
Auto-Configuration of Quadro LAN IP Phones



Abstract: This document describes the steps required to complete on the Quadro and a SIP phone connected to the Quadro's LAN to automatically configure the phone to work with the Quadro. The Quadro supports the automatic configuration of certain SIP phones only, which will be referred as supported SIP phones. The complete list of the supported SIP phones is presented in this document.

Table of Contents:

1	Introduction	3
2	References.....	3
3	Requirements and Preparations.....	3
4	Supported SIP Phones	4
5	IP Line Configuration on the Quadro	5
	5.1 Select an Extension with an IP Line Attached	5
	5.2 Configure the Attached IP line	6
6	IP Phone Configuration	8
	6.1 Reset and Restart the Phone to Complete the Automatic Configuration	10
	6.1.1 Elmeg IP290	10
	6.1.2 Snom320	10
	6.1.3 Snom360	10
	6.1.4 Polycom SoundPoint IP 300SIP	11
	6.1.5 Cisco IP Phone 7960	11
	6.1.6 Swissvoice IP 10S.....	11
	6.1.7 IPDialog SIP Tone II (ST201)	12
	6.1.8 Aastra 480i.....	14
	6.1.9 Sipura SPA-841 IP	14
	6.2 Verifying Configuration	14
7	Restrictions and Limitations.....	14
8	Troubleshooting.....	14
9	Appendix Linux-based DHCP configuration file.....	15

1 Introduction

Quadro2x/4x/16x provides the possibility of using IP phones along with standard analogue phones. IP phones are connected to the Quadro LAN interface via Ethernet and serve as additional extensions similar to onboard FXS extensions (see Figure 1). For how to use the Quadro PBX features on IP phones, see **Quadro features on IP Phones V3-1**.

Starting with software version 3.1, the Quadro provides enhanced IP phone support. This feature simplifies the configuration procedure for certain SIP phones (hereafter referred as **supported SIP phones**) by eliminating the necessity for manual configuration on IP phones. The user needs to configure only the Quadro (see [IP Line Configuration on the Quadro](#)), and then reboot/restart the IP phone to make it functional like a standard FXS extension.

Rebooting/resetting the IP phone to complete the auto-configuration is sufficient when the IP phone is using the Quadro as the DHCP server (recommended configuration). If this is not the case, i.e. the IP phone is using a DHCP server other than the Quadro's built-in DHCP, certain configuration changes on the DHCP server will also be required (see [IP Phone Configuration](#)).

This document describes how to configure a supported SIP phone connected to the Quadro LAN using the automatic configuration option of the Quadro. The complete list of supported SIP phones can be found in [Supported SIP Phones](#).

Please note: The SIP phones out of the supported list should be configured manually (see **IP Phones and IP Lines Configuration Guide**). In this case the option **Other** is selected for the phone model on the **IP Line Settings** page (see [Configure the Attached IP line](#)).



Figure 1 IP phone connected to the Quadro LAN

2 References

- Quadro Manual-II: Administrator's Guide for the corresponding release.
- Quadro Features on IP Phones V3-1.
- IP Phones and IP Lines Configuration Guide.

3 Requirements and Preparations

- SW 3.1.x or a higher image is running on Quadro2x/4x/16x.
- Quadro is connected to the network and all network settings are done without any issue.
- SIP phone(s) is connected to the Quadro LAN and powered up.

4 Supported SIP Phones

Below is the list of SIP phones that can be automatically configured to work with Quadro2x/4x/16x:

Vendor	Model	Software
Elmeg	IP290	Application: snom190-SIP 3.60s
Snom	320	Application version 4.2
Snom	360	Application version 4.1
POLYCOM	Soundpoint IP 300SIP	Application version 1.3.1
Cisco	7960	Image version 7.4 (POS3-07-4-00)
Swissvoice	10S	Application version IP10 SP v1.0.0 (Build 16)
IPDialog	ST201	Firmware Version SipTone 1.2.0 rc Z_21
Aastra	480i	Application version 1.3.0.1080
SIPUra	SPA-841 IP	Software version 3.1.4(a)

5 IP Line Configuration on the Quadro

This section provides step-by-step instructions on configuring IP lines connected to the Quadro LAN. The following steps are detailed below:

1. Select an extension with an IP line attached (or add an extension and attach an IP line to it).
2. Configure the attached IP line.

5.1 Select an Extension with an IP Line Attached

By default the Quadro comes with a number of extensions. Some of these extensions are already attached to IP lines (they start with extension 31). To verify or edit the settings of an extension, on the **Extensions Management** page select the extension and click **Edit**. Check the **Attached Line** to ensure it is set to an IP Line.

It is also possible to manually add an extension and attach an IP line to it.

To add an extension

1. Log in to the Quadro as the administrator.
2. Choose **Extensions Management** from the **Users** menu.
3. Press the **Add** button and enter a number into the **Extension** text box, for example 79 (see Figure 2).
4. Click **Save**.



Figure 2 Extensions Management – Add Entry page

To edit the extension settings

1. From the **Extensions Management** page, select the extension and press **Edit**.
2. On the **Extensions Management – Edit Entry** page, click on the **General Settings** tab.
3. From the **Attached Line** drop-down list, choose an IP line to attach to the extension, IP Line 9 in this example (See Figure 3).
4. Click **Save**.
5. Click on the **SIP settings** tab to specify the SIP settings of the extension (mandatory). Click **Save** to apply the changes.
6. Specify other settings as required (see **Manual II: Administrator's Guide** for the corresponding release).

Main System Users **Telephony** Internet Uplink LAN Services

Extensions Management - Edit Entry

General Settings

[SIP Settings](#)
[SIP Advanced Settings](#)
[Remote Settings](#)
[Call Queue Settings](#)
[Voice Mailbox Settings](#)

General Settings - 79

Display Name

Password

Confirm Password

Attached Line

Allow Call Relay

Use for Call Park

External Call Policy

Percentage of System Memory %

Figure 3 Extensions Management– Edit Entry – General Settings page

5.2 Configure the Attached IP line

To configure the attached IP line, follow these steps:

1. From the **Telephony** menu on the main page of the Quadro's web management, select **Line settings**.
2. Click on the **IP Line settings** tab, then on the IP line the extension is attached to (IP Line 9 in the considered example).
3. On the **IP Line Settings – IP Line number** page, select the SIP phone radio button to activate the line (see Figure 4).
4. From the **Phone Model** drop-down list, select the model of the SIP phone. The list contains only the names and models of the supported phones (see [Supported SIP Phones](#)). If your SIP phone is not included in this list, select **Other** and configure the phone manually (see **IP Phones and IP Lines Configuration Guide**).
5. Enter the MAC address of the phone into the appropriate text fields. MAC addresses of IP phones are usually printed on the back of the phone base unit.

6. In the **Line Appearances** text box, enter the number for simultaneous calls – the total number of active and held calls together. If this field is set to **1**, only one active call is possible to have on the phone and making or accepting a second call while the other is on hold will not be allowed. Note that this number depends on the phone's brand and model, and cannot exceed the number of simultaneous calls supported by the phone.
7. The Quadro identifies each SIP phone located on its LAN by a unique username and a password specified on the **IP Line Settings Page** (See Figure 4). These parameters should also be entered on the SIP phone to allow the phone to register with the Quadro. In case of manual configuration of the phone, they are entered manually via the phone's embedded web server. In case of automatic configuration, they are specified on the Quadro and are automatically included in the phone's configuration file generated by the Quadro.
By default the Quadro assigns a unique username and password to each IP line (see Figure 4–**Username** and **Password**). The user may use either these values or specify new ones.
8. Click Save to apply the changes.

Based on the selected model and the specified MAC address, Quadro generates a configuration file and places it in its built-in TFTP server.

Main	System	Users	Telephony	Internet Uplink	LAN Services
IP Line Settings - IP Line 9					
<input type="radio"/> Inactive					
<input type="radio"/> MGCP Phone					
IP Address: <input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/> <input type="button" value="IP-Clipboard"/>					
Gateway Name: <input type="text"/>					
Endpoint Name: <input type="text" value="aaln/1"/>					
<input checked="" type="radio"/> SIP Phone					
Phone Model: <input type="text" value="Snom360"/>					
MAC Address: <input type="text" value="00"/> : <input type="text" value="04"/> : <input type="text" value="13"/> : <input type="text" value="22"/> : <input type="text" value="0F"/> : <input type="text" value="9F"/>					
Line Appearance: <input type="text" value="2"/>					
Username: <input type="text" value="sipphone000298"/> <input type="button" value="SIP-Clipboard"/>					
Password: <input type="password" value="....."/>					
<input type="button" value="Save"/> <input type="button" value="Back"/>					

Figure 4 IP Line Settings page

6 IP Phone Configuration

The next step in auto-configuration is to notify the IP phone to download its configuration file(s) from the Quadro's TFTP. This means the phone should have the Quadro LAN address as its boot server (TFTP server) address. The configuration varies depending on whether the IP phone is using the Quadro as the DHCP server or not:

1. **If the IP phone is using the Quadro as its DHCP server** (see Figure 5), it will obtain the basic network parameters from the Quadro. These parameters include also the TFTP server address set to the Quadro LAN address (by default 172.30.0.1). The only required step in this case is to reboot/reset the phone to initiate configuration file download (see below).

Please note: This is the recommended configuration for IP phone setup.



Figure 5 IP phone obtains basic network parameters from the Quadro DHCP server

2. **If the IP phone is using a DHCP server other than the Quadro's built-in DHCP**, the user needs to configure the DHCP server to notify the phone the location of the TFTP server, which is the Quadro. An example of such network configuration is shown in Figure 6. Here the LAN of the Quadro, the dedicated DHCP server, and the IP phone are on the same subnet.

Please note: If your company's LAN configuration is similar to the one shown in Figure 6, make sure the DHCP server is disabled on the Quadro LAN, otherwise unpredictable network behavior can occur.

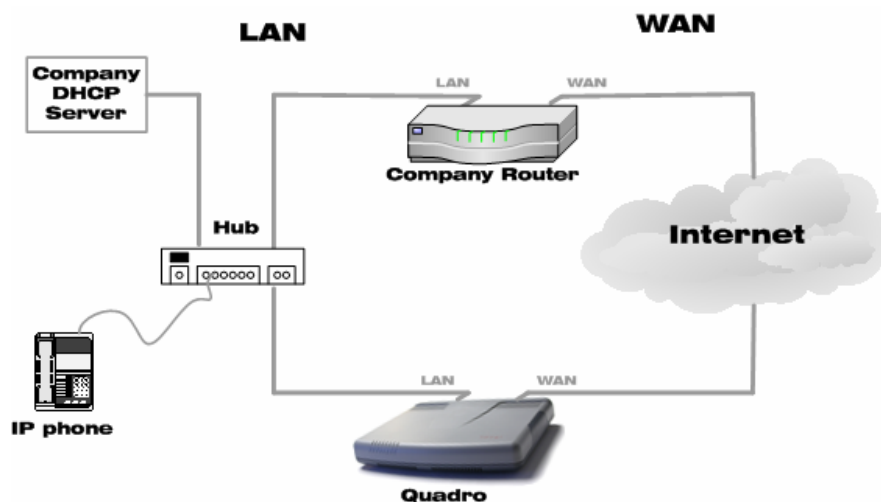


Figure 6 IP phone obtains basic network parameters from the dedicated DHCP server

Below are the steps for the correct configuration of the DHCP server. Note that the following steps also apply to LANs that consist of several logical subnets with the DHCP server and the IP phone on one subnet, and the Quadro on another.

- Set the options listed in [Table 1](#) to the values presented in the right column.
 - Create an IP address reservation for each IP phone connected to the Quadro LAN.
- Please note:** For snom IP phones, configure also the options listed in [Table 2](#):
- Reboot/reset the phone. Depending on the phone model, some additional steps may also be required (see below).

Table 1 Global scope options to configure

Option Name	Value	Example
003 Router	Router IP	172.30.0.2
004 Time Server	Quadro LAN IP	172.30.0.1
005 Name Servers	Quadro LAN IP	172.30.0.1
006 DNS Servers	Quadro LAN IP	172.30.0.1
015 DNS-Domain Name	epygi-config.com	-
066 Boot Server Name	Quadro LAN IP	172.30.0.1

Table 2

Option Name	Value	Example
066 Boot Server Name	http://Quadro_LAN_IP	http://172.30.0.2
067 Bootfile name	ipeconfig/snom- Phone_MAC_address	ipeconfig/snom-00041321014A.htm

Now, when the IP phone requests the network parameters from the DHCP server, the server, together with those parameters, will provide the phone with the boot server name (the LAN IP address of the Quadro). After rebooting/resetting the phone, it will download the files from the Quadro.

6.1 Reset and Restart the Phone to Complete the Automatic Configuration

To prepare the phone to download the configuration file(s) generated by Quadro (see [Configure the Attached IP line](#))

1. Restore the default configuration of the phone by performing a factory reset.
2. Reboot the phone to initiate file download.

Please note: Except for **Polycom Soundpoint IP 300SIP** and **IP Dialog SIP Tone II (ST201)**, no additional steps are required to perform on any of the supported SIP phones. For more information on how to complete the automatic configuration on a supported SIP phone, please refer to the corresponding section below.

6.1.1 Elmeg IP290

To complete the automatic configuration on Elmeg IP290, reset the phone to factory default settings:

1. Press the **F** key to invoke the menu.
2. Use the right or left navigation keys on the keypad of the phone to scroll to **Configuration**.
3. Press the **Reset** soft key. The phone will require the administrator password (the default is **0000**).
4. Enter the password and press **OK**. If the entered password is correct, the phone will ask for a reboot.
5. Press **OK** to restart the phone.
6. After the phone restarts, select the language of the phone and press **OK**.

6.1.2 Snom320

To complete the automatic configuration on snom320, reset the phone to factory default settings:

1. Press the **Settings** key on the keypad of the phone.
2. Press the **Reset** soft key. The phone will ask for the administrator password (the default is **0000**).
3. Enter the password and press **OK** (the ✓ key). If the entered password is correct, the phone will ask for a reboot.
4. Press **OK** (the ✓ key) to reboot the phone.
5. After the phone restarts, select the language of the phone and press **OK**.

6.1.3 Snom360

To complete the automatic configuration on snom360, reset the phone to factory default settings:

1. Press the **Settings** key on the keypad of the phone.
2. Scroll to **Reset Values** and press **OK** (the ✓ key). The phone will ask for the administrator password (the default is **0000**).
3. Enter the password and press **OK**. If the entered password is correct, the phone will ask for a reboot.
4. Press **OK** (the ✓ key) to reboot the phone.
5. After the phone restarts, select the language of the phone and press **OK**.

6.1.4 Polycom SoundPoint IP 300SIP

To complete the automatic configuration on Polycom SoundPoint, reset the phone to factory default settings and change the server type from FTP, the default server type, to Trivial FTP.

To perform a factory reset

1. Simultaneously press the **4**, **6**, **8**, and ***** keys and hold them down for several seconds until the password prompt appears. The phone requires the administrator password (the default is **456**) to initiate the reset.
2. Enter the password and press the **Enter** soft key.

To change the server type

1. During the auto-boot countdown, press the **Setup** soft key to access the main menu/**Network Configuration** menu. Note that this is done after imitating the reset, as soon as the **Welcome** screen appears on the phone LCD. This menu is locked by default. To unlock, enter the administrator password, which has been reset to the default **456** and press **OK**.
2. Use the up or down arrows to scroll to **Server** menu and press the **Select** soft key.
3. Scroll down to **Server Type**, and press **Edit**.
4. Use the down arrow to set the **Server Type** to **Trivial FTP** and press **OK**.
5. Press **Exit** twice to exit the **Server menu** and **Network Configuration** menu.
6. Press the **Reboot** when asked for the **Exit option**.

Wait until the phone reboots downloading configuration files from the Quadro.

6.1.5 Cisco IP Phone 7960

To complete the automatic configuration on Cisco 7960, reboot the phone by simultaneously pressing the *****, **6**, and **settings** keys. Wait until the phone reboots downloading configuration files from Quadro.

6.1.6 Swissvoice IP 10S

To complete the automatic configuration on Swissvoice IP 10S, reset the phone to factory defaults:

1. Press the **Menu** soft key on the keypad of the phone and scroll to the **User settings** menu by using the navigation keys. Press **OK** to enter the menu.
2. Scroll to **Other settings** and select it by pressing **OK**.
3. Select **Reset** and press **OK**. The phone will require the user password.
4. Enter the password and press **OK** (the default is **0000**).
5. Select the **Factory settings** by pressing **OK**. The phone will ask confirmation to reset the phone.
6. Confirm the reset by selecting **Yes** and pressing **OK**. Wait until the phone reboots.

6.1.7 IPDialog SIP Tone II (ST201)

To complete the automatic configuration on IP Dialog SIP Tone II, reset the phone to factory default settings and enable the auto-configuration via built-in web server (by default the phone is not in auto-provisioning mode).

To perform a factory reset:

1. Press the **MENU/HANGUP** key on the keypad of the phone to access the main configuration menu.
2. Press **3**, then **2** to enter the **Settings** and the **Phone Settings** menus, respectively.
3. Press **2** to select the **Config phone** menu.
4. Press **4**, then **2** to enter the **Reset** and **Defaults** menus, respectively.
5. Press **1** to select the **Restore Defaults** item and confirm the restore by pressing **1**.

Please note: Use the **VOL** keys to navigate within the menus. To select the menu item, dial the number associated with it. For example, the short way to perform the factory reset is to consecutively dial: **3→2→2→4→2→1→1**, or in a more detailed way:

3) Settings→2) Phone Settings→2) Config Phone→4) Reset→2) Defaults→1) Restore Defaults→1) Yes.

To enable the auto-configuration on the phone

1. Access the configuration web site on the phone's built-in web server. To do this, open a browser on a computer that is on the LAN of the Quadro and enter the phone's IP address into the address bar of the browser. The IP address of the phone may be viewed by pressing the **INFO/MUTE** key on the keypad of the phone. The phone will require the username and the password to allow access to its configuration. Enter the username (admin) and the password (the default is admin) and press **OK**. The configuration web site of the phone can also be accessed from the Quadro's **IP Line Settings** page. Click on the **Web** link corresponding to the IP line attached to the extension.
2. On the configuration web site of the phone's built-in web server (see Figure 5), click on the **Advanced** tab to access the advanced settings.
3. Scroll to **Auto-config profile** and select **Profile-C** from the list to enable auto-configuration.
4. Select the **Auto-config every boot** checkbox to allow the automatic download of the configuration files every time the phone boots (recommended), otherwise, it loads the file whenever the commit button on the web page is clicked.
5. Press the **Commit changes** button and wait until the phone downloads the configuration settings. The LCD of the phone will display the username of the extension, but the status will still be unregistered.
6. Click on the **Servers** tab, select the **Register through proxy** checkbox (see Figure 6), and press the **Commit changes** button. Wait until the phone registers.

The screenshot shows the 'Advanced' page of the IPDialog configuration utility. The interface has a blue header with the 'ipDialog™' logo and a navigation menu with tabs for 'General', 'Network Setup', 'Phone Configuration', 'Servers', 'Phonebook', 'Change Password', and 'Advanced'. The 'Phone Configuration' tab is selected. The main content area contains various configuration options:

- NAI Address: [Text input field]
- Syslog Server: [Text input field]
- Autodial Userid: [Text input field] Enable Autodial
- Session timer (sec): [Text input field with value 3600] Enable Session Timer Enable Refresher flag
- Preferred Codec: [Dropdown menu with value g711ulaw]
- Use Preloaded Route:
- Download Dial Plan:
- Auto-config profile: [Dropdown menu with value Profile-C]
- Auto-config path: [Text input field]
- Auto-config every boot:
- Disable All Feature (*) Codes:
- Disable LINE 1/2 key during call:
- Use UDP SRV search only:
- Enable Headset Support:
- Offhook on 3rd party Refer:
- Force In-band DTMF:

A 'Commit changes' button is located at the bottom right of the configuration area.

Figure 7 IPDialog – Advanced Page

The screenshot shows the 'Servers' page of the IPDialog configuration utility. The interface has a blue header with the 'ipDialog™' logo and a navigation menu with tabs for 'General', 'Network Setup', 'Phone Configuration', 'Servers', 'Phonebook', 'Change Password', and 'Advanced'. The 'Servers' tab is selected. The main content area is titled 'Servers' and contains configuration options for a registrar and proxy:

- REGISTRAR: [Dropdown menu with value Manual]
- SIP URL: [Text input field with value sip:172.30.0.1:5078]
- From URL: [Text input field]
- To URL: [Text input field]
- Use Domain Name:
- Expires (sec): [Text input field with value 600]
- SIP PROXY: [Text input field with value sip:172.30.0.1:5078]
- Forward all through proxy:
- Register through proxy:
- Server Password: [Text input field with asterisk mask]

A 'Commit changes' button is located at the bottom right of the configuration area.

Figure 8 IPDialog - Servers page

6.1.8 Aastra 480i

To complete the automatic configuration on Aastra480i, restart the phone:

1. Press the **Options** key on the keypad of the phone to enter the Options List.
2. Use the up and down navigation keys to scroll to **11. Phone Status** and press the **Show** soft key, or press **0** to jump directly to this option.
3. Scroll to **3. Restart Phone** and press the **Show** soft key, or press **3** to jump directly to this option. The phone will ask confirmation for the restart.
4. Press the **Reboot** soft key to restart the phone.

6.1.9 Sipura SPA-841 IP

To complete the automatic configuration on Sipura SPA-841, reset the phone to factory default settings and reboot it:

1. Press the **☰** key on the keypad of the phone to enter the main menu.
2. Use the up or down arrow keys to scroll down to **14. Factory Reset** and press the **Select** soft key, or dial **14** to immediately select this option. The phone will ask confirmation for the factory reset. Press the **ok** (the left soft key) soft key and wait until the phone restarts.
3. Press the **☰** key on the keypad of the phone and scroll to **12. Reboot** or dial **12** to immediately select this option. The phone will ask confirmation for a reboot. Press **ok** (the left soft key) to continue.

6.2 Verifying Configuration

To verify the IP phone has been configured properly

- Go to Quadro Status- SIP Registration status – Registered IP Lines to see if IP Line registration is successful.
- Dial *74 to get the line information.
- Make outgoing and accept incoming calls.

7 Restrictions and Limitations

The auto-configuration of IPDialog ST201 is not possible in network configurations described in chapter 6, option 2. Please use the manual configuration instead.

8 Troubleshooting

The IP phone fails to reboot/restart

Some IP phones may fail to reboot when the reboot is initiated from the phone's LCD-based interface. The only way to recover the phone from the permanent reboot is to unplug the power cable from the base unit of the phone and plug it in again.

9 Appendix Linux-based DHCP configuration file

Below is an example of a Linux-based DHCP configuration file for different supported IP phones. The following settings are used in the example:

- Quadro LAN IP - 172.30.0.1
- Router IP - 172.30.0.2
- MAC addresses of IP phones.

```
subnet 172.30.0.0 netmask 255.255.0.0
{
    range 172.30.255.1 172.30.255.254;
    option routers 172.30.0.2;
    option subnet-mask 255.255.0.0;
    option domain-name-servers 172.30.0.1;
    option ntp-servers 172.30.0.1;
    option domain-name "epygi-config.com";
    option tftp-server-name "172.30.0.1";

    host Polycom_0004f200e90b
    {
        hardware ethernet 00:04:f2:00:e9:0b;
    }

    host Cisco7960_00059BB46B5A
    {
        hardware ethernet 00:05:9B:B4:6B:5A;
    }

    host Snom_00041321014A
    {
        hardware ethernet 00:04:13:21:01:4A;
        option bootfile-name "ipeconfig/snom-00041321014A.htm";
        option tftp-server-name "http://172.30.0.1";
    }
    host Aastra480i_00085D03067C
    {
        hardware ethernet 00:08:5D:03:06:7C;
    }
    host SwissVoice_000501010101
    {
        hardware ethernet 00:05:01:01:01:01;
    }

    host Sipura841_000601010101
    {
        hardware ethernet 00:06:01:01:01:01;
    }
}
```