

MicroComm DXL

Grandstream FXS Gateway Settings Guide

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1 Introduction

This application note outlines the configuration information necessary in the DXL Administrator software and the Grandstream web configuration details to use a Grandstream FXS Gateway to provide analog telephone set ports for a VoIP based DXL system.

You should have some knowledge of the DXL Administrator Software before using this guide.

This application note outlines configuration for a 16 port GXW42xx series gateway, model GXW4216, but larger or smaller GXW series gateways are available with similar user interfaces, the main difference being the number of ports on the FXS port configuration pages.

2 Planning

Each of the telephone ports on the FXS gateway will be configured as a “Master” in the DXL system. This master will be assigned a unique “Master number” in the system.

Each DXL DCC can handle up to 13 VoIP masters, including Harding IMS-640, TMM-640, MAI-640, and third party VoIP devices such as VoIP telephones or telephones on FXS gateways. You will need to split up your masters to a maximum of 13 per exchange. For larger gateways (such as the 16 port gateway outlined here) this means that the ports will need to be split between two or more exchange DCC’s so that there are 13 or less VoIP masters per exchange DCC. This example has 13 ports on the first exchange DCC, and the remaining 3 ports on the second exchange DCC.

In addition you will need to assign unique numbers to masters, stations, and page zones. You will need to know the number of dial digits you want to assign to these masters, stations, and page zones for setup of the telephone dialling of these devices. The largest ID number of the devices will influence the number of digits needed to dial this number. On the DXL system the number of dial digits for each device could be independent, but for user simplicity’s sake, you may want to make the number of dial digits for all devices the same.

For example, if your largest master number is 90, your largest station number is 4100, and your largest page zone number is 9, you will need 2 digit master dial numbers, 4 digit station dial numbers, and 1 digit page zone dial numbers. To be consistent you may want to choose 4 digit dial numbers for all devices.

Dialling a device from a telephone attached to the FXS Gateway involves picking up the telephone, then dialling a prefix, then the number to call. If the number is less than the number of dialling digits, fill in the number with leading zeros. The prefixes are changeable in the DXL configuration but the defaults are as below:

- 0 dials a master station
- # dials an intercom station
- * Dials a page zone

With a three digit dial length for all devices:

- 0 101 dials master station 101
- # 199 dials intercom station 199
- # 042 dials intercom station 42 (prefixed with 0’s to fill to 3 digits)

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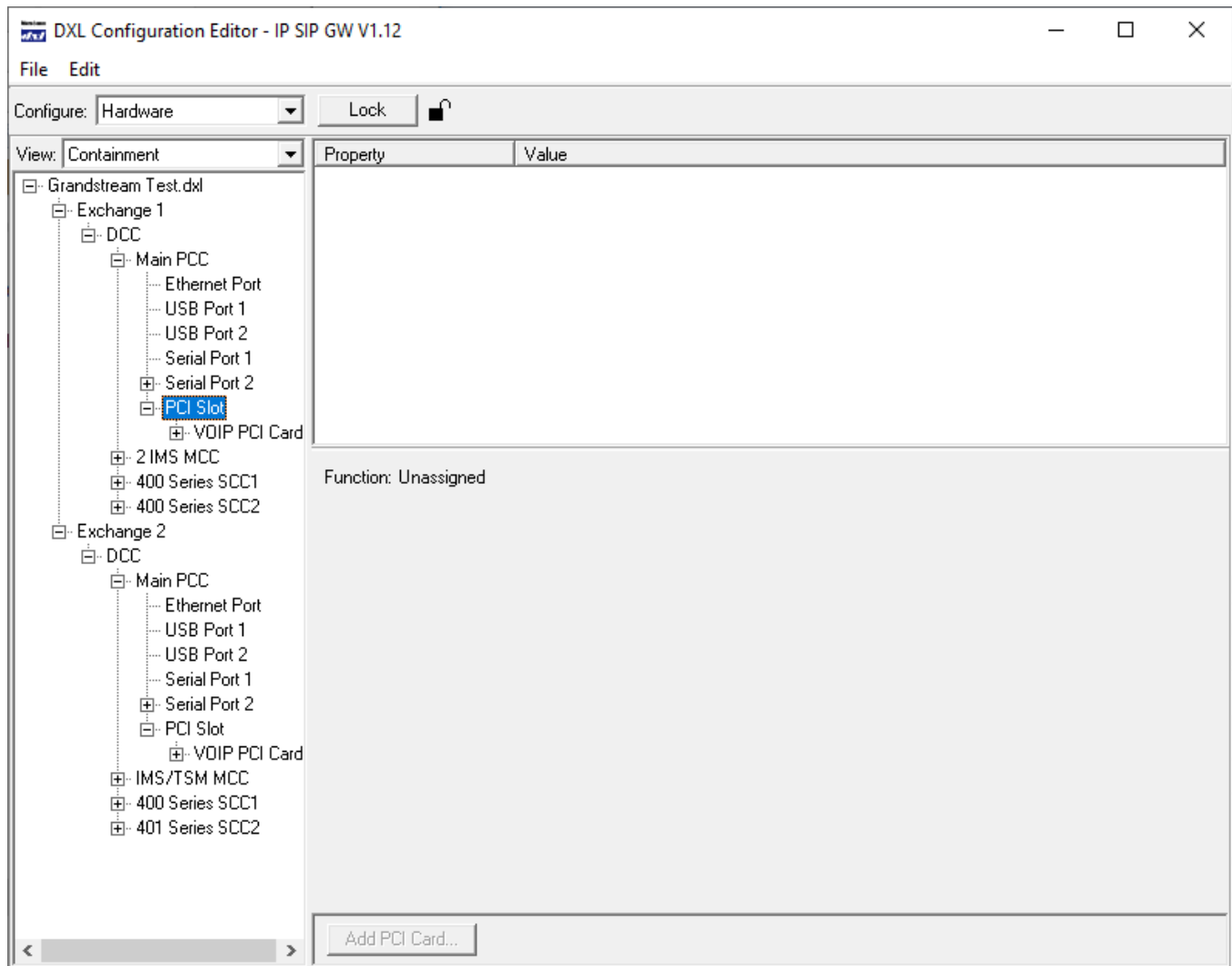
- * 009 dials page zone 9 (prefixed with 0's to fill to 3 digits)

3 DXL Administrator Configuration

This section outlines the settings required in the DXL Administrator configuration to use telephone ports on the Grandstream FXS Gateway as master stations.

3.1 Configure: Hardware

Make sure all of your exchanges were created with a “VOIP” card in the PCI slot when you created the DCC. This card can be added to the configuration if it was not. You can verify this (or add the card if necessary) by going to Configure: Hardware at the top left of the configuration editor, then open up the tree for each exchange to show the exchange, DCC, Main PCC, PCI slot. If there is no card installed then you can click the “Add PCI Card...” button at the bottom of the screen to add the cards to all exchanges.



3.2 Configure: Masters

Go to the “Configure: Masters” settings.

For each port on the FXS Gateway you wish to configure a master for, add a master. On the “Identification” tab set the following:

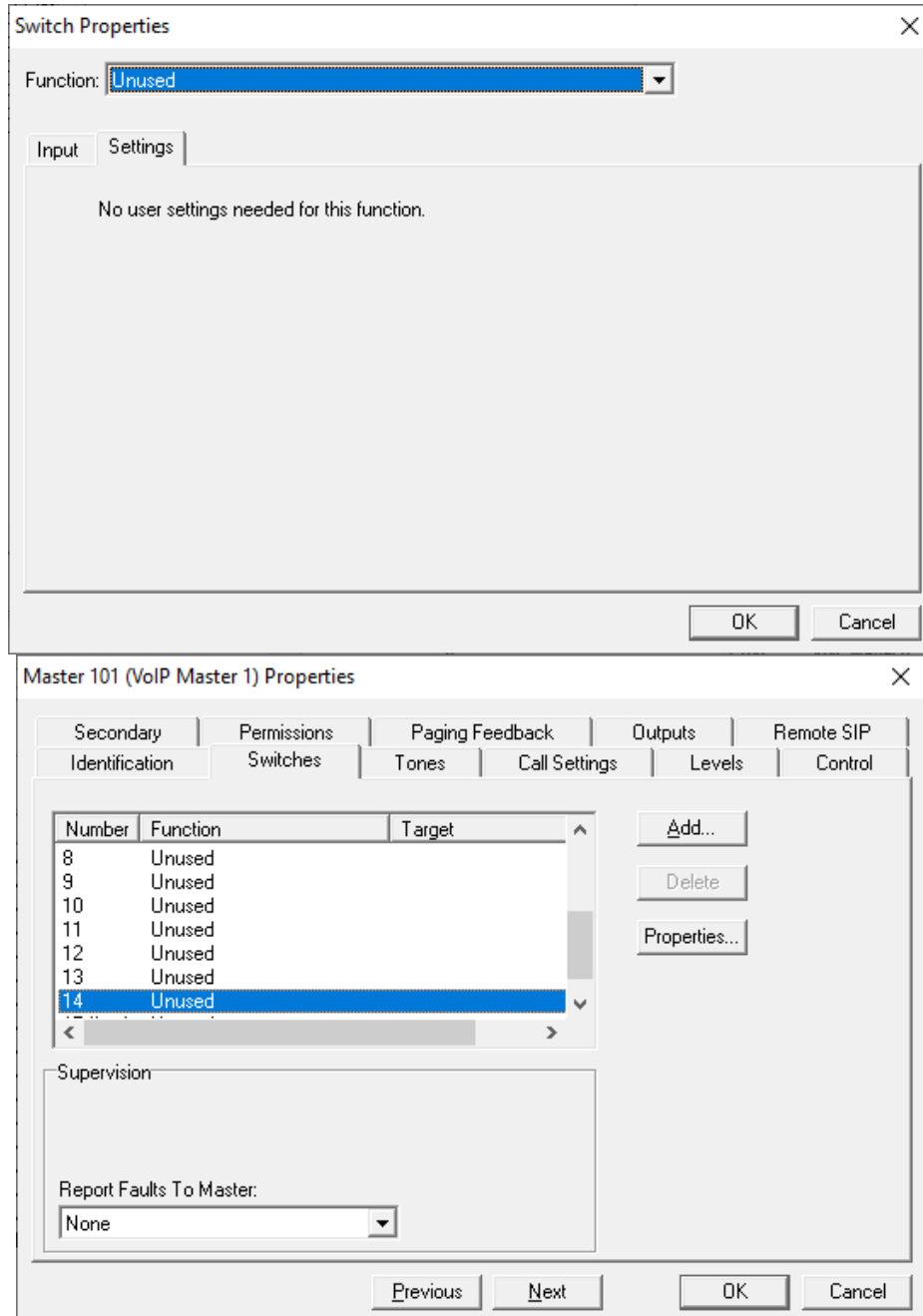
The screenshot shows a dialog box titled "Master 101 (VoIP Master 1) Properties". It has a close button (X) in the top right corner. The dialog is divided into two tabs: "Identification" (selected) and "Secondary". The "Identification" tab contains several sub-sections: "Permissions", "Paging Feedback", "Outputs", and "Remote SIP". Below these are "Switches", "Tones", "Call Settings", "Levels", and "Control". The main configuration area includes: "Number:" with a text box containing "101"; "Name:" with a text box containing "VoIP Master 1"; "Info:" with an empty text box and a browse button (...); "Type:" with a dropdown menu set to "IP Master"; "Exchange:" with a dropdown menu set to "Exchange 1"; "Box:" with a dropdown menu set to "DCC"; "Card:" with a dropdown menu set to "VOIP PCI Card"; and "Port:" with a dropdown menu set to "1". At the bottom of the dialog are four buttons: "Previous", "Next", "OK", and "Cancel".

- Set “Number” to the master number you wish to assign to this telephone. This will be the dial number of this master telephone.
- Set “Name” to the descriptive name for this master.
- Set “Type” to “IP master”
- Select the “Exchange” that the master is configured for.
- The “Port” setting is automatically allocated and reflects which of the 13 allowed VoIP masters that this master is set. This is not a physical port on the system, just a way to keep track of how many masters are currently allocated.

Note that when configuring the Grandstream FXS Gateway later, you will need to know the “Number” and the IP address of the “Exchange” settings for each master.

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On the “Switches” tab, double-click Switch 14 and set the function to “Unused” (this is set to “PTT Switch” by default with newer DXL Administrator versions). All other switches should be set to “Unused”, in particular, make sure no other switches have the function “PTT Switch”. If you do not do this, then you will not be able to talk out from the telephone on the gateway as it will require a PTT switch to talk which you do not have.



The other settings on the other tabs are set like other master stations.

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Repeat adding masters for all of the VoIP masters you are using on the FXS Gateway.

The screenshot shows the 'Masters' configuration window in the DXL Configuration Editor. The window title is 'DXL Configuration Editor - IP SIP GW V1.12'. The 'Configure:' dropdown is set to 'Masters' and there is a 'Lock' button. The 'View:' dropdown is set to 'Hardware'. A tree view on the left shows 'Grandstream Test.dxl' selected. The main table lists the following masters:

Number	Name	Info	Type	Port
101	VoIP Master 1		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
102	VoIP Master 2		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
103	VoIP Master 3		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
104	VoIP Master 4		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
105	VoIP Master 5		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
106	VoIP Master 6		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
107	VoIP Master 7		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
108	VoIP Master 8		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
109	VoIP Master 9		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
110	VoIP Master 10		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
111	VoIP Master 11		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
112	VoIP Master 12		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
113	VoIP Master 13		IP Master	/Exchange 1/DCC/Main PCC/PCI Slot/VOI
114	VoIP Master 14		IP Master	/Exchange 2/DCC/Main PCC/PCI Slot/VOI
115	VoIP Master 15		IP Master	/Exchange 2/DCC/Main PCC/PCI Slot/VOI
116	VoIP Master 16		IP Master	/Exchange 2/DCC/Main PCC/PCI Slot/VOI
117	TSM 1		TSM Master	/Exchange 2/DCC/IMS/TSM MCC/Telephc
199	Master Group		Master Group	N/A

At the bottom of the table, there are three buttons: 'Properties...', 'Add...', and 'Delete'.

3.3 Configure: System

Go to the “Configure: System” settings. On this page you will set the number of dial digits and view (or modify) the dial prefixes used by the system.

System Properties

TSM Dialing | Master Operations | Clock | Logging | General

Dialing Format

Fixed Length Variable Length

Fixed Length Id Digits

Station: 3
 Master: 3
 Page Zone: 3
 Station Group: 3
 Visiting Booth: 3
 Signal: 2
 Music: 2

Variable Length

Enable TSM Dialing Timeout
 Timeout (ms): 500

Dial Masters by Name

Separation Key

*

Man/Unman Key Sequence

Man TSM: 23#
 Unman TSM: 73#

Allow Dialing From IMS Keypad

Function Prefixes Prefix Digits: 0

Function	Prefix
Call Master	
Call Page Zone	
Call Station	
Call Visiting Booth	Disabled
Control Master Manned	Disabled
Control Page Zone Program	Disabled
Control Signal	Disabled
Control Station Audio Level Alarm	Disabled
Control Station Call Requests	Disabled
Control Station Group Audio Level Alarm	Disabled
Control Station Group Call Request	Disabled
Control Station Group Program	Disabled
Control Station Program	Disabled
Control Visiting Booth	Disabled
Host Message	Disabled
Monitor Station	Disabled

OK Cancel

- Set Dialing Format to “Fixed Length”.
- In the settings in the “Fixed Length Id Digits” box set the number of dialing digits for each type of device. It may be convenient for the users to set all of the dial digits to the same length but it is not required.

In this example all station, master, page zone, station group, and visiting booth numbers are set to 3 digit numbers.

The right hand side of this screen shows the current default prefixes for calling masters, stations, page zones, etc. such as

- 0 Call Master
- * Call Page Zone
- # Call Station

Once done click “OK”.

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This is all the the DXL Administrator settings that are needed for the FXS Gateway other than the usual settings. Save your configuration and use the file manager to upload and activate the configuration, then proceed to the next section.

4 Grandstream FXS Gateway Setup

Refer to the Grandstream User Manual “gxw42xx_usermanual_english.pdf” for details on the setup and configuration of the Grandstream FXS Gateway.

4.1 Setting the IP Address

The Grandstream FXS Gateway defaults to getting its address from DHCP. However most networks used for security electronics do not have a DHCP server, so you will need to set a manually allocated address.

4.1.1 Automatically Assigned DHCP Address

If you have a DHCP server on your network, the server will automatically assign a DHCP address to the Grandstream FXS Gateway. You can use the front panel display on the FXS Gateway to determine its IP address for later configuration.

Use the “Down Arrow” button on the FXS Gateway until “Network” is highlighted, and then press the “OK” button. The FXS gateway will then display the mode (DHCP or static) and the IP address assigned to it. You can scroll down with the “Down Arrow” button to see the current subnet mask.

You can then use the IP address given to set up the FXS Gateway where you can set up a static address, netmask, and other settings.

Note you can also set the address manually with the section below.

4.1.2 Manual Entry of Static Address with a Telephone

With factory default settings, you can set up the address of the FXS Gateway from an analog telephone plugged into any port of the gateway. The GXW gateway has a voice prompt system to set the addressing information.

From factory defaults, the voice prompt system is activated by pressing the “*” key on a telephone three times. The menu system will prompt for a three digit menu option.

- To set the mode to “Static IP” mode, dial menu item 001. The gateway will speak out the current mode. You can toggle between static and dynamic address by pressing the “9” key. Set the mode to “Static IP mode”. Press “#” to return to the main menu when the mode is confirmed as Static IP mode.
- To set the IP address, dial menu item 002. The gateway will speak out the current IP address. Type in the new IP address with a 12 digit number, with 4 sets of 3 digits to indicate the address. For example, “10.0.1.199” would be entered as “010000001199” (010 000 001 199). Once the IP address is confirmed, press “#” to return to the main menu.
- To set the Subnet Mask, dial menu item 003. The gateway will speak out the current Subnet mask. Type in the new subnet mask with a 12 digit number, with 4 sets of 3 digits to indicate the mask. For example, “255.255.255.0” would be entered as “255255255000” (255 255 255 000). Once the Subnet mask is confirmed, press “#” to return to the main menu.

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- To set the gateway address (if you have a large network spanning multiple subnets), dial menu item 004. The gateway will speak out the gateway address. Type in the new gateway address with a 12 digit number, with 4 sets of 3 digits to indicate the address. For example, "10.0.1.254" would be entered as "010000001254" (010 000 001 254). Once the gateway address is confirmed, press "#" to return to the main menu.
- You can also set the DNS server address with menu item 005 but this is not often used in security networks inside a facility as most do not have internet access on the security network.
- After you have made these changes you need to reboot the gateway. Dial menu item 099 then press "9" to confirm reboot of the gateway. Alternatively you can power off then power on the gateway.

Once configured and rebooted, you can use the front panel display on the gateway to confirm its IP address and netmask.

Uses the "Down Arrow" button on the FXS Gateway until "Network" is highlighted, and then press the "OK" button. The FXS gateway will then display the mode (DHCP or static) and the IP address assigned to it. You can scroll down with the "Down Arrow" button to see the current subnet mask.

4.2 Configuring the Grandstream FXS Gateway using a Web Browser

The following pages outline the settings required by the Grandstream FXS Gateway for use with the DXL system. Only the setting pages that need changes from the default will be detailed below.

If you have more than 13 ports in use, or if you will use one gateway from multiple DXL exchange DCCs, you will need to create one "Profile" on the gateway for each DCC that it will connect to. This example has two exchanges requiring two profiles, with exchange 1 using profile 1 for ports 1-13, and exchange 2 using profile 2 for ports 14-16.

To configure the Grandstream FXS Gateway, make sure your PC is on the same network as the gateway, and using a web browser, enter the IP address of the gateway in the address field of your browser (<http://10.0.1.199> in this example).

You will be prompted for a password; the default password is "admin".

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4.2.1 Settings to Change

The following pages outline the required and recommended changes from the default settings to work with the DXL system.

4.2.1.1 Maintenance/Network Settings

Grandstream GXW4216 Admin Logout Reboot English

Status Maintenance Advanced Settings Profiles FXS Ports

Version 1.0.5.5

Maintenance

Network Settings

Upgrade and Provisioning

Web/Telnet Access

TR-069

SNMP

Security Settings

Date and Time

Syslog

Network Settings

IP Address Mode DHCP PPPoE Static IP

Preferred DNS Server 0 . 0 . 0 . 0

DHCP Settings

Host name (Option 12)

DHCP Domain

Vendor Class ID (Option 60) GXW4200

PPPoE Settings

PPPoE Account ID

PPPoE password

PPPoE Service Name

Static IP Settings

IP Address 10 . 0 . 1 . 199

Subnet Mask 255 . 255 . 255 . 0

Gateway 0 . 0 . 0 . 0

DNS Server 1 0 . 0 . 0 . 0

DNS Server 2 0 . 0 . 0 . 0

Enable LLDP Enabled Disabled

Layer 2 QoS Settings

Layer 2 QoS 802.1Q/VLAN Tag 0

Layer 2 QoS 802.1p Priority Value for SIP signaling 0

Layer 2 QoS 802.1p Priority Value for RTP media 0

STUN Settings

Use STUN No Yes

STUN server

Number of STUN Response Misses Allowed 3

Keep-Alive Interval 20

Save Save and Apply Reset

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This page indicates the current mode (DHCP, Static) and current IP address, Subnet mask, Gateway, and DNS Server addresses. You will normally have already set these up in the previous step but you can change them here if necessary (which you may want to do if it was initially configured with DHCP and you want to assign static addressing).

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4.2.1.2 Maintenance/Web/Telnet Access

The screenshot shows the Grandstream GXW4216 Web/Telnet Access configuration page. The page has a blue header with the Grandstream logo and navigation tabs: Status, Maintenance, Advanced Settings, Profiles, and FXS Ports. The version is 1.0.5.5. On the left, there is a sidebar with 'Maintenance' selected, containing options like Network Settings, Upgrade and Provisioning, Web/Telnet Access, TR-069, SNMP, Security Settings, Date and Time, and Syslog. The main content area is titled 'Web/Telnet Access' and includes a 'Web Port' field set to 80, a 'Disable Telnet' section with radio buttons for 'No' and 'Yes' (selected), and two password sections: 'User Password' and 'Admin Password', each with 'New Password' and 'Confirm Password' input fields. At the bottom, there are 'Save', 'Save and Apply', and 'Reset' buttons. A copyright notice for Grandstream Networks, Inc. 2015 is at the very bottom.

This page will allow you to disable the telnet console and specify new passwords for user and administration access to the Grandstream FXS Gateway web configuration.

- It is recommended to set “Disable telnet” to “Yes” to close the telnet port to secure your network.
- It is suggested that you set a non-default password for user and administration access (and record the password so that the gateway can be accessed or modified later).

4.2.1.3 Advanced/System Features

The screenshot shows the Grandstream GXW4216 System Features configuration page. The page has a blue header with the Grandstream logo and navigation tabs: Status, Maintenance, Advanced Settings, Profiles, and FXS Ports. The version is 1.0.5.5. On the left, there is a sidebar with 'Advanced Settings' selected, containing options like Ring Tones, FXO Follower, and System Features. The main content area is titled 'System Features' and includes three sections with radio buttons for 'No' and 'Yes' (selected): 'Disable Direct IP Call', 'Disable SIP NOTIFY Authentication', and 'Disable Voice Prompt'. Below these are fields for 'IVR Language' (set to English), 'Upload/Delete language pack' (with Upload and Delete buttons), 'LCD Display Language' (set to English), 'Prompt Dial Tone Code' (empty field), and 'Country Specific Deployment' (set to None(default)). At the bottom, there are 'Save', 'Save and Apply', and 'Reset' buttons. A copyright notice for Grandstream Networks, Inc. 2015 is at the very bottom.

The Grandstream FXS Gateway allows the phones on the FXS ports to call to other VoIP enabled devices without going through the server and allows phones connected to it to access the menu system used for system setup. For security purposes you will want to disable this functionality.

- Set “Disable Direct IP call” to “Yes” to forbid dialing to other VoIP enabled devices without going through the server.
- Set “Disable voice Prompt” to “Yes” to disable the menu system on phones connected to the FXS Gateways so that users at the phones cannot change the FXS Gateway settings.

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4.2.1.4 Profiles/Profile X/General Settings

The screenshot displays the Grandstream GXW4216 web interface. At the top, there is a header with the Grandstream logo, navigation links (Status, Maintenance, Advanced Settings, Profiles, FXS Ports), and user options (Admin Logout, Reboot, English). The main content area is titled "General Settings" for "Profile 1". The settings include:

- Profile Active:** Radio buttons for No and Yes, with Yes selected.
- SIP Server:** A text input field containing "10.0.1.95".
- Fallover SIP Server:** An empty text input field.
- Prefer Primary SIP Server:** Radio buttons for No and Yes, with No selected.
- Outbound Proxy:** An empty text input field.

At the bottom of the settings area, there are three buttons: "Save", "Save and Apply", and "Reset". A sidebar on the left lists other settings categories like Network Settings, SIP Settings, Fax Settings, Audio Settings, Call Settings, Call Features Settings, and Ring Tones. Below the main content area, there are links for Profile 2, Profile 3, and Profile 4.

For each DCC on the system, you will create a profile. Each profile will specify the IP address of the DCC server on the “General Settings” page.

- Ensure that the “Profile Active” setting is set to “Yes”.
- Set the “SIP Server” address to the DCC address for this exchange.

The page shown specifies the server address for the first profile (“Profile 1”). If you have more than 13 ports in use, you will have the other ports assigned to another profile (for another exchange DCC) such as “Profile 2”. In this case you will repeat these settings for the other profile pages accordingly, using the correct “SIP Server” address for the other exchange DCC(s).

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4.2.1.5 Profiles/Profile X/SIP Settings/Call Settings

There are two settings that need to be changed on the “Call Settings” page for each profile.

- The “Use # as Dial Key” setting must be set to “No”.
- The “Dial Plan” entry will reflect the number of dial digits needed for master, station, and page zone calls, and other special features.

For the “Dial Plan” entry, you need to know the number of dial digits for each type of device you want to call.

For 3-digit master numbers, 3 digit station numbers, and 3 digit page zone numbers the “Dial Plan” entry should be “{ 0xxx | #xxx | *xxx }” as shown to indicate that valid dialing numbers are “0” followed by 3 digits (master numbers), “#” followed by 3 digits (station numbers), or “*” followed by 3 digits (page zone numbers).

For all numbers as four digit numbers the dial plan would be “{ 0xxxx | #xxxx | *xxxx }”.

Your dial plan will change accordingly if you have different number of digits for different devices. For example, with 2 digit masters, 4 digit stations, and 1 digit page zones, the dial plan would be “{ 0xx | #xxxx | *x }”.

The above dial plans exclude special features such as monitoring, changing ALA settings, and other special features. A more comprehensive dial plan would be “{ 0xxx | #xxx | *xxx | [1-6]xxx | 9xxx | 7xxx }” (3 digit masters, 3 digit stations, 3 digit page zones, 3 digit station control commands, 3 digit visiting booth commands, 3 digit page zone commands)

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4.2.1.6 Profiles/Profile X/SIP Settings/Call Feature settings

Grandstream GXW4216 Admin Logout Reboot English

Grandstream Status Maintenance Advanced Settings Profiles FXS Ports Version 1.0.5.5

Profiles **Call Features Settings**

Profile 1 -

- General Settings
- Network Settings
- SIP Settings
- Fax Settings
- Audio Settings
- Call Settings
- Call Features Settings**
- Ring Tones
- Profile 2 +
- Profile 3 +
- Profile 4 +

Enable Call Features No Yes Enable All

SRTP Feature No Yes

Enable SRTP

Disable SRTP

SRTP per call Feature No Yes

Enable SRTP per call

Disable SRTP per call

CID Feature No Yes

Enable CID

Disable CID

CID per call Feature No Yes

Enable CID per call

Disable CID per call

Direct IP calling Feature No Yes

Direct IP calling

CW Feature No Yes

Enable CW

Disable CW

CW per call Feature No Yes

Enable CW per call

Disable CW per call

Call return Feature No Yes

Call return

Unconditional forward Feature No Yes

Enable unconditional forward

Disable unconditional forward

Busy forward Feature No Yes

Enable busy forward

Disable busy forward

Delayed forward Feature No Yes

Enable delayed forward

Disable delayed forward

Paging Feature No Yes

Paging

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DND Feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
Enable DND	<input type="text" value="78"/>
Disable DND	<input type="text" value="79"/>
<hr/>	
Blind Transfer Feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
Enable blind transfer	<input type="text" value="87"/>
<hr/>	
Disable LEC per call Feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
Disable LEC per call	<input type="text" value="03"/>
<hr/>	
Disable Bellcore-style 3-Way Conference	<input checked="" type="radio"/> No <input type="radio"/> Yes
Star Code 3WC Feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
Star Code 3WC	<input type="text" value="23"/>
<hr/>	
Provision start Feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
Enable provision start	<input type="text" value="99"/>
<hr/>	
Play registration id Feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
Enable playing registration id	<input type="text" value="98"/>
<hr/>	
Forced Codec Feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
Forced Codec	<input type="text" value="02"/>
PCMU codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
PCMU codec	<input type="text" value="7110"/>
PCMA codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
PCMA codec	<input type="text" value="7111"/>
G723 codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
G723 codec	<input type="text" value="723"/>
G729 codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
G729 codec	<input type="text" value="729"/>
AAL2-G726-R16 codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
AAL2-G726-R16 codec	<input type="text" value="72616"/>
AAL2-G726-R24 codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
AAL2-G726-R24 codec	<input type="text" value="72624"/>
AAL2-G726-R32 codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
AAL2-G726-R32 codec	<input type="text" value="72632"/>
AAL2-G726-R40 codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
AAL2-G726-R40 codec	<input type="text" value="72640"/>
iLBC codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
iLBC codec	<input type="text" value="7201"/>
G722 codec feature	<input type="radio"/> No <input checked="" type="radio"/> Yes
G722 codec	<input type="text" value="722"/>
<hr/>	
<input type="button" value="Save"/> <input type="button" value="Save and Apply"/> <input type="button" value="Reset"/>	

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The Call Feature settings allow special key sequences on the phone to activate special features when the Grandstream FXS Gateway is used as part of a phone system (such as calling from phone to phone, enabling caller ID, etc.). For use with a DXL system all of the features are provided by the DXL system and the "*" key used by these codes is used for paging on the DXL system by default. For each profile, you want to disable these key sequences so that the DXL system will handle all special features and process all keys on the phone.

- Set "Enable Call Features" at the top of this page to "No".

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4.2.1.7 FXS Ports/Port Settings/FXS 1-16

Port	SIP User ID	Authenticate ID	Password	Name	Profile	Enable FXS (TR-069)
FXS 1	101	101		Master 101	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 2	102	102		Master 102	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 3	103	103		Master 103	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 4	104	104		Master 104	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 5	105	105		Master 105	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 6	106	106		Master 106	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 7	107	107		Master 107	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 8	108	108		Master 108	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 9	109	109		Master 109	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 10	110	110		Master 110	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 11	111	111		Master 111	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 12	112	112		Master 112	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 13	113	113		Master 113	Profile 1	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 14	114	114		Master 114	Profile 2	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 15	115	115		Master 115	Profile 2	<input type="radio"/> No <input checked="" type="radio"/> Yes
FXS 16	116	116		Master 116	Profile 2	<input type="radio"/> No <input checked="" type="radio"/> Yes

This page contains the important information about the account user name and which profile (server) each telephone port will be configured for.

You will have one line for each port on the Grandstream FXS Gateway, and larger gateways may have more than one page of FXS ports.

For each port there are 6 settings that you will change.

- SIP User ID: This is an important setting and you must set this to the master number of this telephone port. This **must** be the same as the “Master number” in the DXL Administrator for this master.
- Authenticate ID: Also set this to the master number of this telephone port.
- Password: Set this to the master number of this telephone port as well.
- Name: This is optional and is just a descriptive name for the master on this telephone port
- Profile: This will be set to the profile (DXL DCC exchange server) that this master will report to. In this example ports 1-13 are set to “Profile 1” (exchange 1), and ports 14-16 are set to “Profile 2” (exchange 2). **Note that a DXL DCC server can handle a maximum of 13 masters, hence if you are using more than 13 IP masters plus telephones on the FXS Gateway, you will need to split the load between two or more exchanges so that no more than 13 IP masters are on each exchange.**
- Enable FXS: Set this to “Yes” for all of the ports you are using.

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4.2.2 Information Screens

The following screens show information about the gateway and status of the telephone ports attached to it.

4.2.2.1 Status/System Info

The screenshot shows the Grandstream GXW4216 System Info page. The top navigation bar includes 'Status', 'Maintenance', 'Advanced Settings', 'Profiles', and 'FXS Ports'. The 'System Info' section is active, displaying the following information:

System Info	
Product Model	GXW4216 V2.3B
Part Number	9660001523B

Software Version	
Boot	1.0.5.1
Core	1.0.5.4
Base	1.0.5.3
Prog	1.0.5.5
CPE	1.0.1.47

System Time	
System Up Time	6 days
System Time	6:49PM Tue, 06 January 1970

Service Status	
/prog/bin/g_s_ata	MEM: 7304
/usr/bin/g_s_gui	MEM: 3184

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This page displays the model number and version information of the gateway.

4.2.2.2 Status/Network Status

The screenshot shows the Grandstream GXW4216 Network Status page. The top navigation bar includes 'Status', 'Maintenance', 'Advanced Settings', 'Profiles', and 'FXS Ports'. The 'Network Status' section is active, displaying the following information:

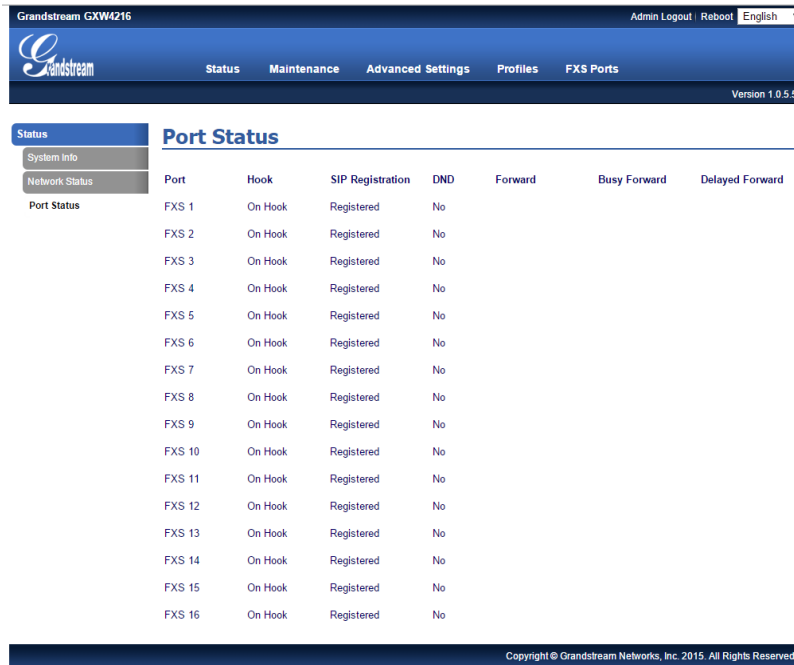
Network Status	
MAC Address	00:0B:82:53:7A:5A
IP Address Mode	Static IP
IP Address	10.0.1.199
Subnet Mask	255.255.255.0
Gateway	
DNS Server	0.0.0.0
PPPoE Link Up	Disabled

NAT Traversal	
Profile 1	No
Profile 2	No
Profile 3	No
Profile 4	No

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This page displays the MAC address and IP addressing information of the gateway.

4.2.2.3 Status/Port Status



The screenshot shows the Grandstream GXW4216 web interface. The top navigation bar includes 'Status', 'Maintenance', 'Advanced Settings', 'Profiles', and 'FXS Ports'. The 'Port Status' page displays a table with the following columns: Port, Hook, SIP Registration, DND, Forward, Busy Forward, and Delayed Forward. The table lists 16 FXS ports, all with 'On Hook' status and 'Registered' SIP status. The DND column for all ports is 'No'. The bottom of the page contains the copyright notice: 'Copyright © Grandstream Networks, Inc. 2015. All Rights Reserved.'

Port	Hook	SIP Registration	DND	Forward	Busy Forward	Delayed Forward
FXS 1	On Hook	Registered	No			
FXS 2	On Hook	Registered	No			
FXS 3	On Hook	Registered	No			
FXS 4	On Hook	Registered	No			
FXS 5	On Hook	Registered	No			
FXS 6	On Hook	Registered	No			
FXS 7	On Hook	Registered	No			
FXS 8	On Hook	Registered	No			
FXS 9	On Hook	Registered	No			
FXS 10	On Hook	Registered	No			
FXS 11	On Hook	Registered	No			
FXS 12	On Hook	Registered	No			
FXS 13	On Hook	Registered	No			
FXS 14	On Hook	Registered	No			
FXS 15	On Hook	Registered	No			
FXS 16	On Hook	Registered	No			

This page displays the status of the telephone ports of the gateway.

It also indicates whether the gateway is properly configured and communicating with the DXL DCC servers. The “SIP registration” status for each port that has been configured should indicate “Registered” indicating that the Grandstream FXS Gateway for that telephone has successfully communicated with its server (the DXL DCC exchange) and “registered” that device with the server.

If any ports do not show “Registered”, then verify the following:

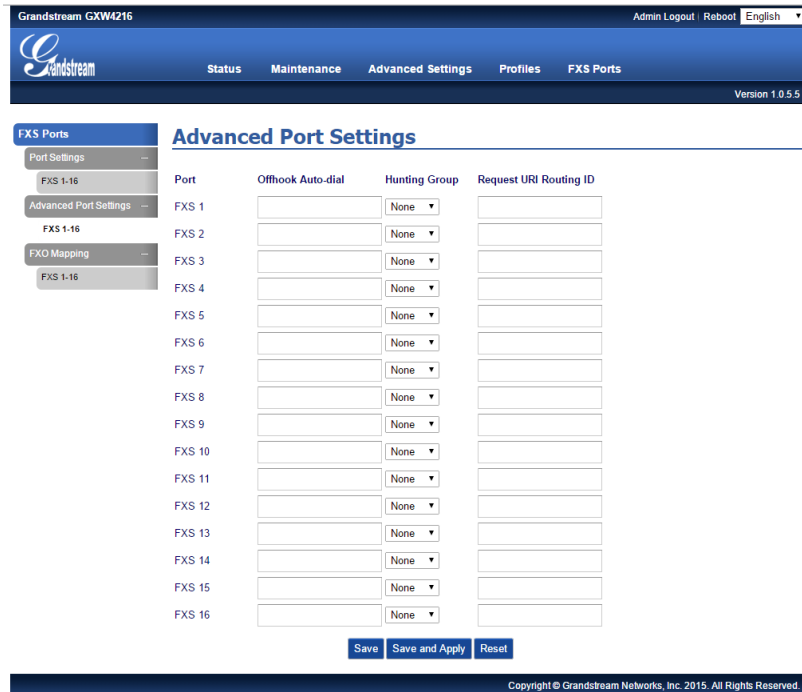
- On FXS Ports/Port Settings/FXS 1-16, verify that the “SIP User ID” exactly matches a master number in the DXL Administrator configuration. Verify that it is assigned a profile and note the profile number.
- On the Profiles/Profile X/General Settings for the indicated profile, verify that “Profile active” is set to “Yes”. Verify that the “SIP Server” setting is set to the IP address of the exchange DCC that the master is assigned to in the DXL Administrator configuration.

4.3 Optional Special Features

4.3.1 Setting a Telephone to Automatically Dial a Number When Picked Up

The Grandstream FXS Gateway can be set so that phones on designated ports can automatically dial a number when the phone is picked up. This is set up in the FXS Ports/Advanced Port settings page.

4.3.1.1 Grandstream FXS Ports/Advanced Port Settings/FXS 1-16



Port	Offhook Auto-dial	Hunting Group	Request URI Routing ID
FXS 1	<input type="text"/>	None	<input type="text"/>
FXS 2	<input type="text"/>	None	<input type="text"/>
FXS 3	<input type="text"/>	None	<input type="text"/>
FXS 4	<input type="text"/>	None	<input type="text"/>
FXS 5	<input type="text"/>	None	<input type="text"/>
FXS 6	<input type="text"/>	None	<input type="text"/>
FXS 7	<input type="text"/>	None	<input type="text"/>
FXS 8	<input type="text"/>	None	<input type="text"/>
FXS 9	<input type="text"/>	None	<input type="text"/>
FXS 10	<input type="text"/>	None	<input type="text"/>
FXS 11	<input type="text"/>	None	<input type="text"/>
FXS 12	<input type="text"/>	None	<input type="text"/>
FXS 13	<input type="text"/>	None	<input type="text"/>
FXS 14	<input type="text"/>	None	<input type="text"/>
FXS 15	<input type="text"/>	None	<input type="text"/>
FXS 16	<input type="text"/>	None	<input type="text"/>

Save Save and Apply Reset

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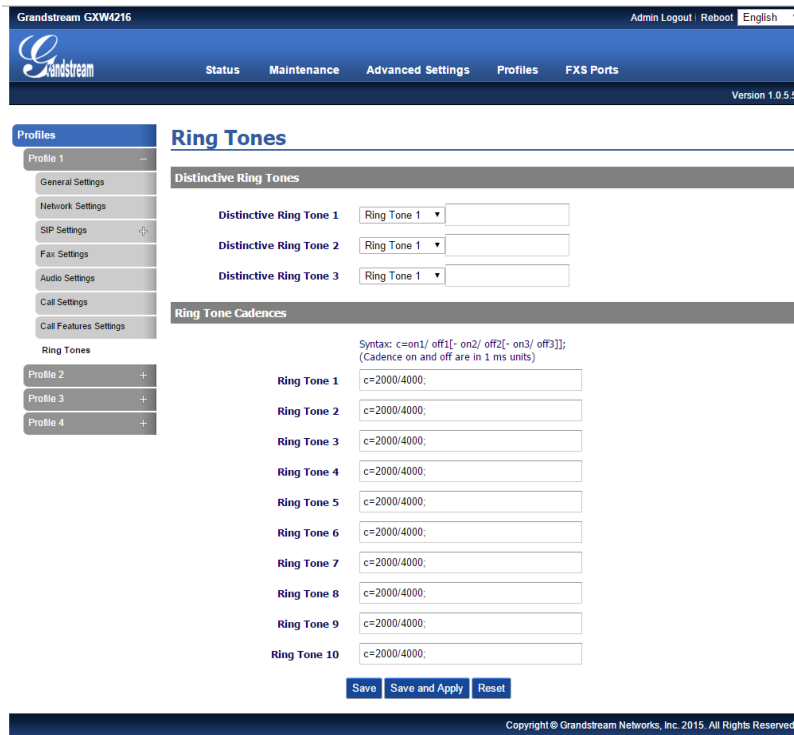
If you wish to have a telephone automatically dial a fixed device (such as automatically call one station or call one page zone) when taken off hook, then you can enter the dial code for that device in the “Offhook Auto-dial” setting in the line corresponding to that port.

For example, to automatically call page zone 99 with a 3 digit page zone you could enter “*099” in an “Offhook Auto-dial” entry for that telephone port. As soon as someone picks up that telephone it will automatically connect to the specified page zone. Likewise to automatically dial station 200 with a 3 digit station number you could enter “#200” in the “Offhook Auto-dial” entry for that telephone port.

4.3.2 Distinctive Ring Tones

The Grandstream FXS Gateway allows you to specify distinctive ring tones for caller IDs matching a pre-determined number of pattern. This can be used to have a unique ring if a master is calling or even a particular master (such as a central control master) could have a unique ring tone. This is configured in the “Profiles/Profile X/SIP Settings/Ring Tones” settings for each profile on the Grandstream FXS Gateway.

4.3.2.1 Grandstream Profiles/Profile X/SIP Settings/Ring Tones



The default settings have all caller IDs use the default ring tone which is 2 seconds of ringing followed by 4 seconds of silence. You can change this ring tone for multiple rings or different ring and silence periods.

The Ring Tones page for each profile has two sections. The Distinctive Ring Tones section allows for 3 caller ID matching patterns and allows you to select a distinctive ring tone for that pattern.

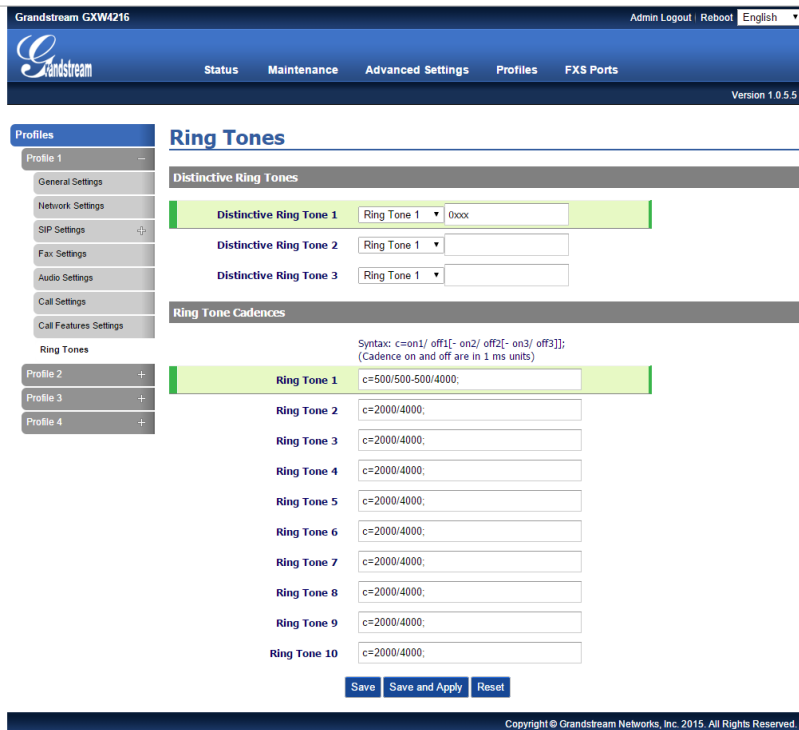
The Ring Tone Cadences section allows you to specify the on/off time (and number of rings) for a particular distinctive ring tone.

You can have the ring tone cadence generate a number of patterns of ring on/ring off. Note that the caller ID is sent to the phone during the off time and there must be at least one off time of 1500 ms or higher for the caller ID to be transmitted.

The above settings show the default with no distinctive ring tones and all default cadence settings to a single ring with 2 seconds on and 4 seconds off time.

To set all master to master calls to have a unique ring tone, you can set a caller ID pattern and ringtone. The example below assumes 3 digit master numbers with the default prefix “0” for masters.

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To set a unique ring tone for all masters to have 2 rings when a master calls in, you can set the following settings.

- Distinctive Ring Tone 1: Ring Tone 1 0xxx
This sets the first distinctive ring tone to use “Ring Tone 1” which will trigger on all masters (a caller ID of 0 followed by 3 digits).
The caller ID matching string is in the same format as the “Dial Plan” settings outlined previously.
- Ring Tone 1: c=500/500-500/4000;
This sets the distinctive ring tone to ring for ½ second on, ½ second off, then ½ second on, 4 seconds off (two ½ second rings then a 4 second wait)

The default ring tone is a cadence of “c=2000/4000;” which is 2 second on and 4 seconds off. Other unique rings you could use may be “c=500/500-500/500-500/4000;” which is three ½ second rings with 4 seconds off, or “c=1000/2000;” which is a shorter 1 second ring with 2 seconds off.

You can set up to 3 different ring patterns and uniquely identify even a single master calling in to ring differently. The more specific caller ID patterns must be first in the list. For example to have master 101 have a unique 3 ring tone and all other masters to have a 2 ring tone you may have

- Distinctive Ring Tone 1: Ring Tone 1 0101
- Distinctive Ring Tone 2: Ring Tone 2 0xxx
- Ring Tone 1: c=500/500-500/500-500/4000;
- Ring Tone 2: c=500/500-500/4000;

4.3.3 Dialing Without Prefixes

The default option for the DXL system is to use prefixes to allow dialing different types of devices which may have the same numbers otherwise. For example, dialing “0” then a number will dial a master, dialing “#” then a number would dial an intercom station, and dialing “*” then a number would dial a page zone.

If this is not desired, or if the phones are only used for one purpose such as paging only, you may not want to require a prefix. In this case you can set the DXL administrator and the dial plan settings in the FXS Gateway to not require the prefix.

Note that this requires all dial digits to be the same, and also requires that the dial numbers for masters, stations, and page zones to be unique, and you cannot do any special features such as monitoring, music control, etc.

4.3.3.1 DXL Administrator Settings

Go to the “Configure: System” settings.

Function	Prefix
Call Master	
Call Page Zone	
Call Station	
Call Visiting Booth	Disabled
Control Master Manned	Disabled
Control Page Zone Program	Disabled
Control Station Audio Level Alarm	Disabled
Control Station Call Requests	Disabled
Control Station Group Audio Level Alarm	Disabled
Control Station Group Call Request	Disabled
Control Station Group Program	Disabled
Control Station Program	Disabled

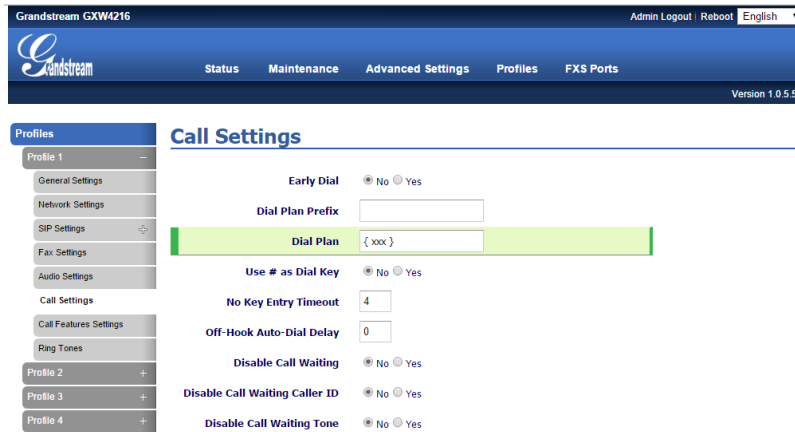
- Make sure that “Fixed Length Id Digits” for “Station”, “Master”, and “Page Zone” are all set to the same number of digits.
- Set the “Prefix Digits” setting to 0.
- For “Call Master”, “Call Page Zone”, and “Call Station”, click on the “Prefix” column and press “Backspace” to clear the prefix.
- For each of the other functions, click on the “Prefix” column and use the pull-down button to select “Disabled”.

Click OK, save the configuration, and upload it to the system and activate the new configuration.

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4.3.3.2 Grandstream Profiles/Profile X/Call Settings

Next you have to change the dial plan on the FXS Gateway to change the dial numbers to just the number of digits. This is in the Profiles/Profile X/Call Settings pages. If you have more than one profile you will want to change it for all profiles.



Change the “Dial Plan” setting to the new numbering scheme without prefix. For a 3 digit number without prefix use “{ xxx }”

Once configured, you can then dial masters, stations, and page zones using just the number without a prefix.

For example if masters are numbered 100 to 199, stations are numbered 200-499, and page zones are numbered 1 to 99, you can dial

- 105 Dials master 105
- 391 Dials station 391
- 085 Dials page zone 85