

Fig. II-168: PPTP/L2TP Connection Wizard – Page 1

The **PPTP/L2TP Connection Wizard** consists of several pages and allows you to create a new PPTP or L2TP connection.

The **PPTP/L2TP Connection Wizard – Page 1** consists of the following components:

Connection Name text field requires a connection identification name. The name of the connection cannot start with a digit symbol, however it can contain digits further in the name.

Connection Type drop down list allows to select the type of the connection (PPTP or L2TP).

The **PPTP/L2TP Connection Wizard – Page 2** consists of the following components:

The **Peer Name** text field requires the connection peer name. If you are about to create a client connection, then the server's name should be defined here. If you are creating a server connection, then the client's name should be defined here.

Please note: When creating a connection with a Windows Server, ensure that a user with the Quadro's host name and Dial-in access exists on the server. When creating a connection with a Windows Client, ensure that the Peer name specified on this page matches the Dial-in connection's username.

Please Note: The input in the **Peer Name** field should only be in Latin characters, otherwise an error occurs and no connection can be created.

The **Password** text field requires the password for the connection establishment.

Please Note: These authentication settings should be identically configured on both peers for the successful connection establishment.

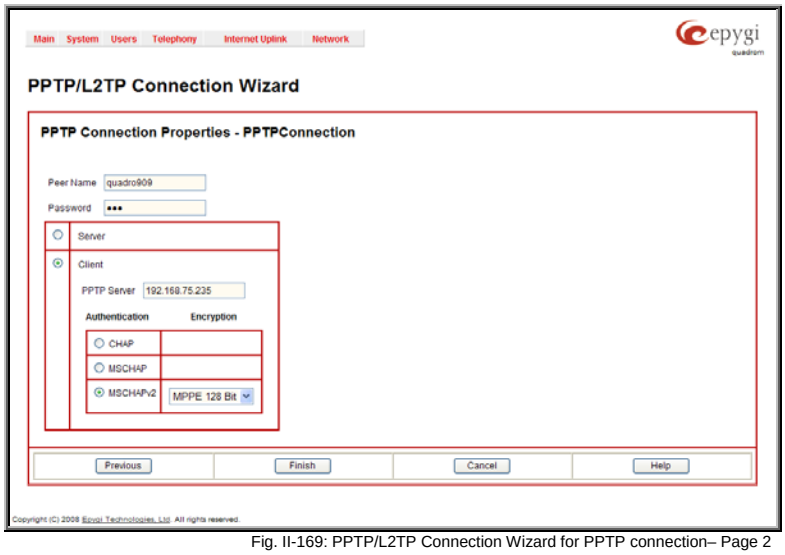


Fig. II-169: PPTP/L2TP Connection Wizard for PPTP connection– Page 2

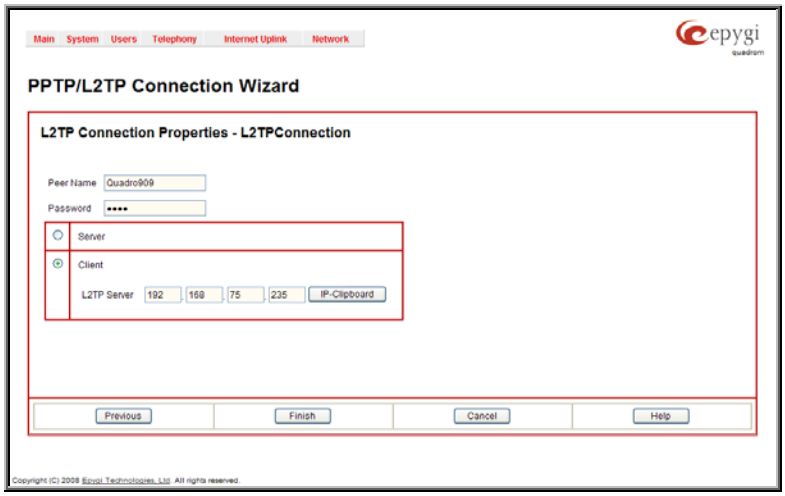


Fig. II-170: PPTP/L2TP Connection Wizard for L2TP connection– Page 2

The manipulation radio buttons selection on this page allows you to choose whether the new connection will be a client or a server. For the **Client** radio button selection, no further details need to be provided. For the **Server** radio button selection, the following information needs to be provided:

For PPTP connection, the **PPTP Server** text field requires an IP address or a host name of the PPTP server. For L2TP connection, the **L2TP Server** text fields require an IP address of the L2TP server.

The **Authentication** manipulation radio buttons are only present if the **Connection Type** selected on the previous page is PPTP. They are used to select the corresponding authentication protocol by which the client communicates with the server. The **MSCHAPv2** selection enables the **Encryption** drop down list where the encryption method can be selected.

The **Start** functional button initiates the selected connection(s). If it is a client connection, then this button initiates a client activity of reaching the server. The **Start** option is applicable for multiple connections selected at the same time.

The **Stop** functional button is used to stop the selected connection(s). Stopping the server connection will disconnect all connected clients and close the PPTP/L2TP tunnel. The **Stop** option is applicable for multiple connections selected at the same time.

The **PPTP Server Configuration** page is used to configure the PPTP server settings and offers the following components:

The **PPTP Subnet** text fields are used to enter the IP address range for the PPTP server and clients within the PPTP tunnel. The value specified for the subnet mask is fixed to 24 to restrict the possible number of clients for the PPTP connection.

Please Note: The first address specified in the PPTP Subnet will be assigned to the PPTP server; others will be assigned to the clients. The PPTP server subnet should be different from the L2TP server subnet, otherwise a corresponding error message will appear.

The **Authentication** manipulation radio buttons are used to select the corresponding authentication protocol by which the client communicates with the server. The **MSCHAPv2** selection enables **Encryption** drop down list where the encryption method can be selected.

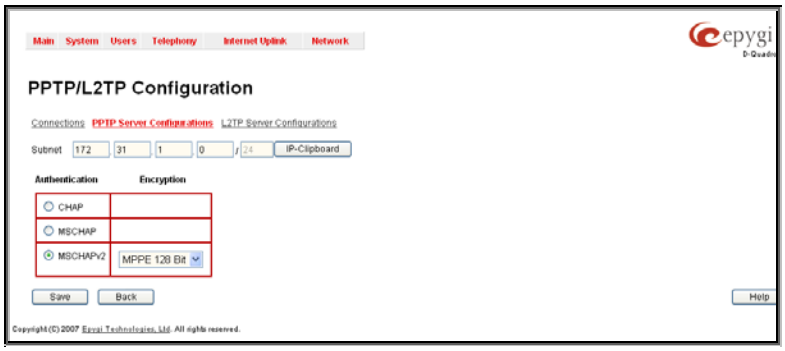


Fig. II-171: PPTP Server Configuration page

The **L2TP Server Configuration** page is used to configure the L2TP server settings and provides the following input options:

The **L2TP Subnet** text fields are used to enter the IP address range for the L2TP server and clients within the L2TP tunnel. The value specified for the subnet mask is fixed to 24 to restrict the possible number of clients for the L2TP connection.

Please Note: The first address specified in the L2TP Subnet will be assigned to the L2TP server; others will be assigned to the clients. The L2TP server subnet should be different from the PPTP server subnet, otherwise a corresponding error message will appear.

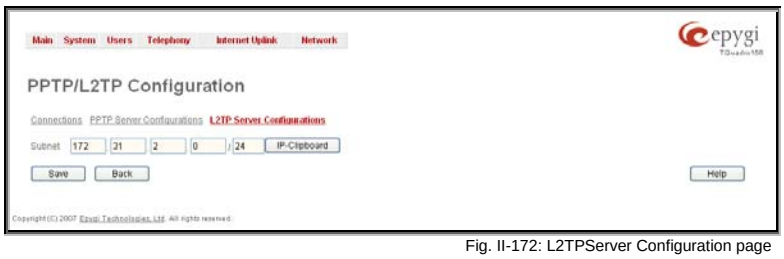


Fig. II-172: L2TPServer Configuration page

To Specify an IPSec Connection

1. Press the **Add** button on the **IPSec Connection Settings** page. The **IPSec Connection Wizard** will appear in the browser window.
2. Select a VPN **Peer Type** and assign a name to the **IPSec Connection**. Press **Next** to go to the next page of the IPSec Connection wizard.
3. Enter the remote side IP parameters, check subnets/gateways for the connection, select the NAT traversal option (if needed), and the desired keying type. Press **Next** to go to the next page of the IPSec Connection wizard.
4. If the **Automatic Keying** type has been selected, enter the automatic keying parameters and select the PFS and IPSec compression options (if needed). If the **Manual Keying** type has been selected enter the encryption and authentication keys and SPI(s).
5. To specify an IPSec connection with these parameters, press **Finish**. Press **Cancel** to abort the operation.

To Manage an RSA key for the IPSec Connection

1. Press the **RSA Key Management** button on the **IPSec Connection Settings** page. The **IPSec Connection RSA Key** will appear in the browser window.
2. Select the RSA key length and press **Generate** to generate a new RSA public key. This may take several seconds.
3. Enter a destination e-mail address in the **Email this key to peer** text field, then press **Send** to send the new RSA public key.

To Delete/Stop/Start/Enable/Disable a VPN Connection

1. Select one or more checkboxes of the corresponding connections that should to be deleted/stopped/started from the **Connections** tables. Press **Select all** to delete/stop/start all connections.
2. Click on the Delete/Stop/ Start button from the table's menu to perform the corresponding operation for the selected VPN connection(s).
3. If deleting, confirm it with pressing on **Yes**. The VPN connection will be deleted. To abort the deletion and keep the VPN connection in the list, click **No**.

Dynamic DNS Settings

The **Dynamic DNS** (DynDNS) is a service that is used to map a dynamic IP address to a host name. This service is used if you are connected to the Internet with a dynamic IP address (and PPP, DHCP client) and want to allow access from the Internet to a device behind the firewall. For example, if you want to run your own WEB server.

To enable the DynDNS service on Quadro, you first have to choose a DynDNS provider and register at their website.

The **Dynamic DNS Settings** page provides the following components:

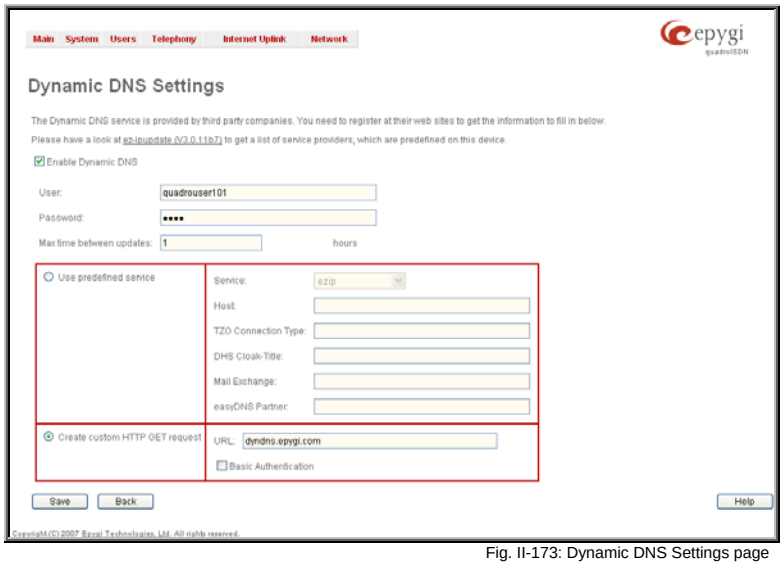


Fig. II-173: Dynamic DNS Settings page

The **Enable Dynamic DNS** checkbox selection enables the dynamic DNS service.

The **User** text field requires the username specified during the registration at the DynDNS provider.

The **Password** text field requires the password specified during the registration at the DynDNS provider.

The **Max time between updates** text field requires entering the period between two updates (in hours). The values entered in these fields should be greater than 24, otherwise the error message "Update interval times smaller than 24 hours are too small" will appear. Normally, whenever you set up a connection to the Internet, the DynDNS is updated at least once in the period indicated in this field.

The **Use predefined service** radio button leads to the manual configuration of the DynDNS service. The selection enables the following optional settings:

The **Service** drop down list contains the provider list where the administrator needs to select the one that it has been subscribed to.

The **Host** text field requires the name of the host on the Internet.

The **TZO Connection Type** text field is used for a special parameter required by the DynDNS provider TZO.

The **DHS Cloak-Title** text field is used for a special parameter required by the DynDNS provider DHS.

The **Mail Exchange** text field requires the address of the e-mail server where the DynDNS service provider will relay your e-mails.
Attention: If this service is used, ensure that there is port forwarding configured for SMTP (port 25) to the internal e-mail server.

The **easyDNS Partner** text field is used for a special parameter required by the DynDNS provider easyDNS.

Selecting the **Create Custom HTTP GET Request** radio button will switch to the custom settings of the DynDNS service. Normally, the DynDNS provider uses HTTP get requests to map dynamic IP addresses to host names. If the HTTP receive request is known to you, choose the **Create Custom HTTP GET Request** radio button and enter the appropriate value into the **URL** text field.

The selection enables the following optional settings:

The **URL** text field requires the complete request to be sent to the DynDNS server. Normally it has the following format:

http://www.server.domain:port/scriptpath/scriptname?param1=value1&param2=value2

The request modifies the nameserver database so that the hostname will be resolved to the new IP address.

The **Basic Authentication** checkbox enables the encoding of the username and password entered in the text fields above, and then uses the **Basic Authentication** method to notify the provider about the user authentication settings.

Most of the DynDNS providers require an authentication for security. Authentication parameters can be provided in the **URL** text field to be used for the HTTP get request. The **Basic Authentication** checkbox can be selected if no authentication parameters to be provided.

Firewall and NAT

The **Firewall Configuration** page allows setting up a firewall, configuring the security level and enabling the NAT and IDS services of Quadro.

A **Firewall** is a security service configured by the Quadro administrator based on various criteria. The firewall allows or blocks traffic based on policies, services and/or IP addresses. The firewall has several levels of security policies (low, medium or high). The administrator may add additional service-based rules. Filtering rules will take effect only if the Firewall has been enabled and are independent from the selected firewall security level.

NAT (Network Address Translation) is used to allow Quadro LAN members to connect to the Internet using Quadro's WAN IP address. The Quadro/NAT also handles forwarding incoming packets from the WAN to the PCs or devices on Quadro's LAN.

The **IDS** (Intrusion Detection System) is a type of firewall, but together with deleting dangerous packets or packets containing intrusion attacks, IDS generates a log file with information about these dropped packets and the senders responsible for those packets. The log can be viewed on the IDS Log page and notifications about them can be sent to the user in various ways such as e-mail, flashing LED and display notification.

The **Firewall Configuration** page offers the following components:

The **Enable IDS** checkbox selection enables the Intrusion Detection System. The **Enable NAT** checkbox selection enables Network Address Translation.

The **Enable Firewall** checkbox selection enables the firewall security service. The firewall security level has to be selected, otherwise the firewall cannot be enabled.

The **Firewall Security** radio buttons are the following:

- **Low Security** - Everything that is not explicitly forbidden will be allowed. This security level doesn't block anything by default. It is recommended if the device is already located behind another firewall or if every filter has been configured correctly.
- **Medium Security** - Traffic originating from the LAN side may pass and traffic from the WAN side will be blocked by default. This is the recommended security level.
- **High Security** - Everything that is not explicitly allowed will be blocked, including traffic from the LAN side.

The Advanced Firewall Settings link refers to the page where Quadro's privacy can be configured.

The **View Filter Rules** link opens the Filtering Rules page.

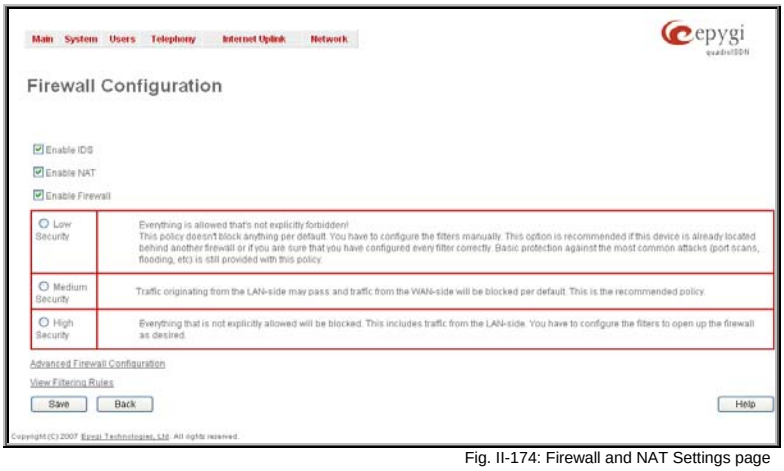


Fig. II-174: Firewall and NAT Settings page

Advanced Firewall Settings

Advanced Firewall Settings are used to deny Ping and Portscanning operations addressed towards the device. With these features enabled, Quadro will answer with inscrutable messages to the Ping and Portscanning operations.

Please Note: Operations are available only when the firewall is enabled from the

Firewall and NAT page.

This page offers the following components:

The **Ping Stealth** checkbox selection prohibits a Ping operation toward Quadro from its WAN.

The **Fool Portscanner** checkbox selection prohibits Quadro portscanning from its WAN. As a reply to a Portscanning operation, "network unreachable" or "host unreachable" feedback messages will be sent.

Fig. II-175: Advanced Firewall Settings page

Filtering Rules

The **Filtering Rules** page allows you to configure the filters for incoming and outgoing traffic.

To prevent inaccurate configuration, only one rule per service is allowed. The user may use IP groups to include several IP addresses for this rule. Since the filtering rules specify the operation mode of the firewall, they only take effect if the firewall has been enabled (additionally NAT should be enabled to use the **Port Forwarding** function in the **Incoming Traffic / Port Forwarding** filtering rules). The filtering rules are independent from the security level, so they will work if enabled, no matter what security level has been selected.

Please Note: Applying firewall rules will prevent the establishment of new connections that violate the rules. Applying rules does not kill existing connections that violate the rule.

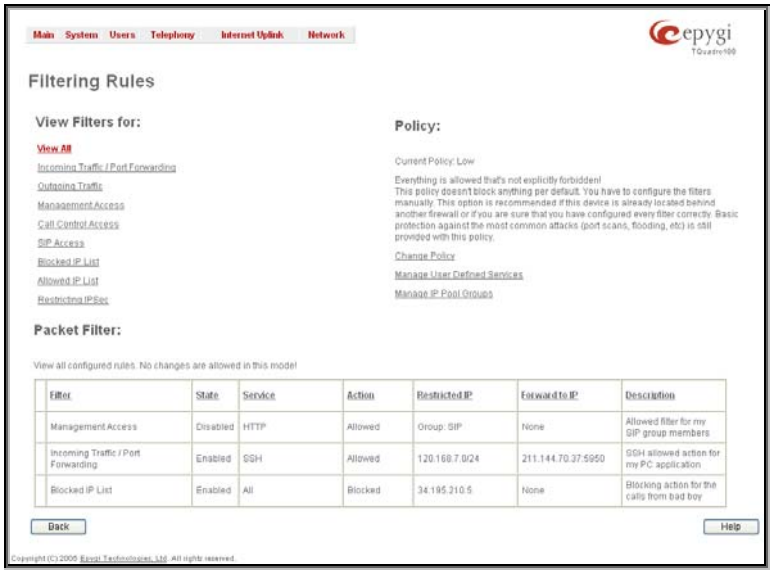
View All displays all configured filters specified by their **State** (enabled or disabled), the selected **Service**, the set **Action** (allowed or blocked), the IP addresses the filters apply to (if **Restricted**) and the destination of port forwarding (**Redirect to**, in case of **Incoming Traffic/Port Forwarding**). Since it is read-only, no modifications are allowed and no functional buttons are available.

The **Incoming Traffic/Port Forwarding** filter is for incoming traffic. The rules here allow or deny systems on the Internet to reach the services of Quadro's LAN. The NAT service should be enabled on the Quadro to provide the possibility of **Port Forwarding** in the **Incoming Traffic/Port Forwarding** filtering rules. The **Port Forwarding** function will be unavailable if NAT is disabled on the Quadro.

The **Outgoing Traffic** filter is for outgoing traffic. The rules here allow or deny Quadro's LAN users to reach external services.

Management Access is used to enable management access to the Quadro from the Internet. A host on the Internet can be allowed to reach the Quadro.

Call Control Access is used to enable the access from the call controlling application from the Internet to the Quadro. The call controlling applications can be used to remotely initiate and handle calls on the Quadro and to subscribe for certain event



notifications from the Quadro.

Fig. II-176: Filtering Rules page

SIP Access is to allow or deny the SIP access to or from the particular SIP servers, SIP hosts or a group of them. The **SIP Access** filtering rule may prevent or allow incoming or outgoing SIP calls to or from specified SIP server(s) or host(s).

When **Blocked IP List** is used, traffic from specific hosts may be blocked, no matter what services are opened in the other filters. NO traffic will be allowed to the specified hosts. The **Blocked IP List** service has a higher priority if the same host is also listed in the **Allowed IP List** table.

Allowed IP List allows trusted hosts to reach your network and vice versa. It is an exception to other rules and only all services may be allowed for a single host.

Restricted IPSec - Generally hosts in a VPN are allowed to have access to any service, i.e., no traffic will be blocked. They are treated as if they were part of the Quadro LAN. However, this service can be manually denied here.

The **Filtering Rules** page provides several links. Each link opens its specific parameters on the same page. Only **Change Policy** (see chapter Firewall and NAT), **Manage user Defined Services** (see chapter Service Pool) and **Manage IP Pool Groups** (see chapter IP Pool) lead to separate pages. The **Filtering Rules** page also includes the currently selected firewall security (**Policy**) level and its description.

The table displayed on the bottom of this page shows the filters selected above, specified by their **State** (enabled or disabled), the selected **Service**, the set **Action** (allowed or blocked), the IP addresses the filters apply to (if **Restricted**) and the destination of port forwarding (**Redirect to**, in case of **Incoming Traffic/Port Forwarding**). With the exception of View All, the table offers the following functional buttons:

Enable is used to enable the rule. If no records are selected the error message "No record(s) selected" will appear.

Disable is used to disable the rule. If no records are selected the error message "No record(s) selected" will appear.

Add opens a filter specific page where new rules may be defined by a **Service**, an **Action,** a **Restriction** to certain IP address(es) or IP groups, and if adding a rule for **Incoming Traffic/Port Forwarding**, the destination IP address for **Forwarding**.

The page to add a rule for **Incoming Traffic/Port Forwarding** offers the following input options:

Service includes a list of possible services to be configured. All user-defined services also will be displayed in this list.

Action includes possible actions to setup the rule.

Forward to IP requires the destination IP address where traffic should be transferred to if it comes from the restricted host. The IP address defined in this field will be ignored for blocked action of the **Incoming Traffic/Port Forwarding** rule.

Note: It is not allowed to forward incoming packets when the NAT service is disabled on the Quadro.

Port Translation text field is available for "Allowed" action only and optionally requires the port number that will stand instead of the original port number when incoming packet is being forwarded. If this field is left empty, the original port number will be used when forwarding the packet.

Restriction radio buttons:

- Selecting **Any** blocks or allows all host IP addresses. This selection is not present for the **Management Access**, **Blocked** and **Allowed IP List** rules.
- Selecting **Single IP** will require the IP address of the allowed or blocked host.
- Selecting **IP/Mask** will require the subnet to be allowed or blocked, specified by an IP address and the Maskbits. The following are **Maskbit** examples:
  255.0.0.0= /8,
  255.255.0.0 = /16,
  255.255.255.0 = /24,
  255.255.255.255= /32
- **Single URL** requires the hostname of the allowed or blocked host.
- **Group** indicates the user-defined groups that include IP addresses that should to be allowed or blocked.

The **Description** field is used to insert an optional description of the filtering rule.

Fig. II-177: Filtering Rules - Page to add a rule for Incoming Traffic

To Add a Filtering Rule

1. Select the **Filter** link (Incoming Traffic/Port Forwarding, Outgoing Traffic, Management Access, SIP Access, Blocked IP List, Allowed IP List or Restricting IPSec) to add a rule for it. The corresponding **Filter** table will appear in the same window.
2. Click **Add** on the **Filtering Rules** page. A page where a new rule may be added will appear in the browser window. The page will be named corresponding to the selected filter.
3. Select a service name from the **Service** list to configure a rule for it. If the list has a default value, do not change the default values.
4. Select an action from the **Action** list that is used in the rule. If the list has a default value, do not change the default values.
5. Enter the IP address in the **Forward to IP** field if an **Incoming Traffic Rule** is to be added.
6. Choose the restriction type by selecting **Any**, **Single IP**, **IP/Mask** or **Single URL** and enter the required information in the text fields or select a group.
7. Insert a **Description**, if needed.
8. To add a rule with these parameters, press **Save**.

To Delete Filtering Rules

1. Select the **Filter** link to delete a rule from its table. The appropriate **Filter** table will appear in the same window.
2. Check one or more checkboxes of the corresponding rules that should be deleted from the rules table. Press **Select all** if all rules should to be deleted.
3. Press the **Delete** button on the **Filtering Rules** page.
4. Confirm the deletion by clicking on **Yes**, or cancel by clicking on **No**.

Service Pool

The **Service Pool** table is a list of all created services and their parameters. It is used to add new services with the appropriate settings (protocol type and port range). New services can be used to add a restriction or permission by defining a new filtering rule with the following:

Add opens the **Add New Service** page where new services may be added.

Edit opens the **Edit Service** page where the service parameters (except for the service name) can be modified. This page includes the same components as the **Add New Service** page. To operate with **Edit** only one record may be selected, otherwise the error message “One row must be selected” will appear.

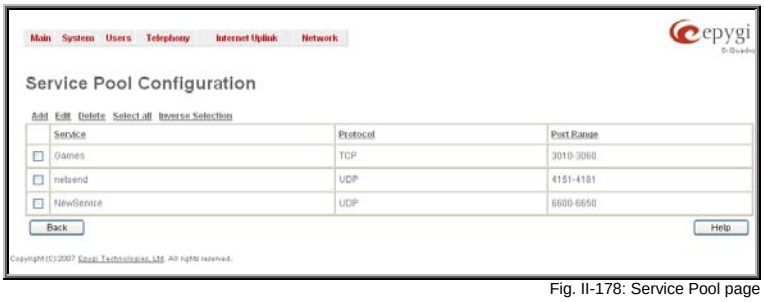


Fig. II-178: Service Pool page

The **Add** page is used to add new services and includes the following text fields and buttons:

Service Name requires a name for the service that should be added.

Protocol includes a list of possible protocols to be selected.

Port Range requires a port range for the defined service.

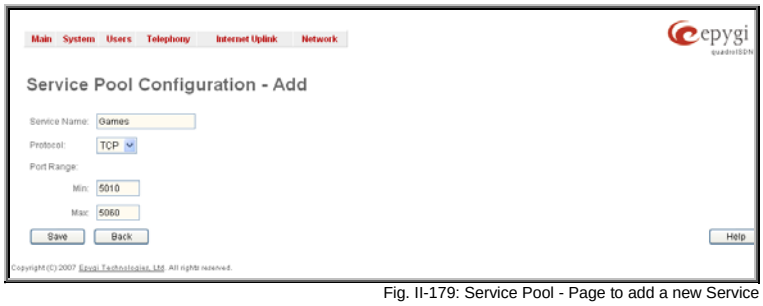


Fig. II-179: Service Pool - Page to add a new Service

To Add a new Service

1. Select the **Manage User Defined Services** link on the **Filtering Rules** page.
2. Click on the **Add** button on the **Service Pool Configuration** page. A page where a new service may be added will appear in the browser window.
3. Define a service name in the **Service Name** text field.
4. Select the protocol type for the service from the **Protocol** drop down list.
5. Enter the port range in the **Port Range** text fields or leave one of them empty to define a particular port for the service.
6. To add a service with these parameters, click on **Save**.

To Delete a Service

1. Select the **Manage User Defined Services** link. The **Service Pool Configuration** page appears with the table of services (if any).
2. Check one or more checkboxes of the corresponding services that should be deleted from the **Service Pool** table. Press **Select all** if all services should be deleted.
3. Click on the **Delete** button on the **Service Pool Configuration** page.
4. Confirm the deletion by clicking on **Yes**, or cancel by clicking on **No**.

IP Pool

The **Manage IP Pool Groups** link opens the **IP Pool Configuration** page.

The **IP Pool** table is the list of all added groups and the members assigned to these groups. If a group is empty, **EMPTY** will be indicated in the **Members** column. If hidden, the group members will still remain active but **HIDDEN** will be displayed in the **Members** column.

The **IP Pool Configuration** is used to add groups of IP addresses that have the same restriction criteria. When adding a new filtering rule, groups may be used instead of several IP addresses. **IP Pool Configuration** offers the following components:

View makes hidden groups visible.

Hide makes group members hidden and adds the **HIDDEN** comment in the member column.

Add opens the **Add Group** page where a new group may be added. This page consists of the **Group Name** text field (requiring the group name) and the **Group Description** text field (requiring the optional group description), as well as standard **Save** and **Back** buttons to apply or abort changes.

Edit opens the **Edit Group** page where the service parameters can be modified. It provides the same components as the **Add Group** page. To operate with **Edit**, only one record may be selected, otherwise the error message "One row must be selected" will appear.

Please Note: Changing a group name will also change the references to this group, including groups where this group is a member of, and all affected filter rules (enabled and disabled ones, in all chains). Deleting a group will also delete any reference to the corresponding group, including filter-rules and member relations to the other groups.

Clicking on the **Group** name will display an **IP Pool Group Configuration** page with the **Members** list for the current group.

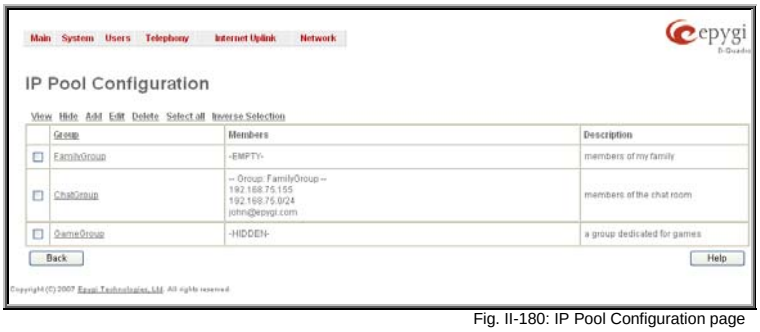


Fig. II-180: IP Pool Configuration page

Fig. II-181: IP Pool configuration – Add Group page

The **IP Pool Group Configuration** page displays a list of all the added member IP addresses for the selected group. It offers the following components:

Current Group provides read-only information about the current group name the members are listed for.

Add opens the **Add Member** page where a new member may be added.

Edit opens the **Edit Members** page where the service parameters can be modified. This page includes the same components as the **Add Member** page. To operate with **Edit**, only one record may be selected, otherwise the error message "One row must be selected" will appear.

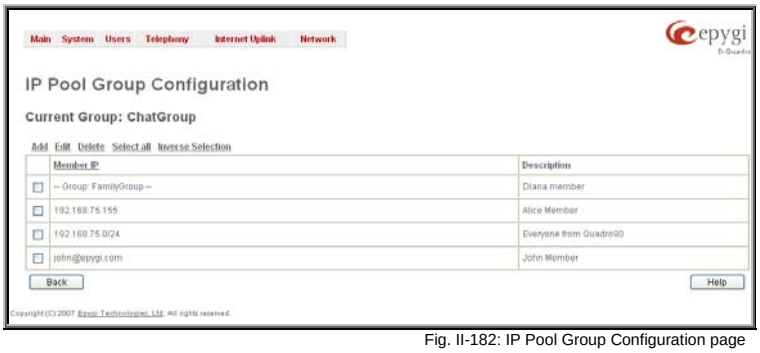


Fig. II-182: IP Pool Group Configuration page

The **Add Members** page provides the following radio buttons:

IPaddress requires the member IP address that is to be added to the group.

IP Subnet requires the subnet specified by the IP address and the Maskbits. See above for more information about Maskbits.

URL Address requires the member hostname to be added to the group.

The **User-defined Group** includes previously added groups that may also be added as a member to another group.

Member description text fields can be used to enter an optional description of the member.

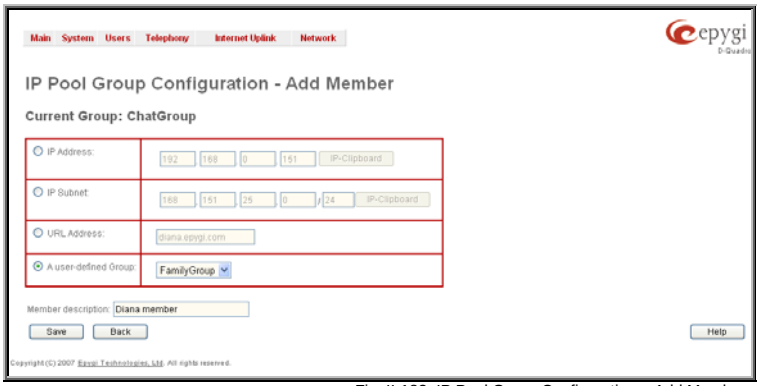


Fig. II-183: IP Pool Group Configuration – Add Member

To Add a new Group with Members

1. Select the **Manage IP Pool Groups** link on the **Filtering Rules** page.
2. Click on the **Add** button on the **IP Pool Configuration** page. A page where a new group may be added will appear in the browser window.
3. Define a group name in the **Group Name** text field and fill in the **Group Description**, if needed.
4. To add a group with the given parameters, press **Save**.
5. Open the **IP Pool Group Configuration** page by clicking on the group name.
6. Select the **Add** button on the **IP Pool Group Configuration** page. A page opens where new members may be added to the group.
7. Enter an IP address for the member in the **IP Address** text fields, select a IP subnet or IP group from the **User defined Group** drop down list to assign it to the currently selected group.
8. Enter a **Member Description** in the corresponding text field, if needed.
9. To add a member with these parameters to the selected group press **Save**.

To Delete a Member

1. Select the **Manage IP Pool Groups** link. The **IP Pool Configuration** page appears with the table of groups (if any).
2. Click on the desired members that should be deleted. The **IP Pool Group Configuration** list will appear.
3. Check one or more checkboxes of the corresponding members that should be deleted from the **Members** table. Press **Select all** if all members should be deleted.
4. Press the **Delete** button on the **IP Pool Group Configuration** page.
5. Confirm the deletion by pressing on **Yes** or cancel the deletion by pressing on **No**.

To Delete a Group

1. Select the **Manage IP Pool Groups** link. The **IP Pool Configuration** page appears with the table of groups (if any).
2. Check the one or more checkboxes of the corresponding groups that should be deleted from the groups table. Press **Select all** if all groups should be deleted.
3. Press the **Delete** button on the **IP Pool Configuration** page.
4. Confirm the deletion by pressing on **Yes** or cancel the deletion by pressing on **No**.

IDS Log

The **IDS logging** page contains information about dropped packets and the senders responsible for those packets. IDS discards dangerous packets or packets including intrusion attacks. It generates a table with the IDS log report. The administrator can be notified about newly logged entries in various ways (mail, display notification and Flashing LEDs) depending on the settings in the **Event Settings** page. To make an IDS log reporting table, IDS needs to be enabled on the IDS Log page.

The **IDS Logs** table is a list of new or read IDS entries and descriptions referring to them. The table provides a status row that has the value **New** if the entry is still unread or it is empty if the entry has already been read.

Mark All as Read marks all IDS logged entries as read and removes the **New** status from the **Status** row of the IDS entries table.

Delete Log is used to delete all entries from the IDS table.

A detailed log of the selected entry can be seen by clicking on the **Description** link of the corresponding entry in the **IDS Entries** table.

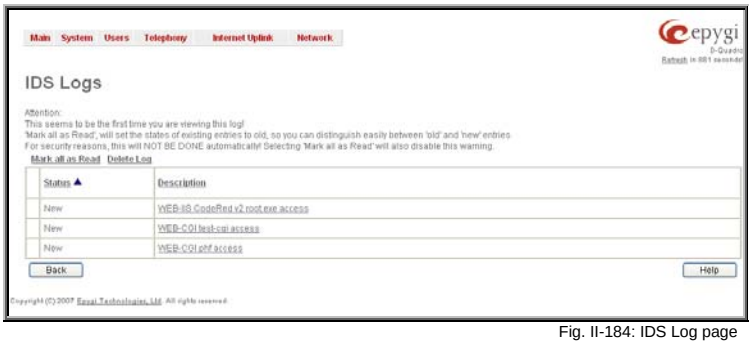


Fig. II-184: IDS Log page

The IDS Logs detailed page has a following preview:

The **Issue Detailed Log** table is a detailed list of new and read IDS entries. The table contains a **Status** row that has the value **New** if the entry is still unread or that is empty if the entry has already been read.

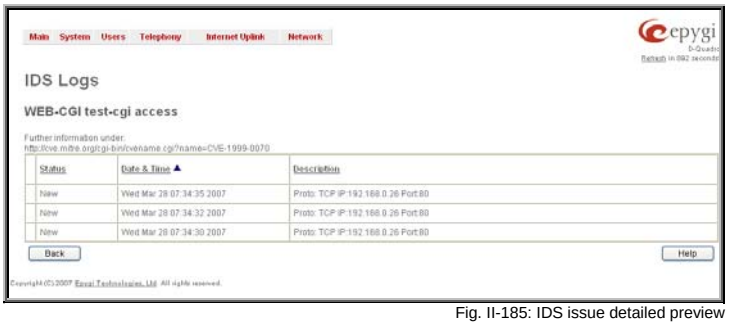


Fig. II-185: IDS issue detailed preview

Network Menu

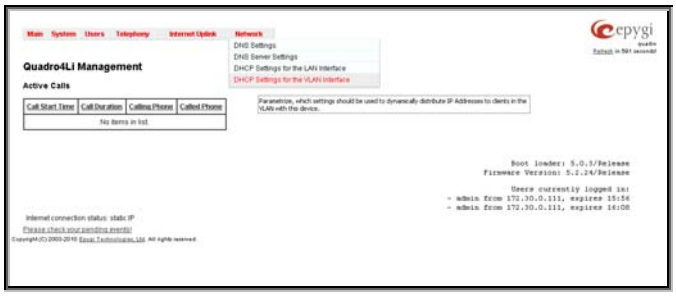


Fig. II-186: Network menu in Dynamo theme

Fig. II-187: Network menu in Plain theme

DNS Settings

The **DNS Settings** page provides the option of setting up a name server for the Quadro. It offers the following components:

The **Nameserver Assignment** radio buttons are as follows:

- The **Dynamically by provider** selection automatically configures the assignment of the name server address from the provider party.
- **Fixed Nameserver address** is a manually selected name server. The **Nameserver** text field requires the IP address of an external name server. The **Alternative Nameserver** text field requires the IP address of the secondary name server. The **Alternative Nameserver** is used if the main name server cannot be accessed.

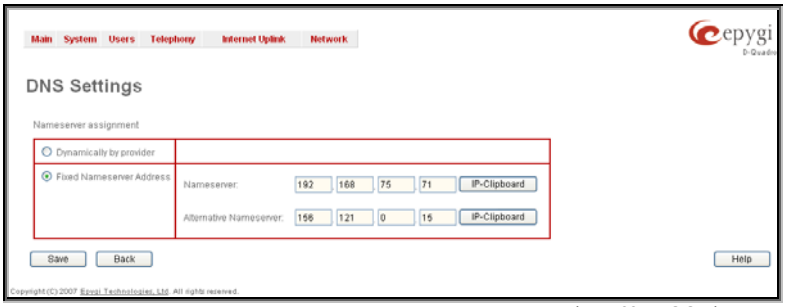


Fig. II-188: DNS Settings page

DNS Server Settings

The **DNS Server** on the Quadro provides the services to the hosts in the Quadro's LAN. With this service, Quadro returns the correct IP address to the requested domain name, so that any device in the LAN can be accessed by its hostname or alternative alias name.

The **DNS Server Settings** page is used to configure DNS server settings on the Quadro and to define a list of aliases for the devices in the Quadro's LAN. This page contains the following components:

Zone field displays the Quadro's host domain name as it is configured in the System Configuration Wizard.

Time to live (TTL) text field indicates the time (in seconds) during which the DNS server will keep the resolved names in its cache. During this time the same address will be resolved from the cache of the DNS server. When this timeout expires, the requested address will be resolved newly.

Mail Exchange (MX) text field indicates the mail server's hostname. When resolving the email address, the reference will go to the mail server defined in this field, before being sent out to the external network. The value in this field will be used in the MX record in the DNS server on the Quadro.

The table on this page lists aliases for each of the device in the Quadro's LAN to be resolves through the DNS server.

Fig. II-189: DNS Server Settings page

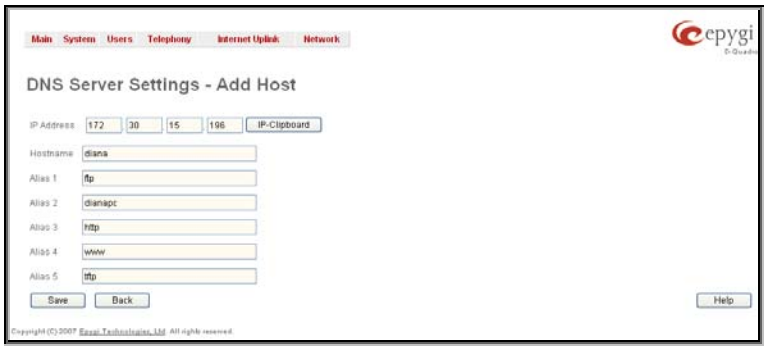


Fig. II-190: DNS Server Settings – Add Host page

Add functional link opens the page **Add Host** where a list of aliased can be defined for the certain device in the Quadro's LAN. The page contains the following components:

IP Address text fields require the IP address of the device in the Quadro's LAN.

Hostname text field requires the hostname of the device in the Quadro's LAN.

Alias text fields are used to enter up to 5 alias names by which the device in the Quadro's LAN will be resolved.

DHCP Settings for the LAN Interface

The **DHCP Settings** page provides the option of enabling a DHCP server and controlling the Quadro user's LAN settings. Therefore, Quadro LAN users will automatically be provided with the following settings using the configured parameters:

- IP addresses
- NTP (corresponds to the Quadro's IP address)
- WINS server
- Nameserver (corresponds to the Quadro's IP address)
- Domain name

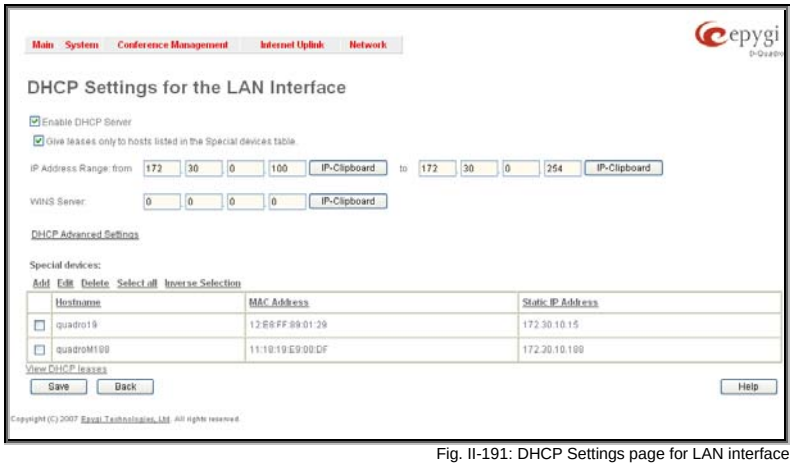


Fig. II-191: DHCP Settings page for LAN interface

The **DHCP Settings** page offers the following input options:

Enable DHCP Server checkbox activates the DHCP server on Quadro. With this checkbox enabled, Quadro will be able to assign dynamic IP addresses to the devices in its LAN.

Give leases only to hosts listed in the static MAC address binding table checkbox enables the DHCP services only for the devices listed in the table below. With this checkbox selected, no DHCP services will be provided to the other devices.

Please Note: When this checkbox is selected, all IP phones configured to use plug and play or auto configuration services (see IP Line Settings) will keep their IP addresses received from the DHCP server of the Quadro. The IP phones that are configured manually should be added to the **Special Devices** table to keep their IP addressed.

IP Address Range defines a range of IP addresses that will be assigned to the Quadro LAN users. The IP range must be at least 6, otherwise the error message "Address Range too small" will prevent it from being saved. The error message "Address Range too large" will appear if the IP range is greater than 254.

WINS Server defines a WINS server IP address for the Quadro LAN users.

The DHCP Advanced Settings link leads to the page where the advanced options of the Quadro's DHCP server can be configured.

The **Special Devices** table on this page allows you to set a static IP address binding on the MAC address of the device in the Quadro's LAN. When this table is configured, the devices with defined hostnames and MAC addresses will always get the same LAN IP address from the DHCP server. Otherwise, devices not listed in this table will get dynamic LAN IP addresses. This table is also displayed in the System Configuration Wizard.

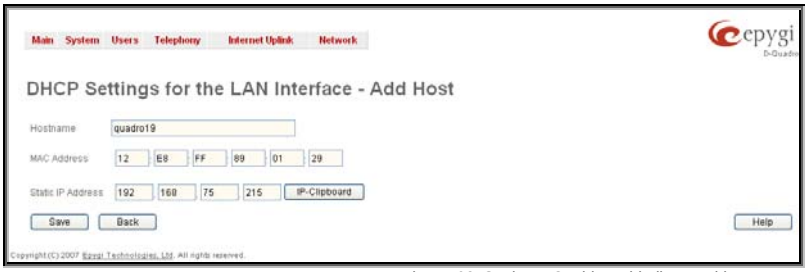


Fig. II-192: Static MAC address binding – Add Host page

Add functional button opens an **Add Host** page where a new static MAC address binding can be defined. The page consists of the following components:

Hostname text field requires the hostname of the device in the Quadro's LAN.

MAC Address text fields require the MAC address of the device in the Quadro's LAN.

Static IP Address text fields require a fixed IP address of the device in the Quadro's LAN.

Please Note: If you leave this field empty, the device in the Quadro's LAN will get the first available IP address from range defined in the **DHCP Settings** page (see above).

View DHCP Leases leads to the page where the DHCP leased LAN IP addresses are listed.

The **DHCP Leases** page includes a list of the leased host addresses that are part of the Quadro's LAN. For these hosts, Quadro acts as a server supplying them with a unique IP address. It displays a read-only table describing all the leased IP hosts and their parameters. The table contains the following columns:

IP address - host IP address, assigned by Quadro.

MAC address - host MAC address, provided by the host itself.

Lease Start - date and time when the leased IP address has been activated.

Lease End - date and time when the leased IP address has been or will be deactivated.

Binding State – indicates the state of the DHCP lease.

Hostname - hostname, provided by the host itself.

Fig. II-193: DHCP Leases page for LAN interface

DHCP Advanced Settings

The **DHCP Advanced Settings** page is used to modify the advanced options of the DHCP server on the Quadro. This page contains a table where a list of default DHCP server options is already defined. More options can be added from this page, as well as settings of the existing options can be modified. All options in the table on this page are then sent to the DHCP clients.

- The **Authoritative** checkbox is used to enable/disable authoritative mode on the Quadro DHCP server. Disabling the checkbox is recommended if several DHCP servers are used on the network and the Quadro should provide network parameters to IP phones only.
- The **Ping Check** checkbox enables checking the availability of an IP address on the network before providing it to a client. If this checkbox is selected, the Quadro will first ping an IP address retrieved from the IP pool and wait for a reply. If no a reply is received within a timeout specified in the **Ping timeout** text field (by default 1 sec), the retrieved IP address will be provided to the client. If otherwise, a new IP address will be retrieved from the IP pool and the procedure will be repeated. If this checkbox is not selected, the Quadro will provide an IP address immediately when requested.

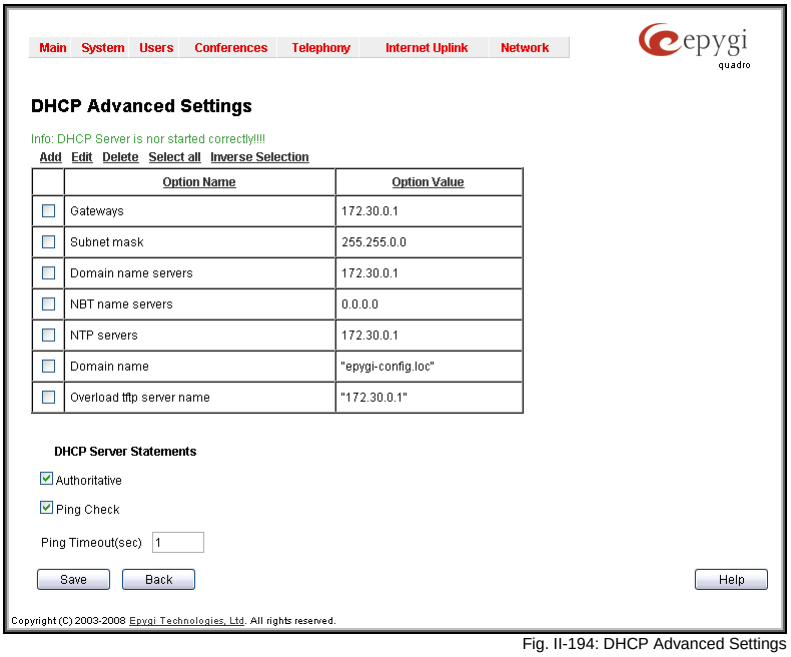


Fig. II-194: DHCP Advanced Settings

The following functional buttons are available:

Add opens a page **Add Entry** page where a new DHCP server option can be defined. The Add Entry page contains a group of manipulation radio buttons to select between the predefined DHCP server options or to define your own DHCP server option:

- **Predefined** - this selection allows you to select from the predefined DHCP server options.

  The **Option Name** drop down list contains the most common DHCP server options.

  The **Option Value** text field requires the value for the selected option. The type and format of the value inserted in this field is dependent on the option selected from the Option Name drop down list.

- **Custom** - this selection allows you to define a new DHCP server options. The following parameters are required to be inserted for a new option:

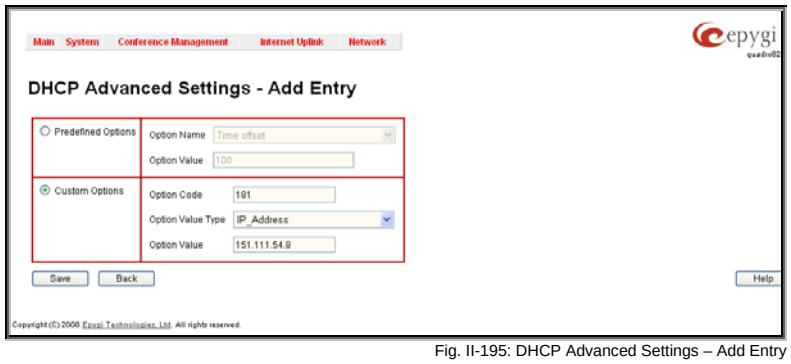


Fig. II-195: DHCP Advanced Settings – Add Entry

The **Option Code** text field is used to insert a code of the option. It may have values in a range from 0 to 255.

The **Option Value** Type drop down list is used to select the type of the option value. It may be an IP address, a boolean or integer value, etc.

The **Option Value** text field is used to insert the value of an option. Depending on the selected Option Value Type, this field should have the corresponding value. Warning messages will prevent saving if the value inserted in this field does not correspond to the requirements of the Option Value Type. If an array should be inserted here, the values should be separated with a comma.

DHCP Settings for the VLAN Interface

DHCP Settings for the VLAN Interface is used to establish virtual networks in the Quadro's LAN or to integrate the Quadro into the corporate network's virtual LAN/WAN. DHCP service can be activated both on virtual LAN or WAN interfaces. VLAN is useful in corporate companies to divide large networks into groups and to have devices like Quadros and IP phones in each network separated (for example, to separate networks for data and voice transmission). Priorities may be assigned to the interfaces for packets prioritization.

With VLAN configuration, each virtual network will be characterized with a VLAN ID (tag). Packets addressed to that network will be checked towards the ID and if the ID number defined in the incoming packets matched the corresponding network's ID, the packets will be accepted. Otherwise, if the ID does not match, the packets will be dropped. In the same way, if the Quadro is integrated into the network that uses VLAN technology, outgoing packets should have the ID number of the corresponding virtual network, for the remote party to accept the packets from the Quadro.

The **DHCP Settings for the VLAN Interface** page contains a table with all enabled VLAN interfaces created in VLAN Settings page (see below) and the corresponding parameters (VLAN ID, IP Address Range and WINS Server). This page contains the following components:

Enable DHCP Server checkbox activates the DHCP server on Quadro for VLAN. With this checkbox enabled, Quadro will be able to assign dynamic IP addresses to the devices in its VLAN.

Activate functional button is used to activate DHCP service on one of the VLAN interfaces in the list. Only one VLAN interface can have DHCP service activated.

Edit functional button opens a page where the corresponding VLAN interface can be configured and controlled. This page contains all the same components as the DHCP Settings for the LAN Interface page does.

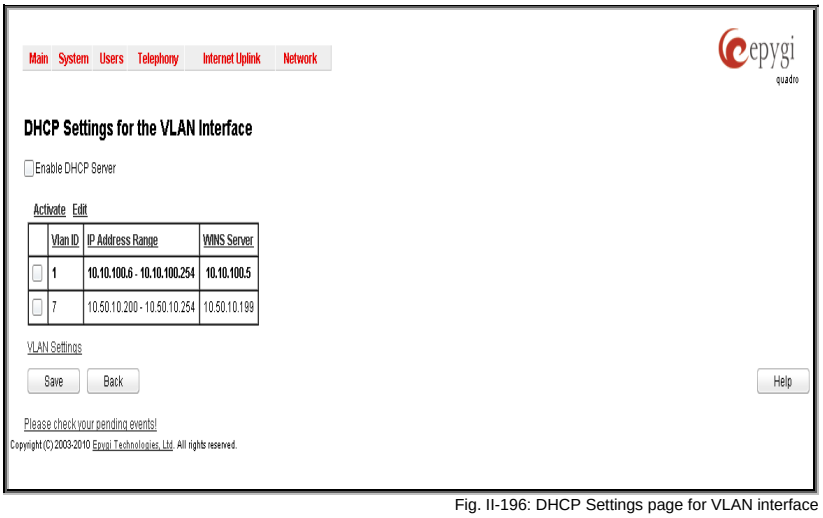


Fig. II-196: DHCP Settings page for VLAN interface

VLAN Settings link moves to the page where virtual LAN/WAN interfaces may be created.

VLAN Settings page lists all existing virtual interfaced created on the Quadro and allows you to create new interfaces.
Enable and **Disable** functional buttons are used to correspondingly enable and disable the selected virtual interface(s).

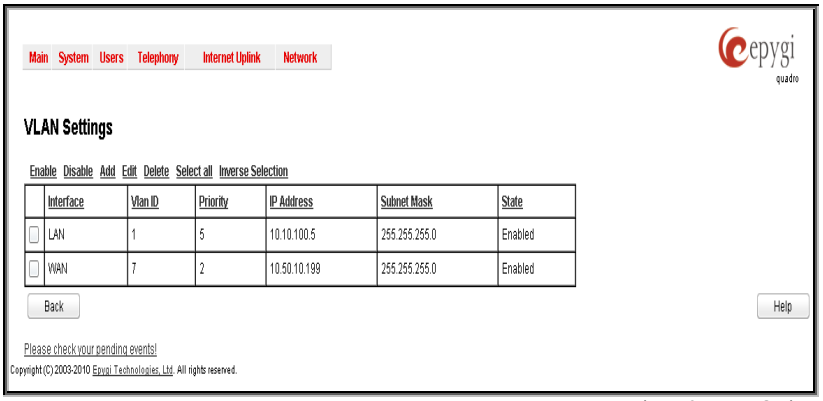


Fig. II-197: VLAN Settings

Add functional button opens an **Add Entry** page where a new virtual network can be defined. The page consists of the following components:

Enable checkbox is used to select whether the corresponding virtual interface will be enabled or disabled after it is created.

Interface Type manipulation radio buttons selection allows to choose whether the virtual interface will be LAN or WAN.

VLAN ID text field requires the virtual network ID. Numeric value in a range from 0 to 4094 is allowed in this field.

Priority drop down list is used to select the priority of packets in the corresponding interface. Packets with the lower priority (0) will be delivered first.

IP Address text field requires the IP address of the virtual interface.
Subnet Mask text field requires the subnet of the virtual interface.

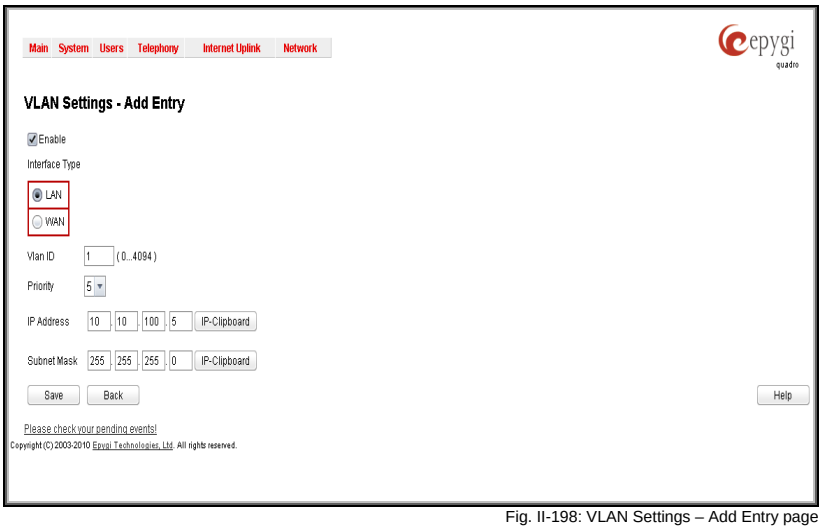


Fig. II-198: VLAN Settings – Add Entry page

Registration Form

The **Registration Form** page appears when administrating an unregistered Quadro, and it has been created for customer support purposes. The page requires customer registration at the Epygi Technical Support Center. It provides several links offering the following registration options:

Register now leads to the Epygi Technical Support System Registration page and requires customer's information to submit the Quadro registration form.

Remind me later hides the registration notification in the Quadro through System Configuration Wizard or Internet Configuration Wizard until the next administrating activities.

Don't remind me more hides the registration notification forever.

Fig. II-199: Device Registration page

Administrator's Additional Features

Incoming Call Blocking and Outgoing Call Blocking

The **Incoming Call Blocking** and **Outgoing Call Blocking** pages offer extended features for the administrator to activate incoming/outgoing call blocking services for certain callers. The users cannot change this information.

For more information on the **Call Blocking Settings** pages, see the Incoming Call Blocking and Outgoing Call Blocking chapters of the Extensions Users Guide - Manual III.

The **Call Blocking** pages accessed from the **Caller ID Based Services** table by clicking on the corresponding address, gives the administrator the option to enable blocking services which could not be disabled by the users.

Along with the components seen by the user, an additional **Protect this entry** checkbox is available in the **Call Blocking - Add Entry** pages for administrator access only. With this checkbox selected, the user will be unable to deactivate the blocking services configured by the administrator.

Fig. II-200: Blocking Page for the Administrator

Voice Mail Profiles

When the administrator accesses the **Voice Mail Settings** of an extension, there is an additional **Voice Mail Profiles** link present that leads to the page where custom voice mail profiles and their settings can be defined. This link is hidden for the extension user's access.
The **Voice Mail Profiles** page is used to define and configure custom voice mail profiles.

The **Voice Mail Profile** is a group of most common Voice Mail Settings which can be saved under a specific name. This allows you to have several versions of Voice Mail Settings configurations per extension.

Each Voice Mail Profile may have custom voice mail greeting, maximum voice mail duration, new voice mail notifications and Zero-Out settings. The Voice Mail Profiles are activated based on the call routing rule used to establish a call. This is limited to the **PBX-Voicemail** type of calls used for a direct access to the extension's voice mailbox. The Voice Mail Profile name should be provided in the Call Routing wizard when defining a PBX-Voicemail routing rule. When the rule is used, caller accesses the called extension's mailbox with the settings configured in the corresponding voice mail profile.

With this service, you can pre-configure several versions of Voice Mail Settings and save them as Voice Mail Profiles. For example, if a call is originated from the PSTN network to the corresponding extension's voice mailbox, the greeting message can tell the caller: "You have reached the ... company, please leave a message." and the maximum voice mail duration is configured to 15 minutes. This voice mail profile can be saved as "ForPSTN" and its name should be defined in the routing rule responsible for incoming PSTN calls distribution. In parallel to this voice mail profile, there can be another profile designed for internal PBX calls. It will play the following voice mail greeting: "Hi, you have reached Mike's voice mailbox, please drop me a message and I shall call you back.", the maximum voice mail duration is 5 minutes and there is a Zero-Out feature configured to call Mike's cellular phone. This voice mail profile can be saved as "ForPBX" and its name should be defined in the routing rule responsible for PBX calls distribution to the local extensions.

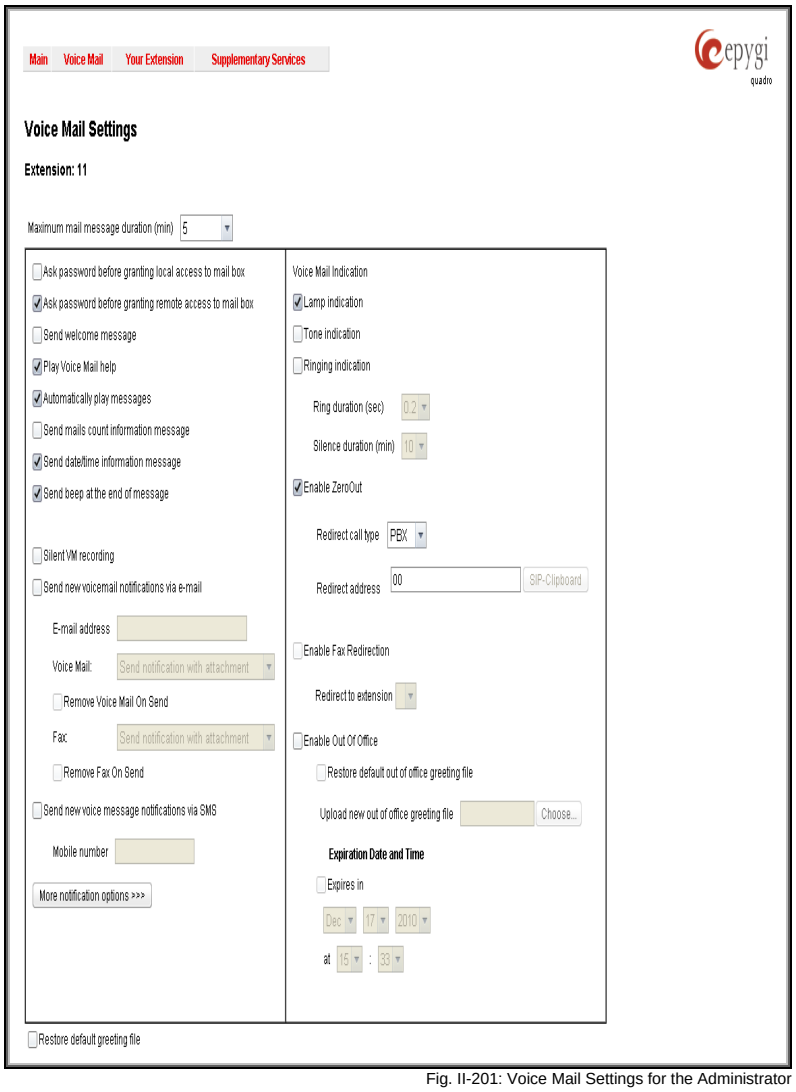


Fig. II-201: Voice Mail Settings for the Administrator

When the first routing rule is used and the call reaches the extension that has the corresponding voice mail profile, the settings of the ForPSTN voice mail profile will be activated. For the second routing rule, when the call reaches Mike's voice mailbox, the settings of the ForPBX voice mail profile will be activated.

The same profile name can be used to create profiles for different extensions. This is useful if the profiles have a similar purpose but differ in certain user-specific settings, such as voice mail greeting, Zero-Out destination number, new voice mail notification options, and so on. Creating multiple profiles with the same name gives a wide flexibility to have different voice mail settings activated depending on which extension is called.

Please Note: If an extension does not have a profile specified in a call routing rule or the specified profile name is incorrect, the default Voice Mail Settings of the extension will be used.

The **Voice Mail Profiles** page contains a table where all Voice Mail Profiles for the corresponding extension are listed. The the following functional buttons are available:

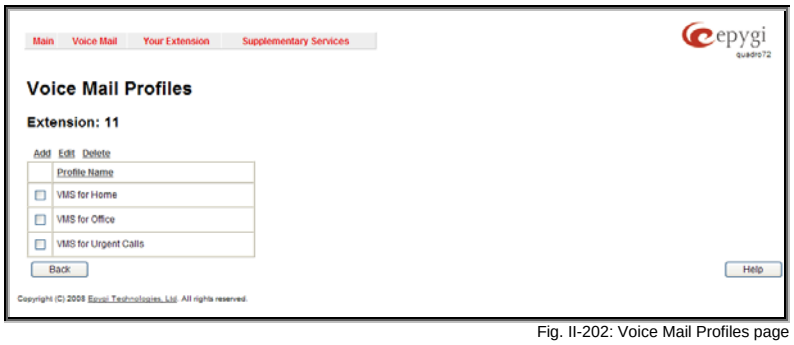


Fig. II-202: Voice Mail Profiles page

Fig. II-203: Voice Mail Profiles – Add Entry page

Add opens the **Add Entry** page where a new **Profile Name** should be defined.

Edit opens the **Edit Entry** page where **Voice Mail Profile** settings should be defined.
The **Voice Mail Profiles - Edit Entry** page is used configure the profile specific voice mail settings. This page contains the following components:

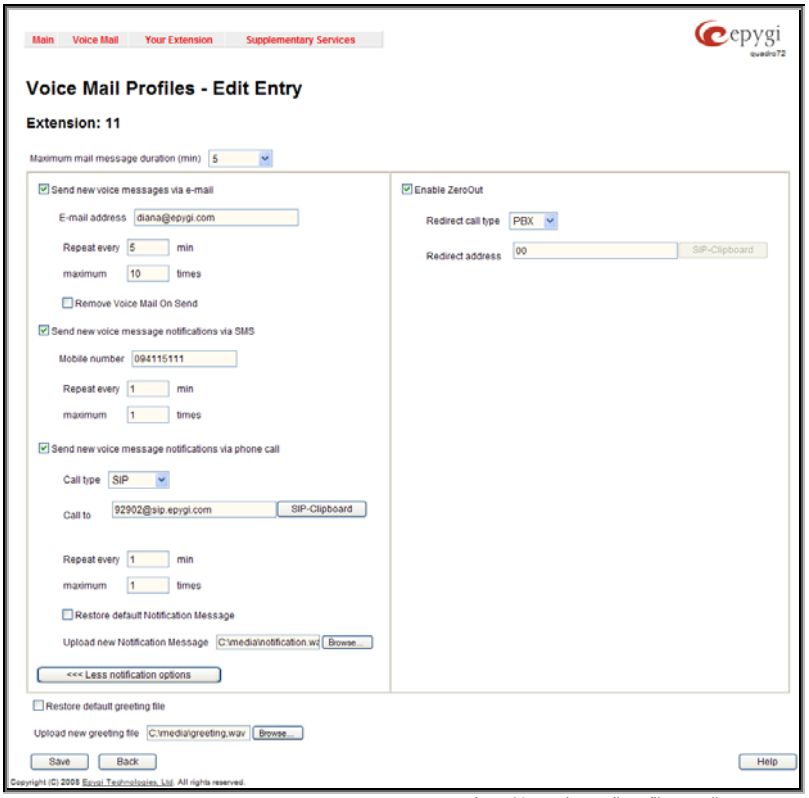


Fig. II-204: Voice Mail Profiles – Edit Entry page

Maximum Mail Message Duration lists the possible values for maximum mail duration (counted in minutes) during which a voice mail will be recorded. The **Unlimited** selection allows voice message to be recorded as long as the user's space could hold.

Send new voice message via email is an option to send new voice mail files via e-mail to the defined recipients. Mails will be automatically converted to the Windows PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format before being attached to the e-mail. Checkbox activates the following input options:

- **Email Address** requires the mailing address(s) of the person(s) that should to receive the newly arrived voice mails on their email accounts. Use a space or a comma to separate the mailing addresses in the text field.
- The next two fields are used for retransmission of voice mails via email. **Number of times** text field requires the maximum number of times the voice mail will be delivered via email to the recipient within the interval (in minutes) defined in the **Repeat every** text field. If the voice mail is required to be sent only once, insert "1" in **Repeat every** text field and "0" in the Number of times text field.
- **Remove Voice Mail on send** removes the voice mail from the user mailbox after sending it to the email recipient(s).
- **Remove Fax On Send** removes the fax attachment from the user mailbox after sending it to the email recipient(s).

Attention: The e-mail can only handle up to 3 minutes long voice mails. If the voice mail is longer than 3 minutes, it will be truncated and only the first 3 minutes of it will be sent to the indicated e-mail address. However, in the e-mail body the recipient will receive the information that the attached voice mail is truncated and the total length of the voice mail. Please note that the voice mails longer than 3 minutes will not be removed from the voice mailbox once they are sent per e-mail even if the **Remove Voice Mail on send** checkbox is selected. This gives you a possibility to listen to the ending of the voice mail directly from your voice mailbox (from the handset or by downloading it from the Web management).

Please Note: This service will work only when System Mail is enabled on the Quadro (see Mail Settings). Contact your system administrator, if you have problems with voice mail delivery via email.

Send new voice message notification via SMS allows voice mail notification delivery via SMS to the defined mobile number. Checkbox activates the following input options:

- **Mobile Number** text field requires the destination's mobile number.
- The next two fields are used for retransmission of SMS notifications. The **Number of times** text field requires the maximum number of times the notification should be delivered to the recipient within the interval (in minutes) defined in the **Repeat every** text field. If notification is required to be sent only once, insert "1" in **Repeat every** text field and "0" in the **Number of times** text field.

Please Note: This service will work only when SMS Service is enabled on the Quadro (see SMS Settings). Contact your system administrator, if you have problems with voice mail notifications delivery via SMS.

Send new voice message notification via phone call enables the voice mail notification delivery via phone call to the defined phone number. The checkbox activates the following input options:

- **Call Type** drop down list includes the available call types:
  PBX - local calls to Quadro extensions;
  SIP - calls through a SIP server;
  Auto - for undefined call types. Destination (independent on whether it is a PBX number or SIP address) will be reached through Routing;

Callback - automatic call to the voice mail author. This can be used as notification that the recipient has received the voice mail but has not yet played it.

- **Call To** text field requires the destination's phone number depending on the selected call type. For Callback call type, no destination's phone number is required.
- The next two fields are used for retransmission of phone notifications. The number of times text field indicates the maximum number of times the notification should be delivered to the recipient within the interval (in minutes) defined in the **Repeat every** text field. If the notification is specified to be sent only once, insert "1" in **Repeat every** text field and "0" in the Number of times text field. For **Callback** call type, the first notification is sent to the voice mail author after the first expiration of the interval defined in the **Repeat every** text field. For calls with call type different from Callback, the first notification will be sent immediately.
- **Restore default Notification Message** restores the default notification message. If the checkbox is selected, the file upload will be disabled.
- **Upload new Notification Message** will show the attached notification file selected by the current extension. Please note that a different notification message can be uploaded in case this service serves as a notification to the extension user (to inform about the new voice mail received) or if it serves as a notification for the voice mail author to be informed that the message has been received by the Quadro but is not yet played by the extension user). The uploaded file needs to be in the PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format, otherwise the system will prevent uploading with the "Invalid audio file, or format is not supported" warning message. The system also prevents uploading in case not enough space is available on Quadro for the corresponding extension and gives a "You do not have enough space" warning.
- **Browse** browses for the notification file that must be in PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format.
- **Download Notification Message** appears only if a file has been uploaded previously. The link is used to download the audio file to the PC and opens the file-chooser window where the saving location can be specified.

The **ZeroOut** voice mail feature allows a caller that has reached the called extension's voice mailbox to accelerate the automatic redirection feature instead of leaving a message in the extension's Voice Mailbox. To activate this feature, the caller should dial **0** digit (see Feature Codes) during the voice mail greeting which invites the caller to leave a message. The caller will then be automatically transferred to the destination specified in this page.

Enable ZeroOut checkbox selection enables the ZeroOut feature and activates the following fields to be inserted:

- **Redirect Call Type** drop down list includes the available call types:
  PBX - local calls between Quadro extensions and the Auto Attendant
  SIP - calls through a SIP server
  PSTN - calls through the ISDN
  Auto - used for undefined call types. Destination (independent on whether it is a PBX number, SIP address or PSTN number) will be reached through Routing.
- **Redirect Address** text field requires the destination address where caller should be automatically forwarded in case of activating the ZeroOut feature.

Restore Default Greeting File will restore the default greeting file. If the checkbox is selected, the file upload will be disabled.

Upload New Greeting File shows an attached greeting file selected by the current user. The greeting file will be played to a caller party when it is entering the voice mail system. The uploaded file needs to be in PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format, otherwise the system will prevent uploading and the "Invalid audio file, or format is not supported" warning message will be received. The system also prevents uploading in case not enough space is available on Quadro for the corresponding extension. In this situation, the "You do not have enough space" warning will be received. Optionally, greeting file can be recorded from the phone handset (see Feature Codes).

The **Browse** button helps to choose the desired greeting file that should be in PCMU (CCITT u-law, 8 kHz, 8 bit Mono) wave format.

Download Greeting File appears only if a file has been previously uploaded. The link is used to download the audio file to the PC and opens the file-chooser window where the saving location can be specified.

Logout

This option is used to close the session between the user PC and Quadro and to leave the Quadro Web Management or to enter the management with another login. By selecting the **Logout** button, the startup page will be displayed and the user needs to login again.

PBX Services for Quadro's Administrator

The following **PBX Services** are accessible at the dial tone, characterized by beginning with the key *:

Administrator Login Allows to modify Auto Attendant greeting and menu messages, as well as to manage universal extension messages.	*75
Enabling/disabling the Call Routing rules Allows managing the routing entries in the Call Routing table, i.e. to enable/disable certain dialing rules by dialing key combinations pre-configured on each routing entry. By dialing *77, you will be required to dial enabler/disabler key to enable or disable the routing rule(s) correspondingly. Since multiple routing rules may have the same enabler/disabler key combinations (the same key may be used as enabler for one routing rule, and as disabler for another one), dialing the certain key will affect all pre-configured routing rules. If the routing record has an authorization enabled on the enabler/disabler key, administrator's password will be required to be inserted after the key. Once the administrator's password is dialed, system plays a confirmation about the accepted configuration and the state of the certain routing rule(s) is getting modified. If administrator's password has been inserted incorrectly for 3 times, no status changes will be applied to any of the routing record(s), even to those which have no authorization enabled.	*77

Administrator Login menu has the following sub-menus and the management keys:

***75 Administrator's Login**

1 Auto Attendant Greeting	2 Auto Attendant Menu Message	3 Universal Extension Messages				
		1 Greeting Message	3 Incoming Blocking Message	4 Outgoing Blocking Message	5 Your Name	6 Out of Office Message
Dial **AA Number** (in case of multiple AAs on the Quadro)	Dial **AA Number** (in case of multiple AAs on the Quadro)					
1 Listen to Current AA Greeting	1 Listen to AA Menu Message	1 Listen to Current Greeting Message	1 Listen to Current Incoming Blocking Message	1 Listen to Current Outgoing Blocking Message	1 Listen to Current Name recorded	1 Listen to Current Out of Office Message
2 Record a New AA Greeting	2 Record a New AA Menu Message	2 Record a Universal Greeting Message	2 Record a Universal Incoming Blocking Message	2 Record a Universal Outgoing Blocking Message	2 Record a Universal Name	2 Record a Universal Out of Office Message
3 Restore Default AA Greeting	3 Restore Default AA Menu Message	3 Restore System Default Greeting Message	3 Restore System Default Incoming Blocking Message	3 Restore System Default Outgoing Blocking Message	3 Restore System Default Name	3 Restore System Default Out of Office Message
# Stop Recording or Playback	# Stop Recording or Playback	# Stop Recording or Playback Greeting Message	# Stop Recording or Playback Incoming Blocking Message	# Stop Recording or Playback Outgoing Blocking Message	# Stop Recording or Playback Name Message	# Stop Recording or Playback Out of Office Message

*0 Administrator's Logout

Appendix: Extension User's Welcome Page

This welcome page may be helpful, if administrators want to inform their extension users about individual data, they need to use the extensions. Such as phone numbers, phone lines, IP addresses and SIP numbers. To get a word form that may be edited and sent by mail, double-click on the paperclip sidewise.

Welcome

You are using a **Quadro4Li IP PBX** made by Epygi Technologies, Ltd. This product incorporates SIPVoice™ Digital Signal Processing technology to send crystal clear voice around the globe without associated fees for long distance. But, you will soon learn, it does much more. Your **Quadro IP PBX, The Global Phone Network in a Box**, operates in much the same way as systems with which you are already familiar: a telephone, a PBX, voice mail, a phone book, et cetera. Beyond that the **Quadro4Li IP PBX** provides capabilities you never believed were accessible in a customer premise telephony product. Soon you will experience the freedom and power of the **Quadro4Li IP PBX, The Global Phone Network in a Box.**

To get started the following information is helpful.

PHONES

Your extension number is **<extension number>** and your password is **<password>** (optional).

Remember to type the **Auto Attendant number** when you pick up your phone receiver to find THE WELCOME SPOT. ***0** will take you directly to voice mail for your extension. ***74** will confirm your extension number.

LOCAL PHONE LINES

The Quadro4Li offers 4 external phone lines. They are:

<1. local phone line> **<2. local phone line>** **<3. local phone line>** **<4. local phone line>**

IP

To reach your Quadro Voice Router from a network connection inside your office, home or place of utilization, connect a Web browser to **IP address: <IP address>** (172.30.0.1 is the default IP address).

The email address of your Quadro Voice Router System Administrator is **<email address>**

The phone number of your Quadro Voice Router System Administrator is **<phone numbers>**

SIP

Your SIP number (an Internet phone number) is **<SIP number>**@sip.epygi.com.

This is a number you can give others in order for them to reach you.

The SIP number to reach the Auto Attendant of your local Quadro is **<SIP number>**@sip.epygi.com.

Your SIP group link which provides you a phone directory of numbers to call is:

http://www.epygi.com/sip/grp_view.php?viewgrp=**<groupname>**

The email address of your SIP System Administrator is **<email address>**

The phone number of your SIP System Administrator is **<phone numbers>**

Appendix: System Default Values

Administrator Settings

Parameter	System Default Value
Admin Settings	Login name -admin Password - 19
Quadro Hostname	quadro
Quadro Domain Name	epygi-config.loc
LAN IP Address	172.30.0.1 Subnet Mask - 255.255.0.0
DHCP Server	Disabled. No special devices defined.
Regional Settings and Preferences	Locale – US, TimeZone – Central Time (US&Canada), Theme – Dynamo, Theme on Login – disabled.
Emergency and PSTN codes	Emergency code -911, PSTN code – 9.
WAN Interface Protocol	Ethernet
WAN Interface Bandwidth	Upstream – 10000, Downstream – 10000, Min Data Rate – 0.
WAN IP	Automatically through DHCP
Mac Address	Assigned by device, MTU - 1500 Bytes.
DNS Server	Dynamically
System Security Management	Security Level-Medium Enable SIP IDS 1-disabled
IP Routing Configuration	No Routes
Configuration Management	Automatically Backup Configuration – disabled Automatic Firmware Update – enabled, Server Configuration – Assign manually, Server Name – ftp.epygi.com, Server Port – 21, Update Method – ftp, Username and Password – empty, Check and notify – Every day at 0:00.
Event Settings	”Display notification” for all except Login and Firmware Update. Those events have “Do nothing” action assigned.
Time/Date Settings	NTP Server and Client – enabled, Predefined NTP Server - ntp1.epygi.com, Polling interval – 6.
Mail Settings	System Mail Settings-disabled, SSL-disabled , Enable SMTP Authentication-disabled, User Name-empty, User Password-empty
SMS Settings	Disabled
SNMP Settings	SNMP - disabled, no SNMP traps defined.
System Logs Settings	User Logging – enabled, Developer Logging – disabled, Archived Logging – disabled, Remote Logging – disabled.
Features	3pcc support – no key found IP phone support - no key found QCM support – no key found
Language Pack	Default - English Custom Language Pack – none
User Rights Management	Users - admin (enabled), localadmin (disabled). Roles - Extension (all accessible pages for extension), Local Administrators (all accessible pages for localadmin). GUI Access Password-Old Password(empty), New Password(empty), Confirm New Password(empty). Phone Access Password- Old Password(empty), New Password(empty), Confirm New Password(empty).

Parameter	System Default Value
Extensions Management	Extension Length – 2, once applied extensions 00, 11-28 appear All extensions are shown
Extension Settings – General	Display name – none, Password – empty, 11-28 extensions attached to the IP lines 1-18, Use Kickback - disabled, Call Relay – disabled, Login Allowed-disabled, Show on Public Directory – disabled, Percentage of Total Memory – 5%.
Extension Settings – SIP	Registration username and password - automatically generated, SIP server - sip.epygi.com, SIP Server port – 5060, SIP Server Registration – enabled for extensions 11-20, disabled for extensions 21-28.
Extension Settings – SIP Advanced	Authentication User Name – undefined, Send Keep-alive Messages to Proxy – disabled, RTP Priority Level – medium, Do Not Use SIP Old Hold Method – disabled, Outbound Proxy, Secondary SIP Server and Outbound Proxy for Secondary SIP Server – undefined, Secondary SIP Server Port - 5060.
Extension Settings – Remote	Remote Extension – disabled
Extension Settings – Call Queue	Call Queue – disabled
Extension Settings – Voice Mailbox	Voice Mailbox - Internal Voice Mail, Configuration Wizard Status – activated.
Extension Settings – Licensing	QCM License – inactive.
Extension Settings – Codecs	Codecs - G711u (preferred), G711a, G729a – enabled, G726/16, G726/24, G726/32, G726/40, iLBC – disabled, Out of Band DTMF Transport – enabled, T.38 FAX – disabled, Pass Through FAX – disabled, Pass Through Modem – disabled, Force Self Codecs Preference for Inbound Calls - disabled.
Attendant 00 Settings – General	Display name – Attendant, FAX forwarding – disabled, Show on Public Directory – enabled, Percentage of System Memory – 5%.
Attendant 00 Settings – Attendant Scenario	Scenario – default, Send AA digits to Routing Table – disabled, Redirection on Timeout – disabled, Welcome Message – enabled, Welcome Message, Recurring Attendant Prompt and Attendant Ringing Announcement – default,
Attendant 00 Settings – SIP and SIP Advanced	Same as for an extension.
Attendant 00 Settings - Codecs	Codecs - G711u (preferred), G711a, G726/16, G726/24, G726/32, G726/40, G729a, enabled, iLBC – disabled, Out of Band DTMF Transport – enabled, T.38 FAX – disabled, Pass Through FAX – disabled, Pass Through Modem – disabled, Force Self Codecs Preference for Inbound Calls - disabled.
Universal Extension Recordings	Default, Percentage of System Memory – 1%.
Receptionist Management	No entries
Extension Directory	No entries
Authorized Phones Database	No entries

Parameter	System Default Value
Call Statistics	Enabled, 100 entries for all type of calls. Automatic Downloading of Call Statistics – disabled.
SIP Settings	UDP and TCP Port – 5060, Session Timer – disabled, TLS Port-empty DNS Server for SIP – default, SIP timers – RFC 3261.
RTP Settings	Properties for all Codecs except iLBC : Packetization -20ms Silence Suppression -yes iLBC properties: Packetization - 30ms Silence Suppression – yes G.726 Standard - ITU-T specification RTP/RTCP port range - 6000-6099 RTCP Support - disabled
NAT Traversal Settings	NAT Traversal for SIP – Automatic SIP and RTP Parameters - Use STUN SIP TCP Port – 5060 STUN Parameters: Primary STUN Server - stun.epygi.com Primary STUN Port – 3478 Secondary STUN Server – undefined Secondary STUN Port - undefined Polling Interval: 1 hour Keep-alive interval: 120 seconds NAT IP checking interval: 300 seconds No entries in NAT Exclusion table
Line Settings	IP Lines Configuration: PnP for IP lines – enabled, Firmware version control – enabled, Connect IP phones from WAN side - enabled, 1-18 IP Lines attached to 11-28 extensions. IP Lines 1-10 enabled, others enabled for a trial period. All IP lines are in inactive mode.
ISDN Settings	ISDN Trunks - Trunk 1, Trunk 2, Trunk 3 and Trunk 4 exist. Settings for all Trunks: State – started, Interface Type – User, Connection Type - PTMP(Point To Multi Point), Service Type – No MSN, Route Incoming Call to - 00, Use Default outgoing Caller ID – enabled, Default outgoing MSN – undefined, Advanced Settings – disabled.
Gain Control Settings	ISDN Trunks: Transmit Gain: 0 Receive Gain: 0 Voice Mail: Recording Gain: 0 Playback Gain: 0
SIP Tunnel Settings	Enable Trunks to Slave Devices – disabled, Trunks to Slave Devices – no entries, Enable Trunks to Master Devices – disabled, Trunks to Master Devices – no entries.
Call Routing	Route all incoming SIP calls to Call Routing - disabled Local Routing table - 4 entries defined for PBX, SIP, PSTN and emergency calls establishment. Local AAA Table - no entries.
RADIUS Settings	RADIUS client – disabled.
Voice Mail Common Settings	Voice Mail Recording - G729a.
Dial Timeouts	4 seconds.
3PCC Settings	Secure Connection – disabled, Request Timeout – 10, Feature Key – not installed, WAN port – not open.
Key System Emulation	8 SLA lines – inactive.

Parameter	System Default Value
Key System Emulation – Advanced Configuration	Blind transfer to VM – disabled, Blind transfer to extension – disabled.
RTP Streaming Channels	Undefined.
Advanced Settings for SLAs	Unconditional Call Forwarding – disabled, No Answer Call Forwarding – disabled.
IPSec, PPTP and L2TP	No connections. PPTP Server Configuration Subnet – 172.31.1.0/24, Authentication - MSCHAPv2, MPEE 128 bit L2TP Server Configuration Subnet – 172.31.2.0/24.
Dynamic DNS	Disabled
Firewall	Firewall – disabled, Ping Stealth - enabled Fool Portscanner - disabled
IDS	Disabled.
NAT	Disabled.
Filtering Rules	Outgoing Traffic - MS File Sharing (Blocked for all), SIP Access (Allowed for all), No user defined services and IP pool groups
DNS Server Settings	Time to live (TTL) – 86400 seconds, Mail Exchange (MX) – undefined, No aliases defined.
DHCP Advanced Settings	DHCP Options: Gateways – 172.30.0.1 Subnet mask – 255.255.0.0 Domain name servers – 172.30.0.1 NBT name servers – 0.0.0.0 NTP servers – 172.30.0.1 Domain name – epygi-config.loc Overload tftp server name – 172.30.01 DHCP Server Statements: Authoritative – enabled, Ping Check – enabled, Ping Timeout – 1 sec.
VLAN Settings	Undefined.

Extension Settings

Parameter	System Default Value
Voice Mail Settings	Maximum mail message duration - 5 min, Ask password before granting local access to mail box – disabled, Ask password before granting remote access to mail box – enabled, Send welcome message – disabled, Play Voice Mail help – enabled, Automatically play messages - enabled, Send mails count information message – disabled, Send date/time information message – enabled, Send beep at the end of message – enabled, Silent VM recording – disabled, Send new voice messages via e-mail – disabled, Voice Mail-Send notification with attachment Remove Voice Mail On Send-disabled Fax- Send notification with attachment Remove Fax On Send-disabled

Parameter	System Default Value
	Send new voice message notifications via SMS – disabled, Send new voice message notifications via phone call – disabled, Voice Mail Indication - Lamp indication, Zero Out – enabled, to 00 default Attendant, FAX Redirection – disabled, Out of Office – disabled, Greeting message – default, Profiles for Voice Mail Settings – no entries.
Group List	No entries
Speed Calling	No entries
Account Settings	Display Name – undefined, User Password Protection – disabled both for incoming and outgoing calls, User's Name for Extensions Directory – default, Custom Voice Messages – default.
Caller ID Based Services	No entries in the table. For Any Callers – all services disabled, Intercom - Activate If Requested. Blocking Voice Messages – default.
Basic Services - General	No answer timeout – 20 sec, Call Waiting Service – enabled, Autoredial Interval - 10 sec, Autoredial Period - 15 min.
Basic Services - Hold Music	Send Hold Music to remote party – disabled, Hold Music - Own Music. Music file – default
Basic Services - Do Not Disturb	Disabled. Timeout - 30 min, Send message to Caller Party – enabled.

Appendix: Software License Agreement

EPYGI TECHNOLOGIES, LTD.
Software License Agreement

THIS IS A CONTRACT.
CAREFULLY READ ALL THE TERMS AND CONDITIONS CONTAINED IN THIS AGREEMENT. USE OF THE QUADRO HARDWARE AND OPERATIONAL SOFTWARE PROGRAM INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE TO THESE TERMS AND CONDITIONS, YOU MAY NOT USE THE HARDWARE OR SOFTWARE.

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9. **Compliance With Laws.** You may not use the Licensed Materials for any illegal purpose or in any manner that violates applicable domestic or foreign law. You are responsible for compliance with all domestic and foreign laws governing Voice over Internet Protocol (VoIP) calls.

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11. **Entire Agreement.** It is understood that this Agreement, along with the Quadro Installation Guide and User's Manual, constitute the complete and exclusive agreement between you and the Licensor and supersede any proposal or prior agreement or license, oral or written, and any other communications related to the subject matter hereof. If one or more of the provisions of this Agreement is found to be illegal or unenforceable, this Agreement shall not be rendered inoperative but the remaining provisions shall continue in full force and effect.

12. **No Waiver.** Failure by either you or the Licensor to enforce any of the provisions of this Agreement or any rights with respect hereto shall in no way be considered to be a waiver of such provisions or rights, or to in any way affect the validity of this Agreement. If one or more of the provisions contained in this Agreement are found to be invalid or unenforceable in any respect, the validity and enforceability of the remaining provisions shall not be affected.

13. **Governing Law.** This Agreement shall be governed by and construed in accordance with the laws of the state of Texas, without regard to choice of law provisions that would cause the application of the law of another jurisdiction.

14. **Attorneys' Fees.** In the event of any litigation or other dispute arising as a result of or by reason of this Agreement, the prevailing party in any such litigation or other dispute shall be entitled to, in addition to any other damages assessed, its reasonable attorneys' fees, and all other costs and expenses incurred in connection with settling or resolving such dispute.

    If you have any questions about this Agreement, please write to Epygi at 6900 North Dallas Parkway, Suite 850, Plano, Texas 75024 or call Epygi at (972) 692-1166.