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Grandstream GXW 410X Gateway

Description

When application of the Grandstream GXW 410X is desired for connection of FXO circuits onto the IPitomy IPBX the following configuration information can be used as a guide to install the adjunct properly.

Procedure—Connections

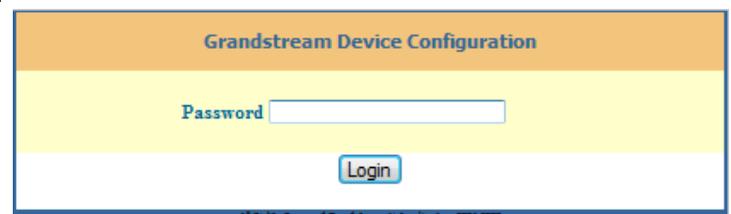
1. Make wiring connections as necessary to the FXO circuits required.



2. Make wiring connections to the LAN per the photo above – Connect the Grandstream **WAN** port to an available LAN port of the network switch/router being used on site.

Procedure—Power-Up and Login

1. Power up the unit and identify its assigned IP address. (Typically assigned from the DHCP server of the host router.)
2. Use your browser to access the Grandstream by inputting the IP Address assigned to it. The IP Address assigned by your router via DHCP can be discovered several ways – the easiest of which is likely by accessing the router's connected devices page and finding it listed there.
3. When the Grandstream page is accessed, input the password (—adminll at default) and navigate to the pages below making the changes as defined.



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Procedure—Configuration

1. Navigate to the —Basic Settingsll page and input the data as in the example.
2. Assign a Static IP Address.
The device must be —foundll by the IPBX regardless of incidental changes and network adjustments. For this reason its best to change the IP Address to Static and assign an address that is out of range of those assigned for DCHP subscription. (E.g. if the router will assign DCHP Addresses from 192.168.1.1 ~ 192.168.1.50 you should select an IP Address out of this range ...192.168.1.200 would work unless it is being used elsewhere.)
3. Use the other information provided by the DCHP assignment process in the remaining data fields; Subnet is usually 255.255.255.0. The Default Router Address must be that of the router—the same one that assigns DCHP IP Addresses. DNS should also be the router since it will direct traffic.
4. Click the button. This saves information on this page before moving on.

The screenshot shows the 'Grandstream Device Configuration' web interface. The 'Basic Settings' tab is selected. Under 'Web Access', 'HTTP' is selected. 'Web Port' is set to 80. 'End User Password' is a blank field. Under 'IP Address', 'statically configured (default) as:' is selected. A yellow box highlights the static IP configuration fields: IP Address (192.168.2.9), Subnet Mask (255.255.255.0), Default Router (192.168.2.1), DNS Server 1 (192.168.2.1), and DNS Server 2 (0.0.0.0). Other fields include DHCP hostname, DHCP domain, DHCP vendor class ID (Grandstream GXW4104), PPPoE account ID, PPPoE account password, PPPoE service name, Preferred DNS server (0.0.0.0), Time Zone (GMT-5:00), and Daylight Savings Time (No).

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5. Navigate to the —FXO Lines page.
6. Change the —Stage Method(1/2):ll to **Ch1-4:1;**

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FXO Termination

1. Enable Current Disconnect(Y/N): (default Y=yes)
 If enabled, use threshold: (default 100ms, range 5 ~ 65530 ms)
2. Enable Tone Disconnect(Y/N): (default No; If yes, use busy tone settings)
3. Enable Polarity Reversal(Y/N): (default No; Consult your carrier)
4. Silence Timeout(X1s): (default 60s)
5. AC Termination Impedance: (0-15, default 0)
 AC Termination Impedance Values (0-15, default 0)
 0 - 600 Ohm (North American)
 1 - 900 Ohm
 2 - 270 Ohm + (750 Ohm||150nF) and 275 Ohm + (780 Ohm||150nF)
 3 - 220 Ohm + (820 Ohm||120nF) and 220 Ohm + (820 Ohm||115nF)
 4 - 370 Ohm + (620 Ohm||310nF)
 5 - 320 Ohm + (1050 Ohm||230nF)
 6 - 370 Ohm + (820 Ohm||110nF)
 7 - 275 Ohm + (78 Ohm || 150 nF)
 8 - 120 Ohm + (820 Ohm||110 nF)
 9 - 350 Ohm + (1000 Ohm||210nF)
 10 - 0 Ohm + (900 Ohm||30nF)
 11 - 600 Ohm + 2.16 uF
 12 - 900 Ohm + 1 uF
 13 - 900 Ohm + 2.16 uF
 14 - 600 Ohm + 1 uF
 15 - Global complex impedance

Channel Dialing to PSTN

1. Wait for Dial-Tone(Y/N): (default No)
2. Stage Method(1/2):
3. Min Delay Before Dial PSTN Number: (default 500ms, range 50 ~ 65000ms)

	User ID	Sip Server	Sip Destination Port
4. Unconditional Call Forward to VOIP:	<input type="text" value="ch1-4:9413062200;"/> <small>(i.e. ch1-2:220;cn3:224</small>	<input type="text" value="@ch1-4:p1;"/> <small>ch1-2:p1;cn3:p2</small>	<input type="text" value="ch1-4:5060;"/> <small>ch1-2:5060;ch2:7080</small>

7. Program the —Unconditional Call Forward to VOIP:ll to include the DID (Direct Inward Dial) number(s) that are to be routed.

This routing is accomplished by Profiles 1, 2 & 3. Usually only one is necessary.

This data field is the routing of the calls that are received on this FXO circuit (aka—very important).

In our example the number dialed will always be 941-306-2200.

We have programmed the Grandstream to route calls that have been received to the SIP Server using Profile 1.

8. Click the button. This saves information on this page before moving on.

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Procedure—Configuration-Profile

1. Navigate to the Profile 1 page.
2. Here the SIP Server must be programmed. Set this to be the IP Address of the IPBX. In our example, the address is 192.168.2.18.
3. Also be sure that the SIP Registration field is set to —Noll.
4. Click the **Update** button. This saves information on this page before moving on.
5. The Gradnstream configuration is now complete. However if you wish to make changes to the dial plan allowed digits you must also program that information. Note: At default the Grandstream allows only digits 0-9 to be sent to the connected PSTN circuit. If you want to use PSTN features like call forward you will need to be able to send a —*ll to the CO. Go to Procedure—Configuration Dial Plan to make these changes. Otherwise:
6. When programming is complete in the Grandstream, click **Reboot** this will commit the changes saved thus far to memory and make them operational. Continue to Procedure—Configuring the IPitomy IP PBX...

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Activate Profile:	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Profile Name:	live (Optional, name of your profile)	
SIP Serve:	192.168.2.18 (Server domain name or IP address)	
Outbound Proxy:		
Use DNS SRV:	<input checked="" type="radio"/> No <input type="radio"/> Yes	
User ID is phone number:	<input checked="" type="radio"/> No <input type="radio"/> Yes	
SIP Registration:	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Unregister On Reboot:	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Register Expiration:	60 (in minutes, default 1 hour, max 45 days)	
SIP Registration Failure Retry Wait Time:	20 (in seconds, Between 1-3600, default is 20)	
SIP Transport:	<input checked="" type="radio"/> UDP <input type="radio"/> TCP	
NAT Traversal (STUN):	<input checked="" type="radio"/> No <input type="radio"/> No, but send keep-alive <input type="radio"/> Yes	
Proxy-Require:		
Early Dial:	<input checked="" type="radio"/> No <input type="radio"/> Yes (use "Yes" only if proxy supports 484 response)	
Session Expiration:	180 (in seconds, default 180 seconds)	
Min-SE:	90 (in seconds, default and minimum 90 seconds)	
Caller Request Timer:	<input type="radio"/> Yes <input checked="" type="radio"/> No (Request for timer when making outbound calls)	
Callee Request Timer:	<input type="radio"/> Yes <input checked="" type="radio"/> No (When caller supports timer but did not request one)	
Force Timer:	<input type="radio"/> Yes <input checked="" type="radio"/> No (Use timer even when remote party does not support)	
UAC Specify Refresher:	<input type="radio"/> UAC <input type="radio"/> UAS <input checked="" type="radio"/> Omit (Recommended)	
UAS Specify Refresher:	<input checked="" type="radio"/> UAC <input type="radio"/> UAS (When UAC did not specify refresher tag)	
Force INVITE:	<input type="radio"/> Yes <input checked="" type="radio"/> No (Always refresh with INVITE instead of UPDATE)	
Enable 100rel:	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Refer-To Uses Target Contact:	<input checked="" type="radio"/> No <input type="radio"/> Yes	
INVITE Ring-no-answer Timeout:	40 (in seconds, default 40 seconds)	
Preferred Vocoder:	choice 1: PCMU choice 2: PCMA choice 3: G.723.1 choice 4: G.729A/B	choice 5: GSM choice 6: GSM choice 7: PCMU choice 8: PCMU
Special Feature:	Standard	

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Procedure—Configuration-Dial Plan

To make changes to the allowed dial plan:

1. Navigate to the Dial Plan page.
2. In the field: —PSTN Outgoing Call Dial Plan input the characters as shown to add the ability to dial a —*||. The correct string is: `{x+ | [x*]+}`
Note: the —|| is not a 1.
3. Click the button. This saves information on this page before moving on.
4. When programming is complete in the Grandstream, click this will commit the changes saved thus far to memory and make them operational. Continue to Procedure—Configuring the IPitomy IP PBX

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Call Routing/Dial Plan (1 Stage Dialing Only) and Dial Settings

1. PSTN Outgoing Call Dial Plan:	<input type="text" value="{x+ [x*]+}"/>	
2. Hookflash Duration (X10ms):	<input type="text" value="ch1-4:60;"/>	(10-200, default 60)
3. Use DTMF Parameter from RFC2833 or SIP Info:	<input checked="" type="radio"/> Yes <input type="radio"/> No (Default Yes, No mean to use following DTMF parameter settings)	
4. DTMF Digit Length(X10ms):	<input type="text" value="ch1-4:10;"/>	(10-200, default 10)
5. DTMF Digit Volume(dB):	<input type="text" value="ch1-4:-11;"/>	(-31-0, default -11)
6. DTMF Dial Pause Between Each Digit(X10ms):	<input type="text" value="ch1-4:d*p10"/>	(syntax ch1-4:d[p[]] default 100ms pause won't show)

DTMF Dial Notes

1. Accept Digits:	1,2,3,4,5,6,7,8,9,0,*,#,A,a,B,b,C,c,D,d
2. Grammar:	x - any digit from 0-9; xx+ - at least 2 digit number; xx. - at least 2 digit number; ^ - exclude; T - timer; [3-5] - any digit of 3, 4, or 5; [147] - any digit 1, 4, or 7; <2=011> - replace digit 2 with 011 when dialing WARNING - illegal input will fall back to default
3. Example 1:	{[369]11 1617xxxxxxx} - Allow 311, 611, 911, and any 10 digit numbers of leading digits 1617
Example 2:	{^1900x+ <=1617>xxxxxxx} - Block any number of leading digits 1900 and add prefix 1617 for any dialed 7 digit numbers
Example 3:	{1xxx[2-9]xxxxxx <2=011>x+} - Allow any length of number with leading digit 2 and 10 digit numbers of leading digit 1 and leading exchange number between 2 and 9; If leading digit is 2, replace leading digit 2 with 011 before dialing
Example 4:	{ [x#]+ [x*]+ } - Allow any length of number with leading * or # in number to dial
4. Default Dial Plan:	PSTN Outgoing Call - {x+}
5. Dial Pause Usage:	Dial pause between digits looks like 'ch1-4:d2p200,d4p100' for GXW4104 or 'ch5-8:d1p100,d3p50' for GXW4108, where dx/py-means pause 10y-ms after d-th digit is dialed. Note that pause value has a multiplier of 10 and default 100ms pause for all digits are not shown.

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Procedure—Configuring the IPitomy IP PBX for Grandstream GXW 410x

1. In the IPitomy IPBX set the fields as you see them below... using the Static IP Address assigned to the Procedure—Configuration step previously completed.. (In our example we assigned the Grandstream an IP Address of 192.168.2.9. This becomes the —Hostll.)
2. Click 

SIP Provider	
Name:	<input type="text" value="grandstream"/>
User Type:	<input type="text" value="peer"/>
DTMF Mode:	<input type="text" value="auto"/>
Host:	<input type="text" value="192.168.2.9"/>
Port:	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>
Register:	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Custom <input type="text"/>
Authentication:	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Custom <input type="text"/>
Auth User:	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>
From User:	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>
From Domain:	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>
Realm:	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>
Outbound Proxy:	<input checked="" type="radio"/> Disabled <input type="radio"/> Enabled <input type="text"/>
Username:	<input type="text"/>
Secret:	<input type="text"/>
Inbound Caller ID:	<input type="text"/>
Outbound Caller ID Name:	<input type="text"/>
Outbound Caller ID Number:	<input type="text"/>
Call Limit:	<input type="text" value="2"/>
Qualify:	<input type="text" value="30000"/>

This should be number of circuits that are actually connected to the Grandstream.

3. Then click on the **Apply Changes** (upper right) to make these settings operational in the Ipitomy IPBX.
4. Test the operation. Make a call into each of the Grandstream ports that have circuits and assure that they are being routed as defined in Call Routing—Incoming.
5. Test the operation. Make a call at an Ipitomy extension using a calling pattern as defined in Call Routing—Outgoing to assure that the call that should be placed over the Grandstream ports are placed.

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Procedure—Configuring Optional Outbound Routing Methods

The Grandstream allows for two methods of outbound dialing at the same time.

- Round-Robin (Linear Hunt)
 - If you add the trunk to an outbound route in the PBX, the Grandstream will follow the Round-Robin rules, which are found on the Channels page. By default it will start at Line 1, and move on until it finds an available channel to dial outbound.
 - If you add the trunk to an outbound route and configure Prefix Digits to 99X where X is the port on the Grandstream you wish to use when placing this call (e.g. 991 is line 1). By doing this you can configure the calls to route out a particular line, or a different order if you add the trunk multiple times and prefix accordingly (992, 994, 991, 993, etc). The code of 99 can be changed on the Channels page in the Grandstream.

1. Navigate to the Channels page.

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2. Go to the Port Scheduling Schema (Voip->PSTN) section and input the code or codes that you wish (99x).

Port Scheduling Schema (Voip->PSTN)

1. Round-robin and/or Flexible: (default rr:1-4;)
(Syntax: rr: port_group; [...])
(Default: rr:1-4; round-robin of all ports)
2. Prefix to Specify Port(1 stage dialing method): (default 99)
(Syntax: prefix# + ch# + dialing# will request the ch# per call)
(Note that this code has to prefix dialplan number and prefix doesn't impact round-robin)

Procedure—Troubleshooting—Outbound Dialing

If you having trouble dialing outbound make the following changes on the FXO Lines page:

1. Tweak the Disconnect Threshold from 100 to 300ms.

FXO Termination

1. Enable Current Disconnect(Y/N): (default Y=yes)
If enabled, use threshold: (default 100ms, range 5 ~ 65530 ms)

2. Tweak the Minimum Delay Before Dialing Out from 500 to 750ms.

Channel Dialing to PSTN

1. Wait for Dial-Tone(Y/N): (default No)
2. Stage Method(1/2): (default 2 - 2 stage dialing)
3. Min Delay Before Dialing Out: (default 500ms, range 50 ~ 65000ms)

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Procedure—Troubleshooting—Call Quality

If you are having call quality issues try the following changes on the Channels page:

1. Set Silence Suppression from YES to NO.
2. Set Echo Cancellation from YES to NO.

Channel Voice Setting

1. Tx to PSTN Audio Gain(dB):	<input type="text" value="ch1-4:1;"/>	(-12-12, default 1)
2. Rx from PSTN Audio Gain(dB):	<input type="text" value="ch1-4:0;"/>	(-12-12, default 0)
3. Silence Suppression(Y/N):	<input type="text" value="ch1-4:Y;"/>	(default Yes)
4. Echo Cancellation(Y/N):	<input type="text" value="ch1-4:Y;"/>	(default Yes)

Procedure—Troubleshooting—Call Volume

If you are having issue with call volume try the following changes on the Channels page:

1. Increase/Decrease Tx to PSTN Audio Gain by increments of 3 for issues with external party volume.
2. Increase/Decrease Rx from PSTN Audio Gain by increments of 3 for issues with internal party volume.

Channel Voice Setting

1. Tx to PSTN Audio Gain(dB):	<input type="text" value="ch1-4:1;"/>	(-12-12, default 1)
2. Rx from PSTN Audio Gain(dB):	<input type="text" value="ch1-4:0;"/>	(-12-12, default 0)
3. Silence Suppression(Y/N):	<input type="text" value="ch1-4:Y;"/>	(default Yes)
4. Echo Cancellation(Y/N):	<input type="text" value="ch1-4:Y;"/>	(default Yes)

Procedure—Troubleshooting—Call Buzzing Noise

If you are having issues with a buzz heard prior to a Menu prompt; try upgrading the Grandstream firmware:

1. Navigate to Advanced Settings page
2. Ensure HTTP is selected for the method to upgrade
3. Set Firmware Server Path: to firmware.grandstream.com
4. Set Automatic Upgrade to YES
5. Set Allow DHCP Option 66 to override server to No
6. Click Update at the bottom of the page
7. Click Reboot

The upgrade may take as long as 20min when done through the internet, so allow plenty of time for this. While upgrading the LED will blink. When the LED returns to normal, the device has completed its upgrade.

Procedure—Troubleshooting—Restore Factory Default

To Restore Factory Defaults:

1. While powered up, hold the recessed Reset button in for 7+ seconds.