



Grandstream Networks, Inc.

Configuring Grandstream Devices with 3CX Phone System



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INTRODUCTION

All Grandstream products are SIP based and respect RFC3261 for SIP and related RFCs, allowing them to interact with any SIP server including 3CX Phone System.

Grandstream endpoints support PnP (Plug and Play) feature to make devices installation and configuration easy from SIP servers supporting this feature such as 3CX Phone System. Using auto-provisioning, Grandstream devices can be configured with zero configuration on the device side.

This guide will help users to configure their Grandstream devices with 3CX Phone System via **manual configuration** or via **auto-provisioning**.

This guide covers different network setups including:

- **Local Devices (LAN):** Grandstream devices and 3CX Phone System are located within same local network.
- **Remote Devices using SBC:** Grandstream devices are located in a different network where a 3CX SBC (Session Border Controller) is installed and connected to the remote 3CX Phone System.
- **Remote Devices using STUN:** Grandstream devices are located in a remote network behind a router with NAT.

NETWORK SETUP

In this tutorial, we will use three network setups including LAN, SBC, and STUN.

Local Network (LAN)

Grandstream devices and 3CX Phone System are located in the same local network as shown on the following figure.

In this network setup, we consider the following:

- 3CX Phone System IP is “192.168.5.116”.
- Grandstream devices (IP: 192.168.5.210,192.168.5.136,192.168.5.212) are in same LAN as 3CX server.

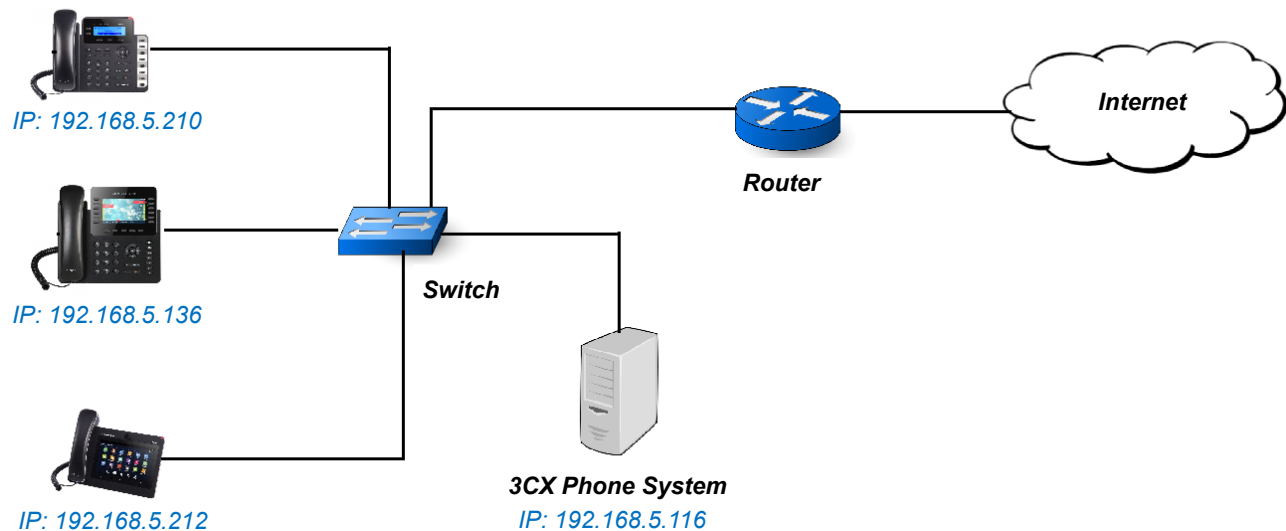


Figure 1: SIP Phones in the same LAN as 3CX Phone System

SBC (Session Border Controller)

In case users have SIP devices outside the local network of 3CX Phone System but behind a 3CX Session Border Controller, it is possible to configure them with 3CX Phone System.

In this network setup, we consider the following:

- 3CX Phone System FQDN is “gstest.3cx.eu”.
- 3CX SBC is installed and configured correctly (IP: 192.168.6.31). Tunnel port (5090 by default needs to be opened and forward traffic to SBC machine).
- Grandstream device is GXV3275 (IP: 192.168.6.225) located in same LAN as 3CX SBC.



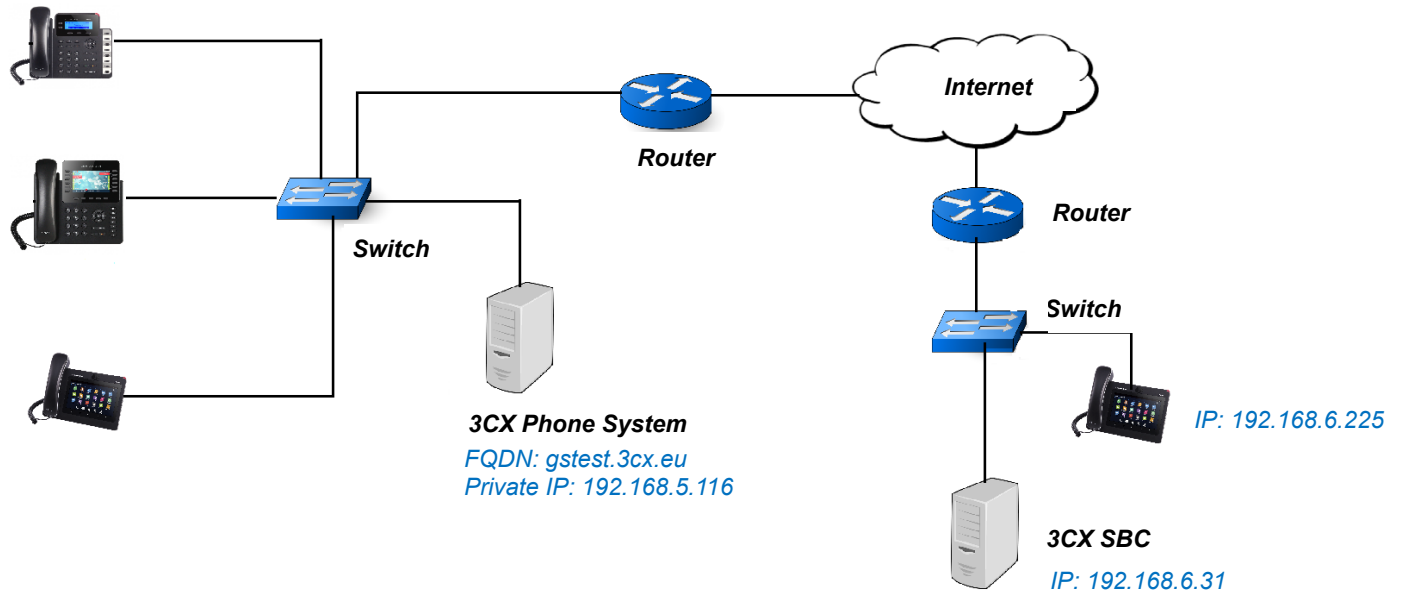


Figure 2: Remote Phone Located Behind SBC

Remote STUN

Grandstream Devices support STUN mode in SIP Network Settings, allowing them to communicate with 3CX Phone System across the WAN. 3CX Phone System must be using a static public IP / FQDN, and the firewall should allow SIP / RTP traffic.

In this network setup, we consider the following:

- 3CX Phone System FQDN is "gstest.3cx.eu".
- Grandstream device is behind a router with dynamic IP.
- TCP port of 8001 with HTTP was configured during installation used for the provisioning of remote extensions (default is 5000 for HTTP and 5001 for HTTPS).
- UDP port 5060: used for SIP traffic.
- UDP ports 9000–9500 used for audio and video (RTP) traffic (default is 9000-10999)



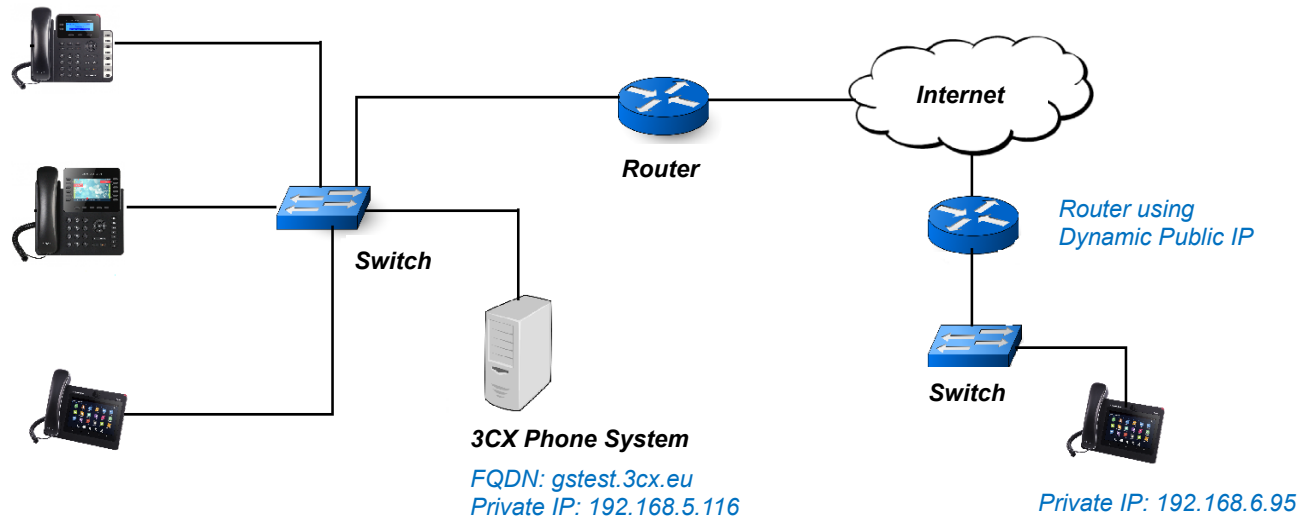


Figure 3: Remote Phone using STUN



MANUAL CONFIGURATION

Before configuring the end device, users will need to ensure that extensions are already created on 3CX Phone System and make sure that the devices are properly powered up, connected to your Network, and have IP addresses.

This section will introduce how to manually configure a Grandstream device that is located in the same local Network as 3CX Phone System, behind a 3CX Session Border Controller, or remotely using STUN.

Local Devices (LAN)

The following section describes basic configuration instructions to configure a Grandstream device when the device is in the same LAN as 3CX Phone System.

SIP Extension Configuration

To configure SIP extension, follow below steps:

1. Take note of the authentication ID and password fields of the extension from 3CX Phone System which will be configured on the device.
2. Connect the network cable and power supply to the device. The phone will boot up and obtain an IP address (assuming a DHCP server is available in the network).
3. Use your browser to access the web interface of the device by entering <http://ip-address> where ip-address is the IP address of the device.
4. Enter the admin username and password and click login to access the configuration pages. Default admin username and password are *admin/admin*.
5. Go to **Accounts** → **Account 1** → **General Settings**.
6. Make sure that “**Account Active**” is set to “Yes”, then Enter the SIP server information along with the SIP extension credentials retrieved from 3CX Phone system in the appropriate fields as shown in the below example:



Grandstream GXP2170 Admin Logout | Reboot | Provision | Factory Reset | English

GRANDSTREAM STATUS ACCOUNTS SETTINGS NETWORK MAINTENANCE PHONEBOOK

Version 1.0.8.27

Accounts

Account 1 -

General Settings

Network Settings

SIP Settings +

Audio Settings

Call Settings

Intercom Settings

Feature Codes

Account 2 +

Account 3 +

Account 4 +

Account 5 +

Account 6 +

General Settings

Account Active No Yes

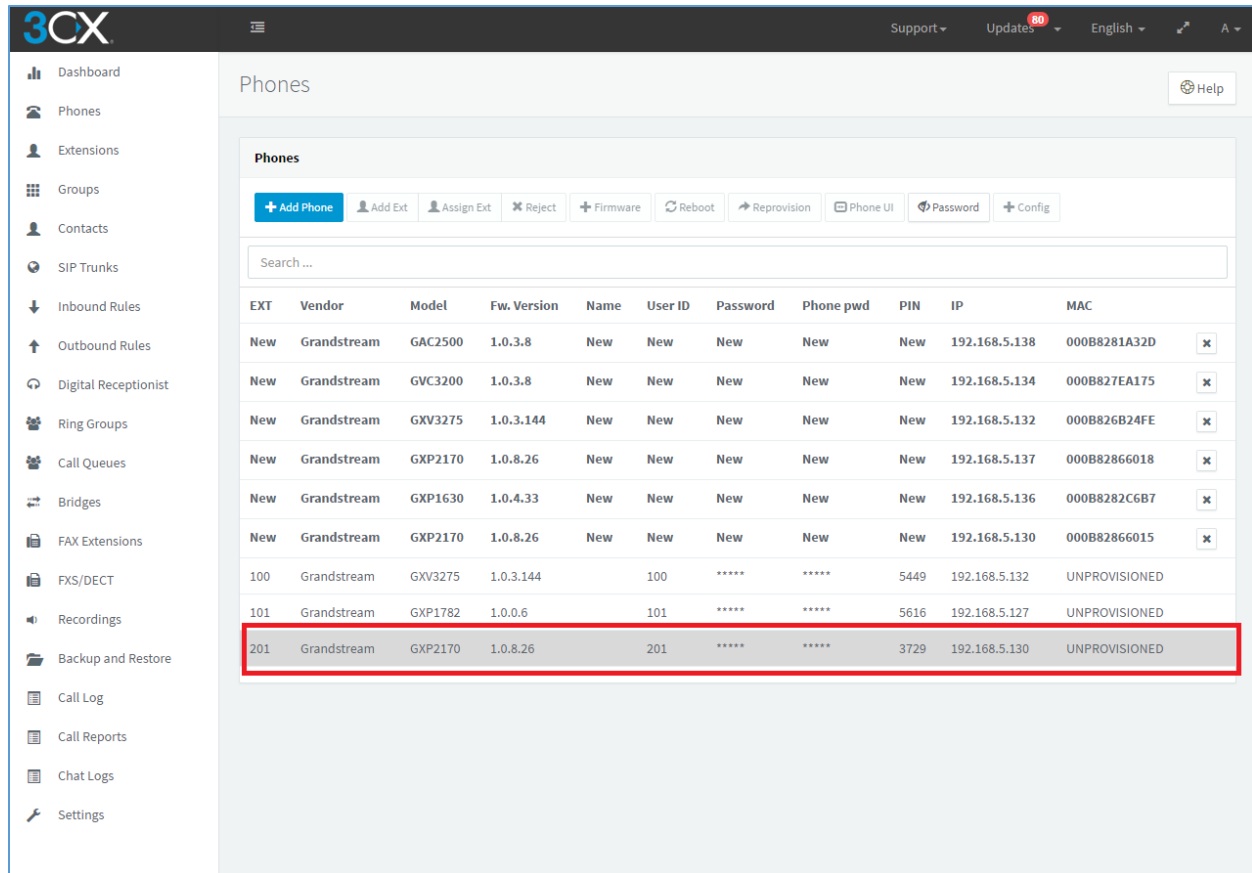
Account Name	201	
SIP Server	192.168.5.116	
Secondary SIP Server	<input type="text"/>	
Outbound Proxy	<input type="text"/>	
Backup Outbound Proxy	<input type="text"/>	
BLF Server	<input type="text"/>	
SIP User ID	201	
Authenticate ID	201	
Authenticate Password	*****	
Name	John Doe	
Voice Mail Access Number	<input type="text"/>	

Picture

Figure 4: Account Configuration on GXP2170

7. Click on **Save and Apply** for the configuration to take effect and register the account. The phone will send a SIP REGISTER request to 3CX Phone System and, if successful, will be shown as registered under **Status** → **Account Status**.





Phones

Search ...

EXT	Vendor	Model	Fw. Version	Name	User ID	Password	Phone pwd	PIN	IP	MAC	
New	Grandstream	GAC2500	1.0.3.8	New	New	New	New	New	192.168.5.138	000B8281A32D	<input type="button" value="x"/>
New	Grandstream	GVC3200	1.0.3.8	New	New	New	New	New	192.168.5.134	000B827EA175	<input type="button" value="x"/>
New	Grandstream	GXV3275	1.0.3.144	New	New	New	New	New	192.168.5.132	000B826B24FE	<input type="button" value="x"/>
New	Grandstream	GXP2170	1.0.8.26	New	New	New	New	New	192.168.5.137	000B82866018	<input type="button" value="x"/>
New	Grandstream	GXP1630	1.0.4.33	New	New	New	New	New	192.168.5.136	000B8282C6B7	<input type="button" value="x"/>
New	Grandstream	GXP2170	1.0.8.26	New	New	New	New	New	192.168.5.130	000B82866015	<input type="button" value="x"/>
100	Grandstream	GXV3275	1.0.3.144		100	*****	*****	5449	192.168.5.132	UNPROVISIONED	
101	Grandstream	GXP1782	1.0.0.6		101	*****	*****	5616	192.168.5.127	UNPROVISIONED	
201	Grandstream	GXP2170	1.0.8.26		201	*****	*****	3729	192.168.5.130	UNPROVISIONED	

Figure 5: Phones Panel

Note: Since the phone used is in the same network as the 3CX Phone System, users may either use 3CX Phone System private IP or FQDN on SIP Server Field.

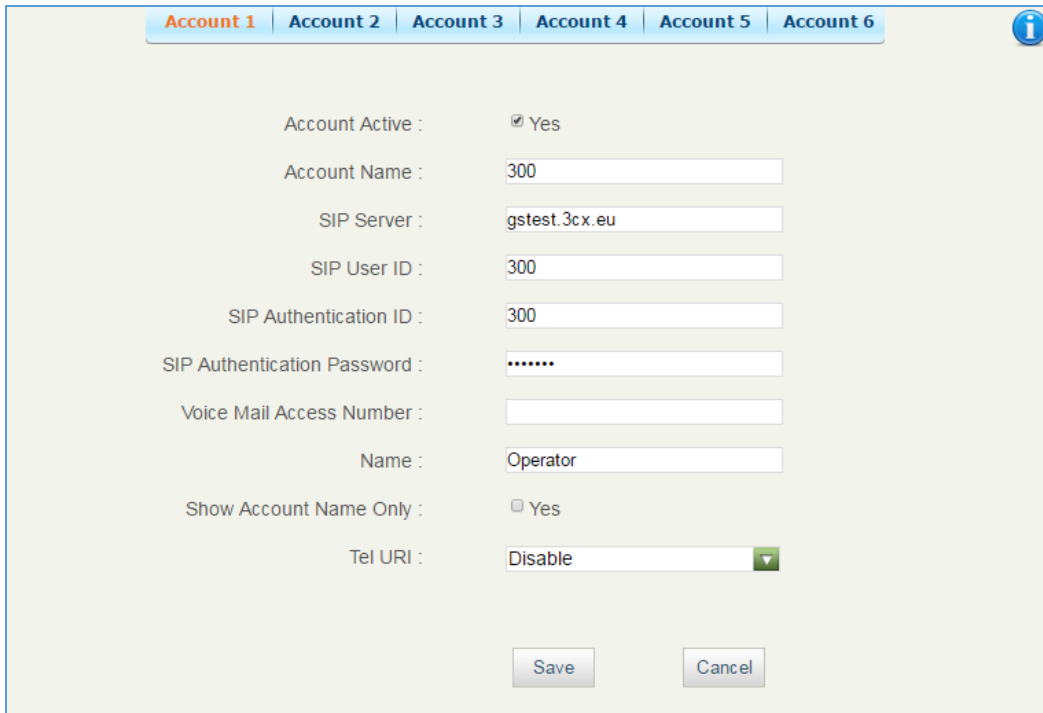
Remote Devices using 3CX SBC

To configure a Grandstream device located behind a 3CX SBC, follow below instructions:

Note: We will use GXV3275 as example. Same configuration applies to other models.

1. Take note of SIP extension credentials from 3CX Phone System to be configured on the device.
2. Log in to the phone web UI and go to **Account** → **General Settings**.
3. Make sure to set **Account Active** to “Yes”.
4. Fill the information related to the extension created on the 3CX Phone System.
5. In **SIP Server** field, enter the IP/FQDN of 3CX Phone System (in this example: “gstest.3cx.eu”), and click on **Save**.





Account 1 | Account 2 | Account 3 | Account 4 | Account 5 | Account 6

Account Active : Yes

Account Name : 300

SIP Server : gstest.3cx.eu

SIP User ID : 300

SIP Authentication ID : 300

SIP Authentication Password :

Voice Mail Access Number :

Name : Operator

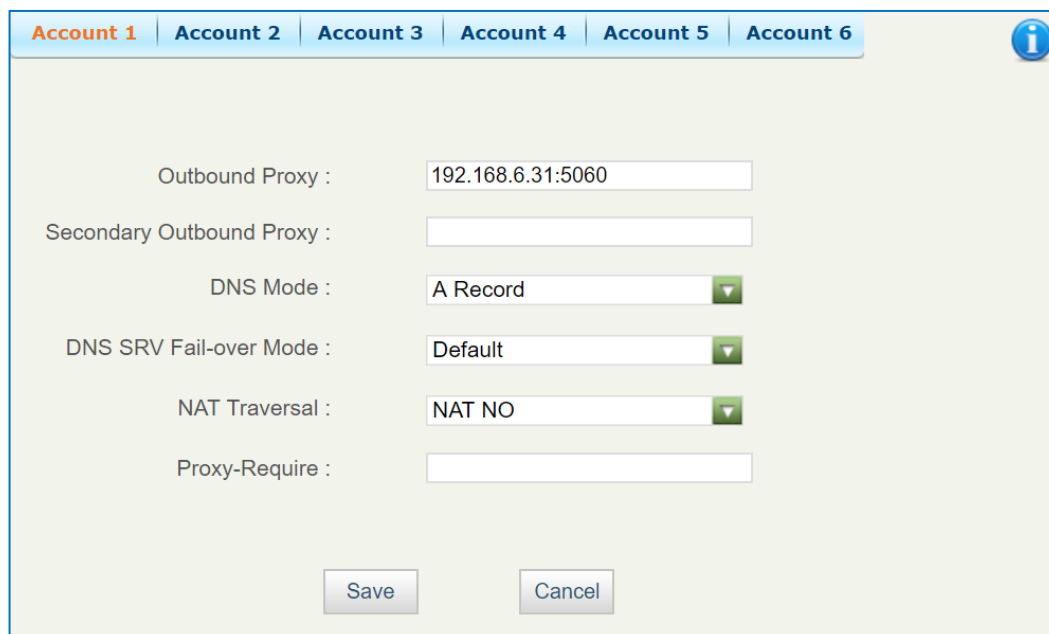
Show Account Name Only : Yes

Tel URI : Disable

Save Cancel

Figure 6: GXV3275 Account General Settings

- Once saved, navigate to **Network Settings** under account and type in the private IP and port of 3CX SBC in **Outbound Proxy** field (192.168.6.31:5060).



Account 1 | Account 2 | Account 3 | Account 4 | Account 5 | Account 6

Outbound Proxy : 192.168.6.31:5060

Secondary Outbound Proxy :

DNS Mode : A Record

DNS SRV Fail-over Mode : Default

NAT Traversal : NAT NO

Proxy-Require :

Save Cancel

Figure 7: Outbound Proxy setting

- Click on **Save and Apply** to register the extension with 3CX Phone System via the SBC.

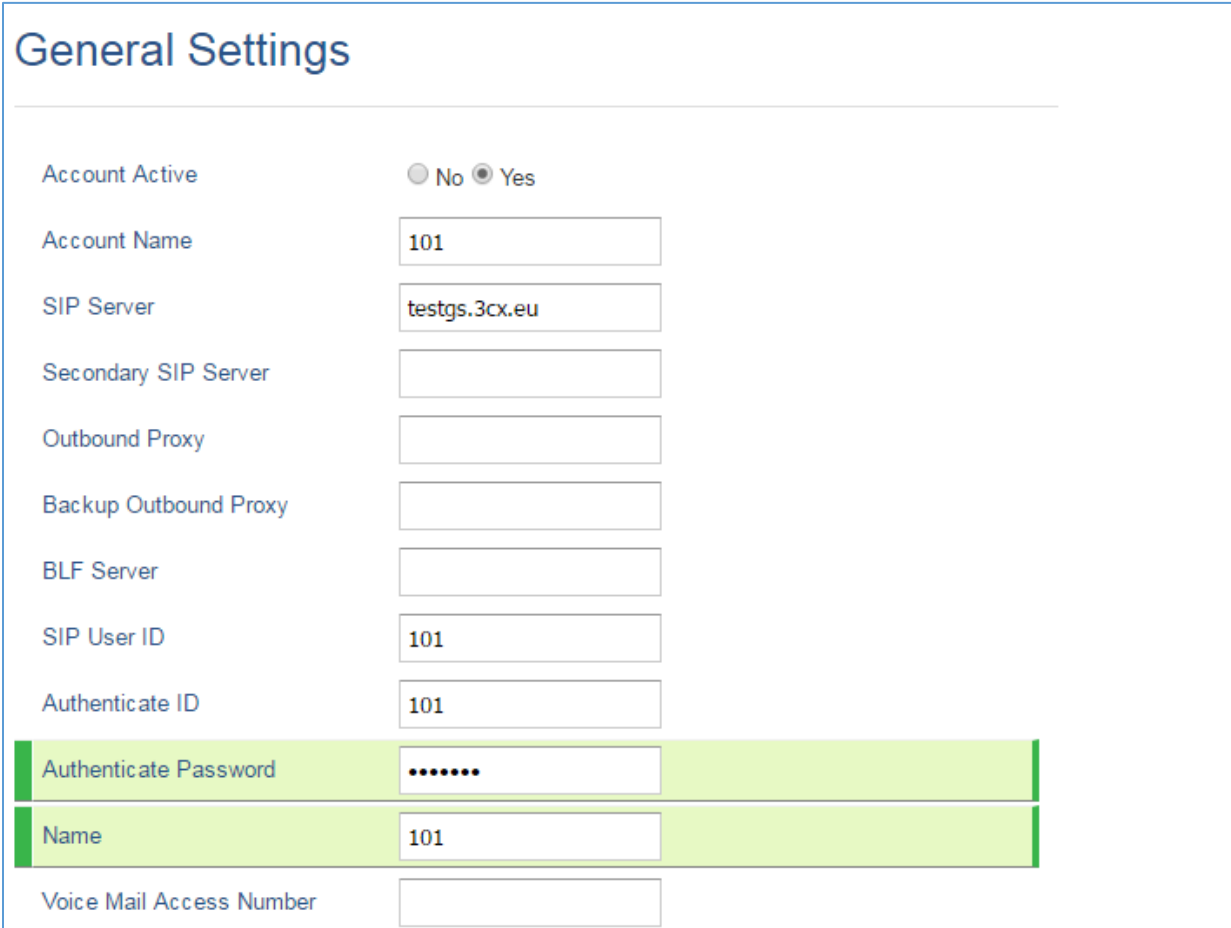


Remote Devices using STUN

To configure a remote Grandstream device using STUN, follow below instructions:

Note: We will use GXP2135 as example. The same configuration applies to other models.

1. Take note of the SIP extension credentials from 3CX Phone System to be configured on the device.
2. Log in to the phone and go to **Account** → **General Settings**.
3. Make sure to set **Account Active** to “Yes”.
4. Fill the information related to the SIP extension created on the 3CX Phone System.
5. In **SIP Server** field, enter the public IP/FQDN of *3CX Phone System* (“testgs.3cx.eu” in this example), and click on **Save**.

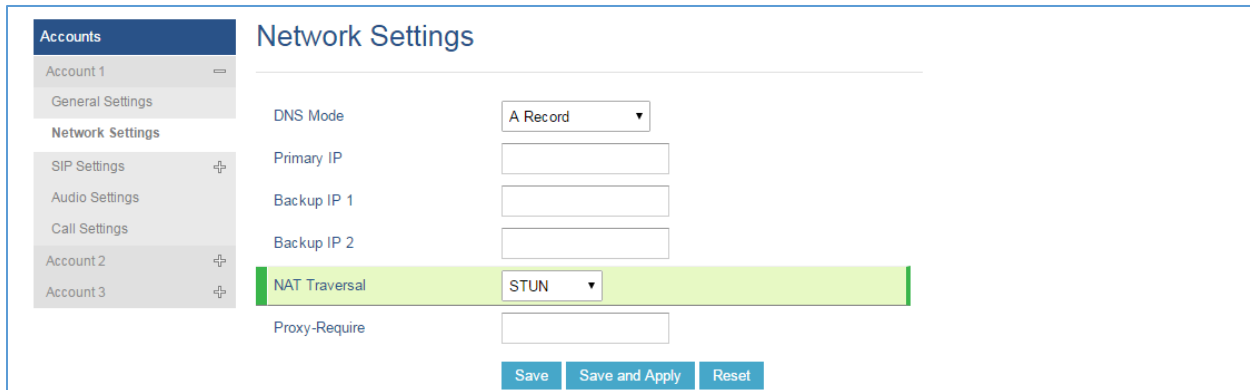


General Settings	
Account Active	<input type="radio"/> No <input checked="" type="radio"/> Yes
Account Name	<input type="text" value="101"/>
SIP Server	<input type="text" value="testgs.3cx.eu"/>
Secondary SIP Server	<input type="text"/>
Outbound Proxy	<input type="text"/>
Backup Outbound Proxy	<input type="text"/>
BLF Server	<input type="text"/>
SIP User ID	<input type="text" value="101"/>
Authenticate ID	<input type="text" value="101"/>
Authenticate Password	<input type="password" value="....."/>
Name	<input type="text" value="101"/>
Voice Mail Access Number	<input type="text"/>

Figure 8: Configure Remote extension via STUN

6. Once saved, navigate to **Network Settings**, and set **NAT Traversal** to “STUN”.





Accounts

- Account 1
 - General Settings
 - Network Settings**
 - SIP Settings
 - Audio Settings
 - Call Settings
- Account 2
- Account 3

Network Settings

DNS Mode: A Record

Primary IP:

Backup IP 1:

Backup IP 2:

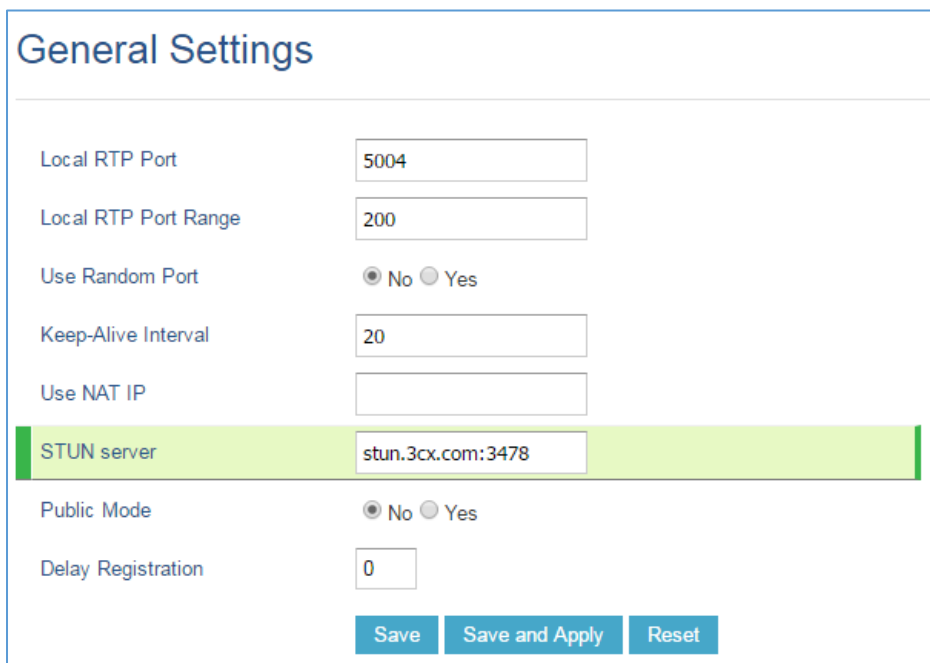
NAT Traversal: STUN

Proxy-Require:

Save Save and Apply Reset

Figure 9 : NAT Traversal set to STUN

- Press **Save** button and navigate to **Settings → General Settings**. In **STUN Server** field, set a valid STUN server (“stun.3cx.com:3478” for example).



General Settings

Local RTP Port: 5004

Local RTP Port Range: 200

Use Random Port: No Yes

Keep-Alive Interval: 20

Use NAT IP:

STUN server: stun.3cx.com:3478

Public Mode: No Yes

Delay Registration: 0

Save Save and Apply Reset

Figure 10: General Settings – STUN server

- Press **Save and Apply** to register the device with 3CX Phone System.

Note: A reboot may be required for STUN server setting to take effect.



MPK / VPK Configuration

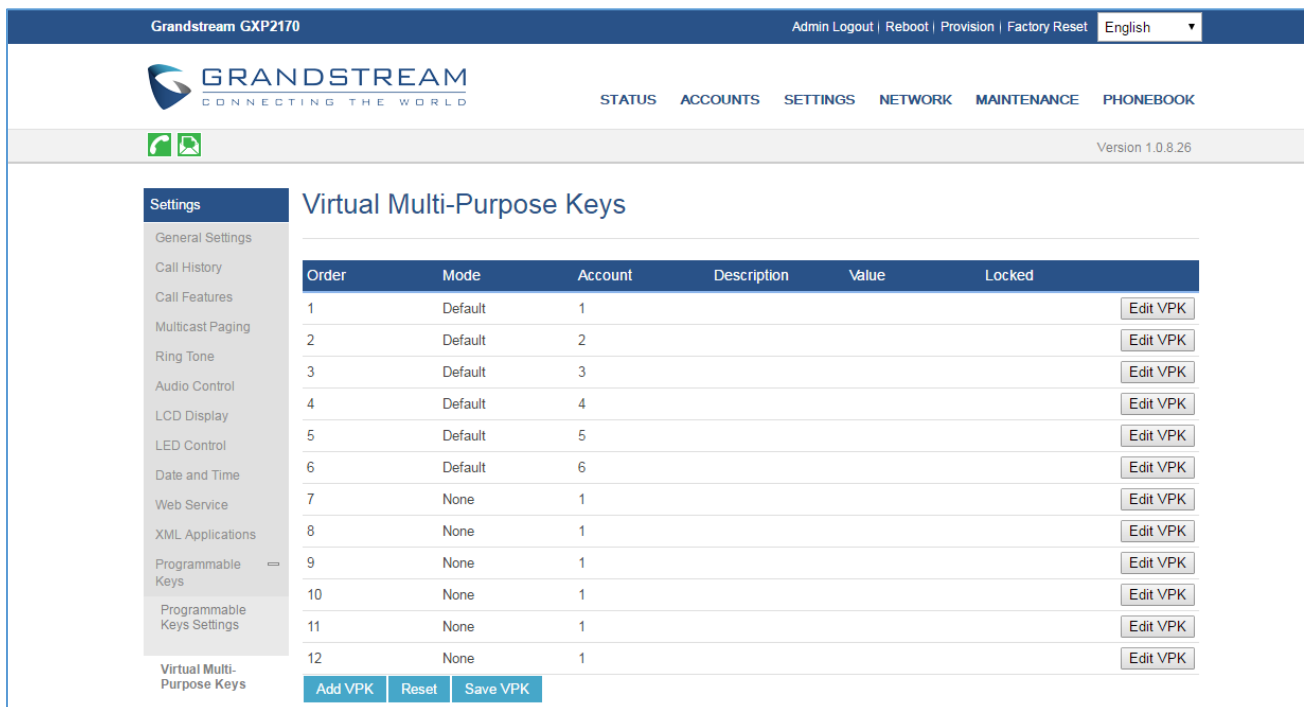
Multi-Purpose Keys (MPK), and Virtual Multi-Purpose Keys (VPK) on supported models can be configured as Speed Dial, BLF (Busy Lamp Field) and more.

VPKs are available in GXP21XX and GXP17XX series only. For models that support both physical built-in MPK or extension module (GXP2200EXT) and VPKs, the VPKs will be filled first.

In the below example, we are using a GXP2170 with VPKs (Optional: extension module can be attached).

To configure VPKs on the phone, follow below instructions:

1. Log in to the phone's Web GUI.
2. Go to **Settings** → **Programmable Keys** → **Virtual Multi-Purpose Keys**.
3. Click on **Add VPK** to add a new VPK. (Click on **Edit VPK** to edit an existing VPK).



Grandstream GXP2170 Admin Logout | Reboot | Provision | Factory Reset English

GRANDSTREAM CONNECTING THE WORLD STATUS ACCOUNTS SETTINGS NETWORK MAINTENANCE PHONEBOOK

Version 1.0.8.26

Settings

- General Settings
- Call History
- Call Features
- Multicast Paging
- Ring Tone
- Audio Control
- LCD Display
- LED Control
- Date and Time
- Web Service
- XML Applications
- Programmable Keys
- Programmable Keys Settings
- Virtual Multi-Purpose Keys

Virtual Multi-Purpose Keys

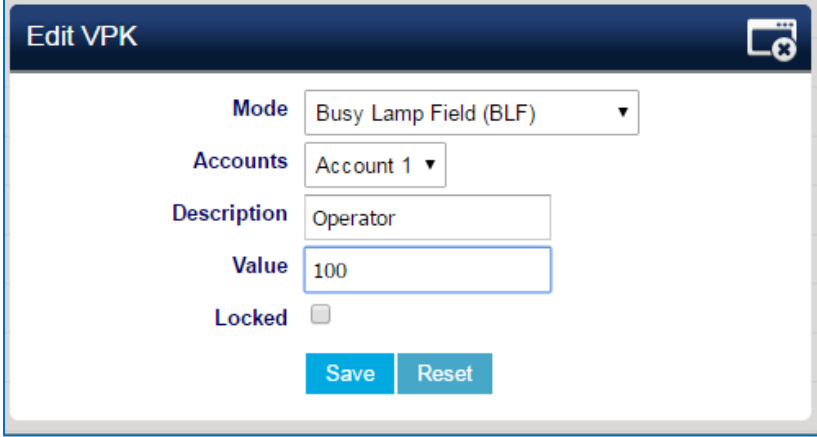
Order	Mode	Account	Description	Value	Locked
1	Default	1			Edit VPK
2	Default	2			Edit VPK
3	Default	3			Edit VPK
4	Default	4			Edit VPK
5	Default	5			Edit VPK
6	Default	6			Edit VPK
7	None	1			Edit VPK
8	None	1			Edit VPK
9	None	1			Edit VPK
10	None	1			Edit VPK
11	None	1			Edit VPK
12	None	1			Edit VPK

[Add VPK](#) [Reset](#) [Save VPK](#)

Figure 11: Create a VPK on GXP2170

4. To configure a Key as BLF to monitor another extension on 3CX Phone System, set Mode to **Busy Lamp Field (BLF)**.





Edit VPK

Mode Busy Lamp Field (BLF) ▾

Accounts Account 1 ▾

Description Operator

Value 100

Locked

Save **Reset**

Figure 12: BLF Key

5. In **Accounts** dropdown list, select the account to use with this VPK.
6. In **Description** field, enter a name to be displayed for this key.
7. In **Value** field, enter the extension SIP user ID to monitor.
8. Click on **Save and Apply** to submit changes.



AUTO-PROVISIONING

Before provisioning the end device, users will need to ensure that extensions are already created on 3CX Phone System, and the devices are properly powered up, connected to your Network, and have IP addresses.

This section will introduce how to auto-provision a Grandstream device located in the same local Network as 3CX Phone System, behind a 3CX Session Border Controller, or remotely using STUN.

Local Devices (LAN)

When having the devices on the same network as 3CX Phone System, users have the ability to provision end devices automatically either using Plug and Play feature, or by adding the device on the 3CX Phone System.

Plug and Play

Grandstream SIP devices can be provisioned using the Plug and Play feature which will auto-discover the device at boot up when in the same local network as 3CX Phone System. This allows the phone to retrieve the configuration automatically once assigned.

To auto-provision Grandstream devices, follow below steps:

1. Power on the phone and connect it to the same LAN as 3CX Phone System.

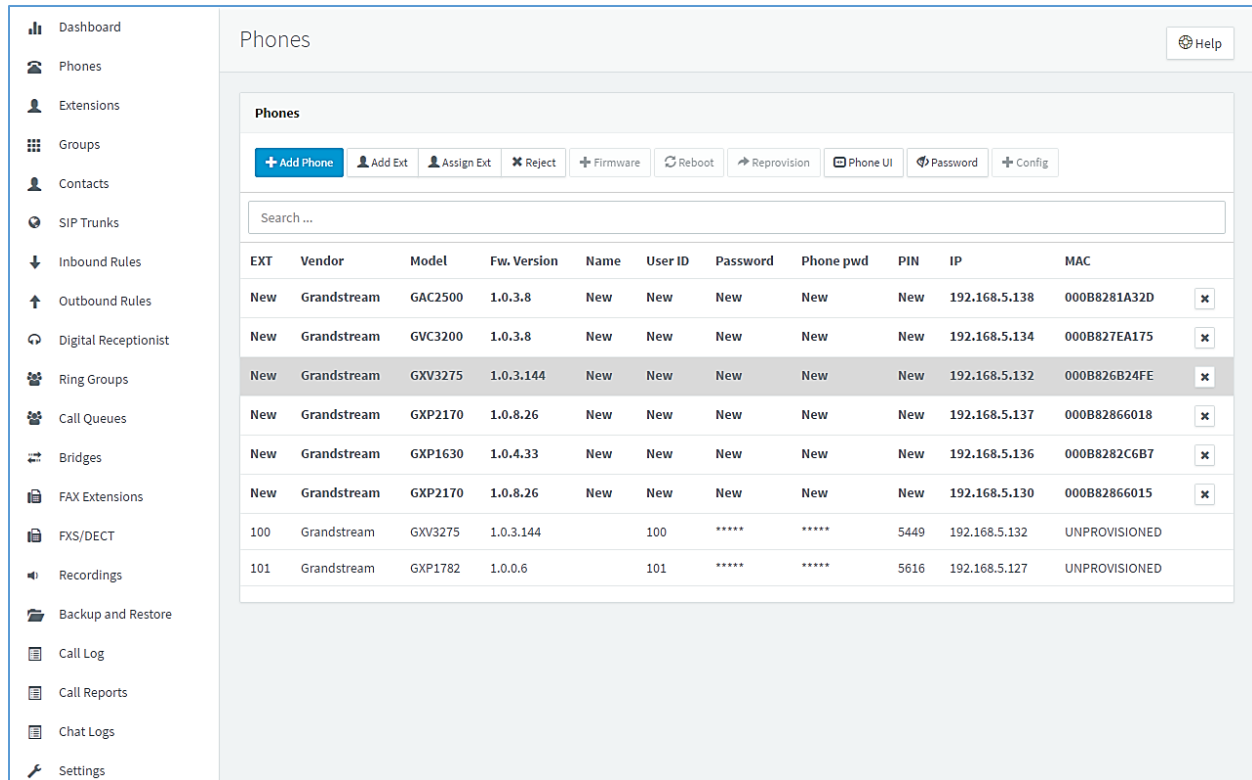
At booting stage, the device will send a SIP SUBSCRIBE message to a multicast IP address and be responded to by the 3CX Phone System in same LAN.

2. Access to 3CX Phone System interface and click on **Phones** in the left panel.

Discovered devices with their related information including Model, MAC address, IP address will be displayed as shown in below figure.

Note: If a device is not discovered, access to its web interface and set **3CX Auto Provision** to "Yes" (by default set to Yes) under **Maintenance → Upgrade and Provisioning** then reboot it.





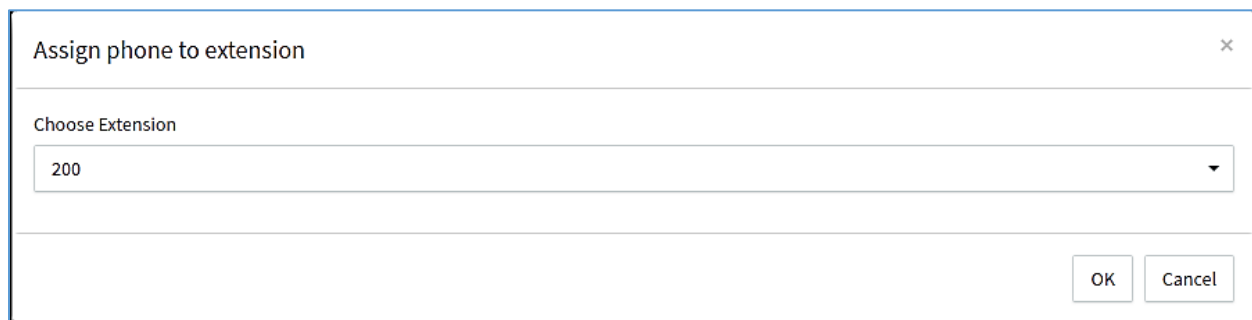
Phones

Search ...

EXT	Vendor	Model	Fw. Version	Name	User ID	Password	Phone pwd	PIN	IP	MAC	
New	Grandstream	GAC2500	1.0.3.8	New	New	New	New	New	192.168.5.138	00B8281A32D	<input type="button" value="x"/>
New	Grandstream	GVC3200	1.0.3.8	New	New	New	New	New	192.168.5.134	00B827EA175	<input type="button" value="x"/>
New	Grandstream	GXV3275	1.0.3.144	New	New	New	New	New	192.168.5.132	00B826B24FE	<input type="button" value="x"/>
New	Grandstream	GXP2170	1.0.8.26	New	New	New	New	New	192.168.5.137	00B82866018	<input type="button" value="x"/>
New	Grandstream	GXP1630	1.0.4.33	New	New	New	New	New	192.168.5.136	00B8282C6B7	<input type="button" value="x"/>
New	Grandstream	GXP2170	1.0.8.26	New	New	New	New	New	192.168.5.130	00B82866015	<input type="button" value="x"/>
100	Grandstream	GXV3275	1.0.3.144		100	*****	*****	5449	192.168.5.132	UNPROVISIONED	
101	Grandstream	GXP1782	1.0.0.6		101	*****	*****	5616	192.168.5.127	UNPROVISIONED	

Figure 13: GXV3275 Discovered via PnP feature

3. Select the device to provision and click on **Add Ext** (to create a new extension for this device) or **Assign Ext** (to assign a previously created extension).



Assign phone to extension

Choose Extension

200

OK Cancel

Figure 14: Assign Extension to Phone

4. Users can configure advanced options on the device during provisioning such as voice codecs, Forwarding Rules and BLF as shown in below figure:



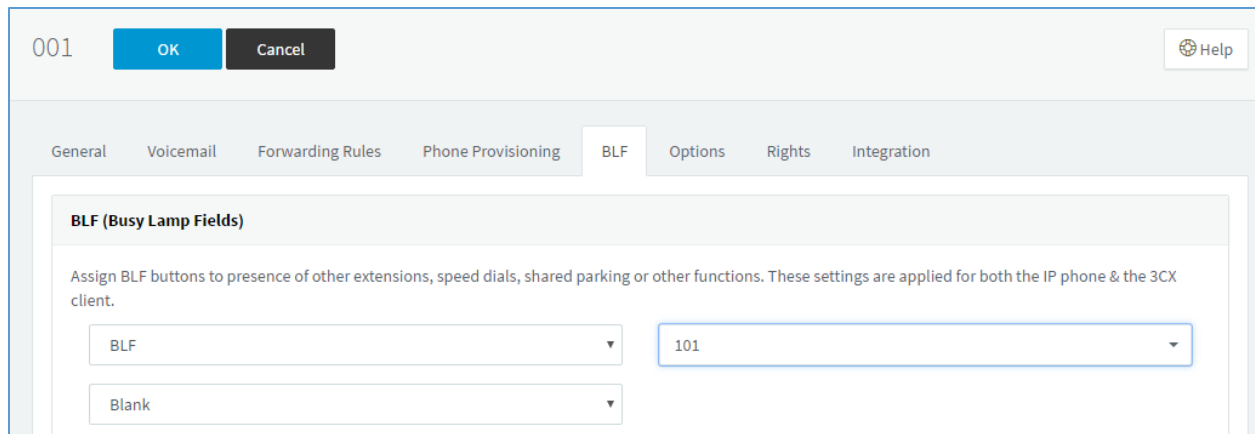


Figure 15: Configuring BLF

5. Press **OK** to save the configuration.
6. Once applied, the phone will be rebooted and get provisioned automatically with provisioning URL on its configuration server path.

Add New Device

Users have also the possibility to prepare 3CX Phone System to provision Grandstream devices that will be deployed with the system before having them connected to the network.

To add a new device to 3CX Phone System, follow below steps:

1. Log in to the 3CX Phone System and go to **Phones** panel.
2. Click on **Add Phone** and choose an extension to assign.
3. Choose the device's model from available models list and enter its MAC address as shown in below figure.

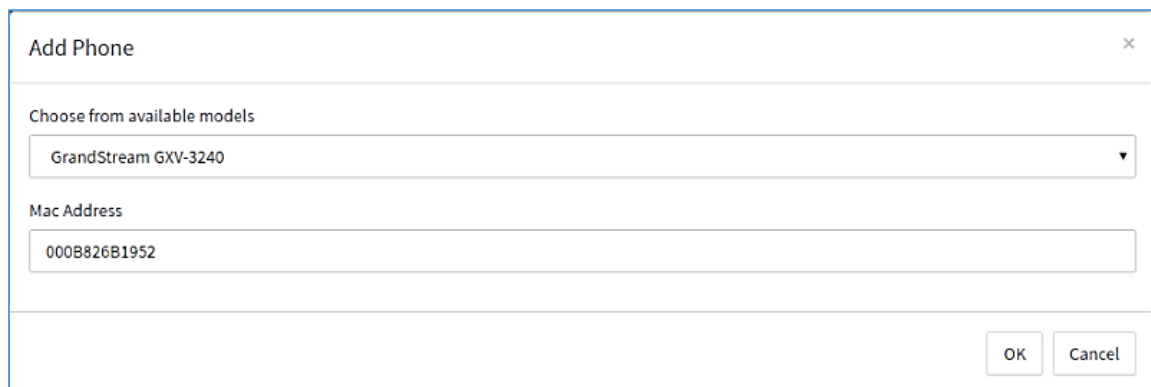


Figure 16: Add Phone via MAC address

4. In "Phone Provisioning" tab, leave **Provisioning Method** set to "Local LAN (in the office)".
5. Press **OK** to save the configuration.
6. Configure Option 66 on the network router and set the path to the 3CX provisioning path.
7. Once the device with matching model/MAC address is connected to the network and detected by



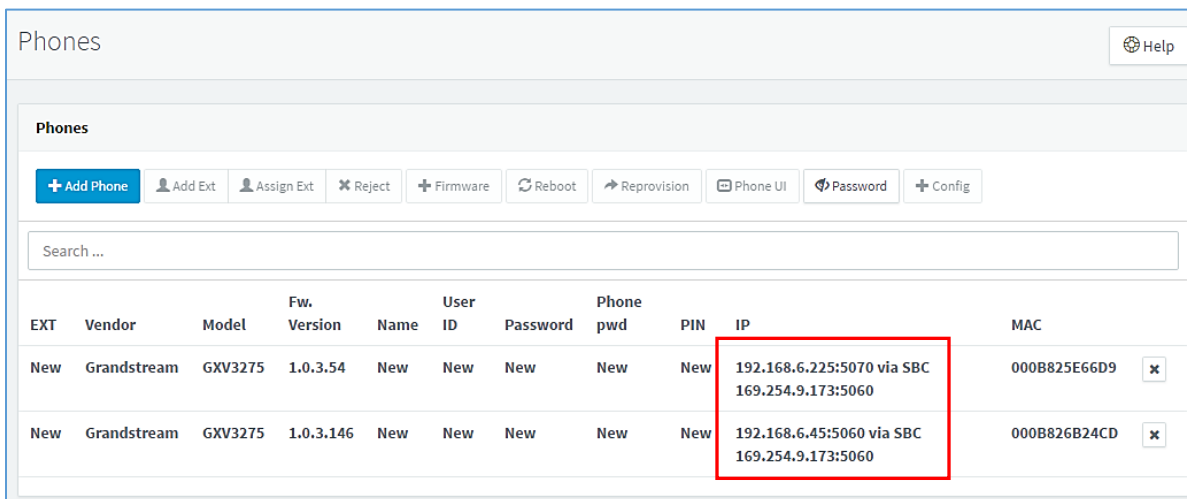
3CX Phone System, it will reboot and be provisioned automatically.

Remote Devices using 3CX SBC

To auto-provision Grandstream devices located behind a 3CX SBC, follow below steps:

1. Log in to the remote 3CX Phone System and go to **Phones** panel.
2. Select the device to provision and click on **Add Ext** (to create a new extension for this device) or **Assign Ext** (to assign a previously created extension).

Devices that are detected through the SBC will be marked with “via SBC” in IP column as show in below figure.



EXT	Vendor	Model	Fw. Version	Name	User ID	Password	Phone pwd	PIN	IP	MAC
New	Grandstream	GXV3275	1.0.3.54	New	New	New	New	New	192.168.6.225:5070 via SBC 169.254.9.173:5060	000B825E66D9
New	Grandstream	GXV3275	1.0.3.146	New	New	New	New	New	192.168.6.45:5060 via SBC 169.254.9.173:5060	000B826B24CD

Figure 17: Devices behind SBC

3. 3CX will open “Phone Provisioning” tab with following options preconfigured:
 - **Provisioning Method** set “3CX SBC (remote)”.
 - **MAC Address** set to phone’s MAC address.
 - **Select Interface** set to 3CX FQDN (in this example: “gstest.3cx.eu”).
 - **IP Address of 3CX Session Border Controller** set to 3CX SBC IP.
 - **Port** set to 3CX SBC SIP port (in this example: 5060).
4. Click on **OK** to provision the phone.
5. Once applied, the phone will be rebooted and get provisioned automatically with provisioning URL on its configuration server path.
 (In this example: “https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0”.)



001 OK Cancel Help

General Voicemail Forwarding Rules **Phone Provisioning** BLF Options Rights Integration

Phone Provisioning

+ Add

Your phones

GrandStream GXV-3275 ✕ Delete

For info on how to provision this phone click [here](#).

IP Phone

Provisioning Method
 3CX SBC (remote)

Provisioning Link: <https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0>

Mac Address
 000B826B24CD

Select Interface
 gstest.3cx.eu

IP Address of 3CX Session Border Controller
 169.254.9.173

Port
 5060

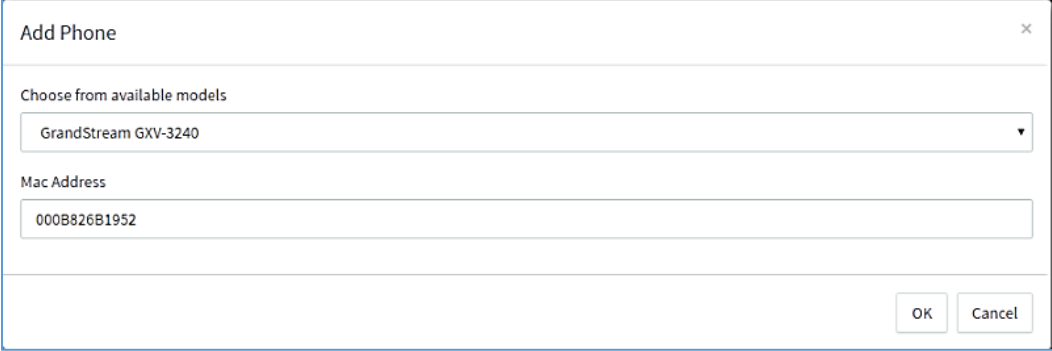
Figure 18: Provisioning via SBC

Remote Devices using STUN

To configure remote extensions using STUN, follow below steps:

1. Log in to the 3CX Phone System and go to **Phones** panel.
2. Click on **Add Phone** and choose an extension to assign.
3. Choose the device's model from available models list and enter its MAC address as shown in below figure.





Add Phone

Choose from available models

GrandStream GXV-3240

Mac Address

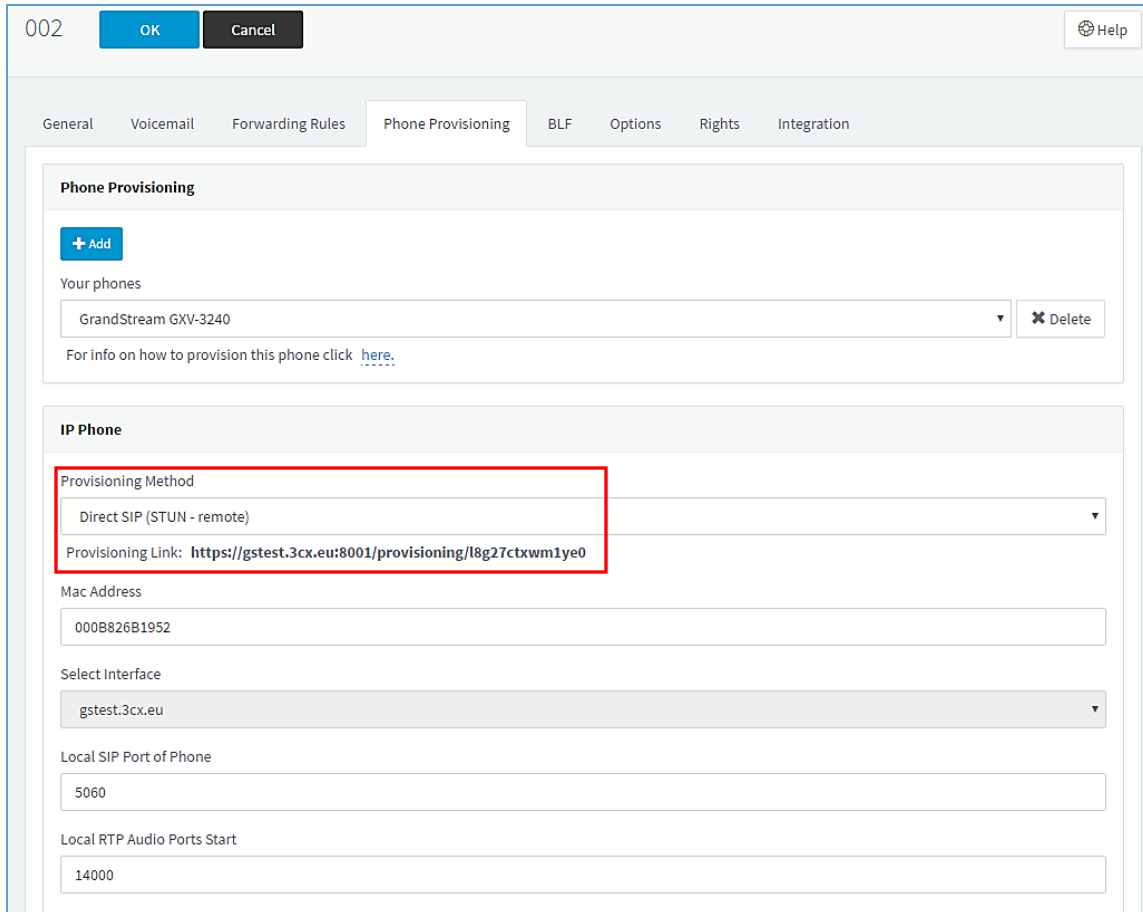
000B826B1952

OK Cancel

Figure 19: Add Phone via MAC address

4. In “Phone Provisioning” tab, set the following:
 - **Provisioning Method:** Direct SIP (STUN – remote)
 - **MAC Address:** Leave as preconfigured (MAC address of the phone entered).
 - **Select Interface:** 3CX FQDN preconfigured (in this example: “gstest.3cx.eu”).
 - **Local SIP Port of Phone:** set the local SIP port used by the phone.
 - **Local RTP Audio Ports Start:** Leave as preconfigured “14000”.
 - **Local RTP Audio Ports End:** Leave as preconfigured “14009”.
5. Copy or take note of the **Provisioning Link**.
(In this example: <https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0>).





002 OK Cancel Help

General Voicemail Forwarding Rules **Phone Provisioning** BLF Options Rights Integration

Phone Provisioning

+ Add

Your phones

GrandStream GXV-3240 ✕ Delete

For info on how to provision this phone click [here](#).

IP Phone

Provisioning Method
Direct SIP (STUN - remote)

Provisioning Link: <https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0>

Mac Address
000B826B1952

Select Interface
gstest.3cx.eu

Local SIP Port of Phone
5060

Local RTP Audio Ports Start
14000

Figure 20: Provisioning using STUN

- Click on **OK** to save and apply changes. 3CX will push the device MAC to the Grandstream RPS server (fm.grandstream.com/gs) as shown below and prepare a configuration file for the phone with the configured MAC address, model, and settings.

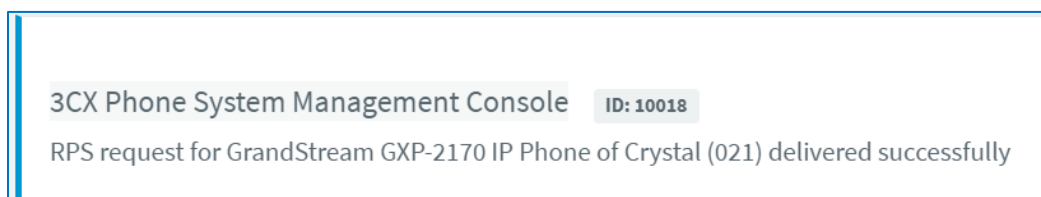


Figure 21: RPS Request for GXP2170

- When the device boots up, it will (by default) fetch configuration from “fm.grandstream.com/gs” and receive a configuration which will redirect config path to the 3CX provision URL.
- The device will show prompt to enter a username and password. Enter the extension number as username and the extension’s voicemail PIN as the password.
- The phone will be rebooted and get provisioned automatically with provisioning URL on its configuration server path.

(In this example: “<https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0>”.)

