# Grandstream Networks, Inc.

## GXE5102/5104/5108/5116

## All-in-one Hybrid IPPBX Appliance

## User Manual

Grandstream Networks, Inc.

www.grandstream.com

# GXE5102/5104/5108/5116 User Manual

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# CHANGE LOG

This section documents significant changes from previous versions of GXE5102/5104/5108/5116 user manuals. Only major new features or major document updates are listed here. Minor updates for corrections or editing are not documented here.

## FIRMWARE VERSION 1.0.0.19

- This is the initial version.

# WELCOME

Thank you for purchasing Grandstream GXE5102/5104/5108/5116. GXE5102/5104/5108/5116 is an innovative, all-in-one hybrid IP PBX appliance designed for small to medium business. Powered by an advanced hardware platform with robust system resources, the GXE5102/5104/5108/5116 offers a highly versatile state-of-the-art Unified Communication (UC) solution for converged voice, video, data, fax and video surveillance application needs. Incorporating industry-leading features and performance, the GXE5102/5104/5108/5116 offers quick setup, deployment with ease and unrivaled reliability all at an unprecedented price point.

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⚠ **Caution:**

Changes or modifications to this product not expressly approved by Grandstream, or operation of this product in any way other than as detailed by this User Manual, could void your manufacturer warranty.

⚠ **Warning:**

Please do not use a different power adaptor with the GXE5102/5104/5108/5116 as it may cause damage to the products and void the manufacturer warranty.

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This document is subject to change without notice. The latest electronic version of this user manual is available for download here:
http://www.grandstream.com/support

# PRODUCT OVERVIEW

## FEATURE HIGHTLIGHTS

- 1GHz ARM Cortex A8 application processor, large memory (512MB DDR RAM, 4GB NAND Flash), and dedicated high performance multi-core DSP array for advanced voice processing
- Integrated 2/4/8/16 PSTN trunk FXO ports, 2 analog telephone FXS ports, and up to 50 SIP trunk options
- Gigabit network port with integrated PoE, USB, SD; integrated NAT router with advanced QoS support (GXE5102 only)
- Supports a wide range of popular voice codes (including G.711 A-law/U-law, G.722, G.723, G.726, G.729A/B, iLBC, GSM), video codec (including H.264, H.263, H.263+), and Fax (T.38)
- Hardware DSP based 128ms-tail-length carrier-grade line echo cancellation (LEC)
- Supports up to 60 concurrent calls and up to 32 conference attendees
- Flexible dial plan, call routing, site peering, call recording
- Automated detection and provisioning of IP phones, video phones, ATA and other endpoints for easy deployment
- Hardware encryption accelerator to ensure strongest security protection using SRTP, TLS, and HTTPS

## TECHNICAL SPECIFICATIONS

**Table 1: GXE5102/5104/5108/5116 TECHNICAL SPECIFICATIONS**

| **Interfaces** | |
|---|---|
| **Analog Telephone FXS Ports** | 2 ports |
| **PSTN Line FXO Ports** | 2 ports (GXE5102); 4 ports (GXE5104);<br>8 ports (GXE5108); 16 ports (GXE5116) |
| **Network Interfaces** | Single or Dual (GXE5102 only) 10M/100M/1000M RJ45 Ethernet port (s) with integrated PoE Plug (IEEE 802.3at-2009) |
| **NAT Router** | Yes (GXE5102 only) |
| **Peripheral Ports** | USB, SD |
| **LED Indicators** | Power/Ready, Network, PSTN Line, USB, SD |
| **LCD Display** | 128x32 graphic LCD with DOWN and OK button |
| **Reset Switch** | Yes |
| **Voice/Video Capabilities** | |

| | |
|---|---|
| **Voice-over-Packet Capabilities** | LEC with NLP Packetized Voice Protocol Unit, 128ms-tail-length carrier grade Line Echo Cancellation, Dynamic Jitter Buffer, Modem detection & auto-switch to G.711 |
| **Voice and Fax Codecs** | G.711 A-law/U-law, G.722, G.723.1 5.3K/6.3K, G.726, G.729A/B, iLBC, GSM; T.38 |
| **Video Codecs** | H.264, H.263, H.263+ |
| **QoS** | Layer 3 QoS |
| **Signaling and Control** | |
| **DTMF Methods** | In Audio, RFC2833, and SIP INFO |
| **Provisioning Protocol and Plug-and-Play** | TFTP/HTTP/HTTPS, auto-discovery and auto-provisioning of Grandstream IP endpoints |
| **Network Protocols** | TCP/UDP/IP, RTP/RTCP, ICMP, ARP, DNS, DDNS, DHCP, NTP, TFTP, SSH, HTTP/HTTPS, PPPoE, SIP (RFC3261), STUN, SRTP, TLS/SIP |
| **Disconnect Methods** | Call Progress Tone, Polarity Reversal, Hook Flash Timing, Loop Current Disconnect, Busy Tone |
| **Security** | |
| **Media** | SRTP, TLS, HTTPS, SSH |
| **Physical** | |
| **Universal Power Supply** | Output: 12VDC, 1.5A;<br>Input:n 100-240VAC, 50-60Hz |
| **Environmental** | Operating: 32 - 104$^{o}$F / 0 - 40$^{o}$C, 10-90% (non-condensing);<br>Storage: 14 - 140$^{o}$F / -10 - 60$^{o}$C |
| **Dimensions** | GXE5102/5104: 226mm (L) x 155mm (W) x 34.5mm (H)<br>GXE5108/5116: 440mm (L) x 185mm (W) x 44mm (H) |
| **Mounting** | Wall mount and Desktop |
| **Additional Features** | |
| **Caller ID** | Bellcore/Telcordia, ETSI-FSK, ETSI-DTMF, SIN 227 - BT, NTT Japan (pending) |
| **Polarity Reversal/ Wink** | Yes, with enable/disable option upon call establishment and termination |
| **Call Center** | Multiple configurable call queues, automatic call distribution (ACD) based on agent skills/availability busy level, in-queue announcement |
| **Customizable Auto Attendant** | Up to 5 layers of IVR (Interactive Voice Response) |
| **Concurrent Calls** | Up to 30 (GXE5102), 45 (GXE5104), or 60 (GXE5108/5116) |

| | |
|---|---|
| | simultaneous calls |
| **Conference Bridges** | Up to 3 (GXE5102/5104) or 6 (GXE5108/GXE5116) password-protected conference bridges allowing up to 25 (GXE5102/5104) or 32 (GXE5108/5116) simultaneous PSTN or IP participants |
| **Call Features** | Call park, call forward, call transfer, DND, ring/hunt group, paging/intercom etc |
| **Compliance** | FCC: Part 15 (CFR 47) Class B, Part 68<br>CE: EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, EN60950-1, TBR21, RoHS<br>A-TICK: AS/NZS CISPR 22 Class B, AS/NZS CISPR 24, AS/NZS 60950, AS/ACIF S002<br>ITU-T K.21 (Basic Level); UL 60950 (power adapter) |

# INSTALLATION

## EQUIPMENT PACKAGING

**Table 2: GXE5102/5104 EQUIPMENT PACKAGING**

| | |
|---|---|
| **Main Case** | Yes (1) |
| **Power Adaptor** | Yes (1) |
| **Ethernet Cable** | Yes (1) |
| **Quick Start Guide** | Yes (1) |

**Table 3: GXE5108/5116 EQUIPMENT PACKAGING**

| | |
|---|---|
| **Main Case** | Yes (1) |
| **Power Adaptor** | Yes (1) |
| **Ethernet Cable** | Yes (1) |
| **Quick Start Guide** | Yes (1) |
| **Wall Mount** | Yes (2) |
| **Screws** | Yes (6) |

## CONNECTING YOUR GXE5102/5104/5108/5116

The following example shows GXE5104 connection.


**Figure 1: GXE5104 Front View**

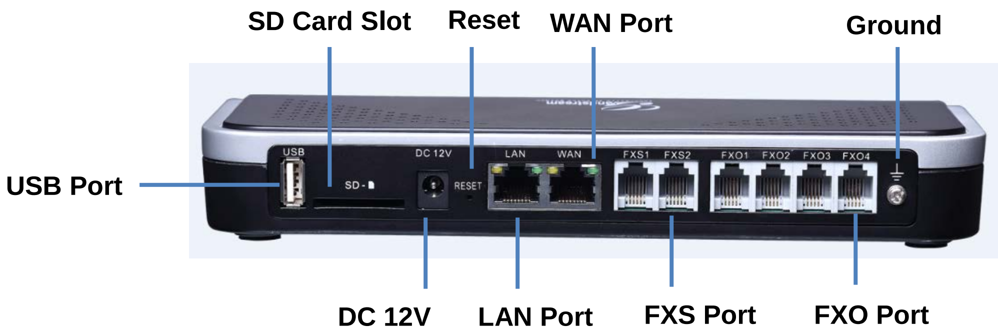


**Figure 2: GXE5104 Back View**

To set up the GXE5102/5104 (WAN port and LAN port), follow the steps below:

1. Connect one end of an RJ-45 Ethernet cable into the WAN port of the GXE5102/5104;
2. Connect the other end of the Ethernet cable into the uplink port of an Ethernet switch/hub;
3. Connect the 12V DC power adapter into the 12V DC power jack on the back of the GXE5102/5104. Insert the main plug of the power adapter into a surge-protected power outlet;
4. Let the GXE5102/5104 boot up for the first time. You will know it is finished with the boot process when the LCD is on. The model and hardware information will show up in the LCD.
5. Once connected to network, the Network LED indicator is solid green and the LCD shows up the IP address;
6. Connect PSTN lines from the wall jack to the FXO ports, and analog lines (phone and fax) the FXS ports. IP phones will be connected in a later step.

To set up the GXE5108/5116 (LAN port only), follow the steps below:

1. Connect one end of an RJ-45 Ethernet cable into the LAN port of the GXE5108/5116;
2. Connect the other end of the Ethernet cable into the uplink port of an Ethernet switch/hub;
3. Connect the 12V DC power adapter into the 12V DC power jack on the back of the GXE5108/5116. Insert the main plug of the power adapter into a surge-protected power outlet;
4. Let the GXE5108/5116 boot up for the first time. You will know it is finished with the boot process when the LCD is on. The model and hardware information will show up in the LCD.
5. Once connected to network, the Network LED indicator is solid green and the LCD shows up the IP address;
6. Connect PSTN lines from the wall jack to the FXO ports, and analog lines (phone and fax) the FXS ports. IP phones will be connected in a later step.

## SAFETY COMPLIANCES

The GXE5102/5104/5108/5116 complies with FCC/CE and various safety standards. The GXE5102/5104/5108/5116 power adapter is compliant with the UL standard. Use the universal power adapter provided with the GXE5102/5104/5108/5116 package only. The manufacturer's warranty does not cover damages to the device caused by unsupported power adapters.

## WARRANTY

If the GXE5102/5104/5108/5116 was purchased from a reseller, please contact the company where the device was purchased for replacement, repair or refund. If the device was purchased directly from Grandstream, contact the Grandstream Sales and Service Representative for a RMA (Return Materials Authorization) number before the product is returned. Grandstream reserves the right to remedy warranty policy without prior notification.

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⚠ **Warning:**

Use the power adapter provided with the GXE5102/5104/5108/5116. Do not use a different power adapter as this may damage the device. This type of damage is not covered under warranty.

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# GETTING TO KNOW GXE5102/5104/5108/5116

## USING THE LCD MENU

### NAVIGATION IN LCD MENU

- **Default LCD display**. By default, when the device is powered on, the LCD will show device model, hardware version and IP address.
- **Enter Menu**. Press "Down" or "OK" button to start browsing menu options.
- **Navigate in the menu options**. Press the "Down" arrow key to browser different menu options.
- **Select menu entries**. Press the "OK" button to select an entry.
- **Exit**. There is "Back" option in the menu. Select it to go back to previous menu.
- The LCD will come back to default display after being idle in menu for more than 20 seconds.

### LCD MENU OPTIONS

The following table shows the LCD menu options.

**Table 4: GXE5102/5104/5108/5116 LCD MENU OPTIONS**

| | |
|---|---|
| **View Events** | • **Critical Events**<br>• **Other Events** |
| **Device Info** | • **Hardware**: Hardware version number<br>• **Software**: Software version number<br>• **P/N**: Part number<br>• **MAC**: MAC address<br>• **Uptime**: System up time |
| **Network Info** | • **Mode**: DHCP, Static IP, or PPPoE<br>• **IP**: IP address<br>• **Subnet Mask** |
| **Network Menu** | • **LAN Mode**<br>Select LAN mode as DHCP, Static IP or PPPoE |
| **Factory Menu** | • **LCD Test Patterns** |

| | |
|---|---|
| | • **Fan Mode**: Auto or On<br>• **Language Test** |

## USING THE WEB GUI

The GXE5102/5104/5108/5116 embedded Web server responds to HTTP/HTTPS GET/POST requests. Embedded HTML pages allow users to configure the GXE through a Web browser such as Microsoft's IE, Mozilla Firefox, Google Chrome and etc.


**Figure 3: GXE5102/5104/5108/5116 Web GUI - Login**

## ACCESSING WEB GUI

To access the Web GUI:

1. Connect the computer to the same network as the GXE5102/5104/5108/5116;
2. Make sure the GXE is turned on and shows its IP address on the LCD;
3. Open a Web browser on your computer;
4. Enter the GXE's IP address in the address bar of the browser. The Web GUI URL format is:

   ***http(s)://GXE-IP-Address:Port***

where the GXE-IP-Address is the IP address displayed on the GXE5102/5104/5108/5116 LCD. By default, the protocol is HTTPS and the Port number is 8089.

For example, if the GXE LCD shows 192.168.40.167, please enter:

https://192.168.40.167:8089

5. Enter the administrator's login and password to access the Web Configuration Menu. The default administrator's username and password is "admin" and "admin".

## SAVING AND APPLYING CHANGES

After configuring from web GUI options, click on 

to save the change. Then click on "Apply Changes" button (if displayed) on the top right of the web page to submit the changes. Follow the prompted message to reboot the GXE if it's required.

# GXE5102/5104/5108/5116 CONFIGURATIONS

This section describes the options in the GXE5102/5104/5108/5116 Web GUI.

- **Status:** Displays PBX status, System Status and CDR.
- **PBX:** To configure extensions, trunks, call control options (inbound routes, conference, IVR, Ring Group and etc), internal options (call features, music on hold, IVR Prompt, FAX and etc), IAX Settings and SIP Settings.
- **Settings:** To configure network settings, change password, LDAP Server, HTTP Server, Email Settings and Time Settings.
- **Maintenance**: To configure syslog, upgrade, backup, reset, reboot, and perform troubleshooting.

## STATUS PAGE DEFINITIONS

### STATUS/PBX STATUS

In PBX Status page, there are different sections to display status for Trunks, Extensions, Queues, Conference Rooms, Interfaces and Parking lot.

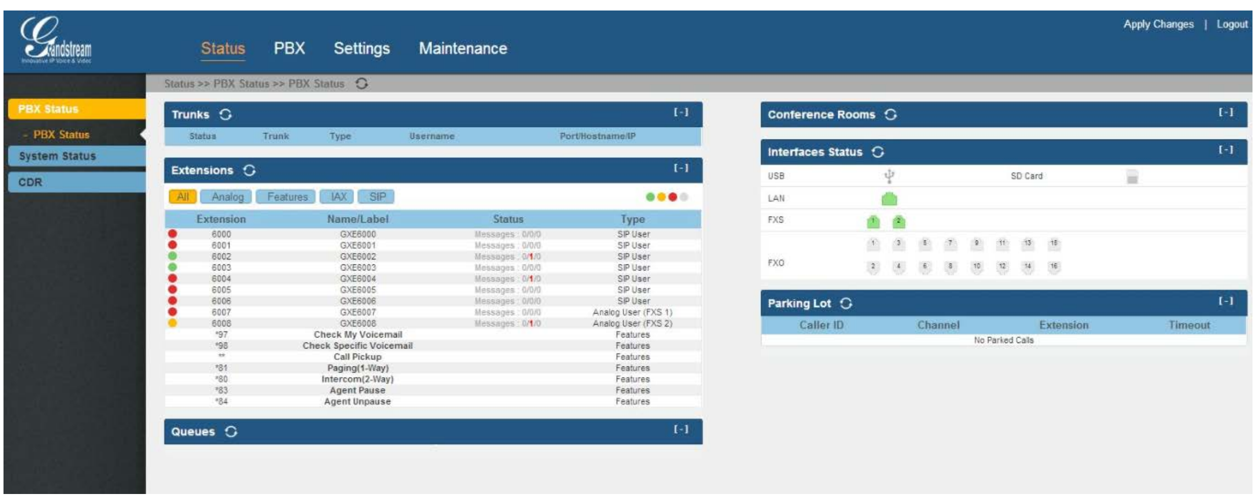



**Figure 4: Status->PBX Status**

## STATUS/SYSTEM STATUS

| Status ->System Status -> General | |
|---|---|
| Model | Product model of the GXE. |
| Part Number | Product part number. |
| System Time | System time of the GXE. |
| Up Time | System up time since the last reboot. |
| Idle Time | System idle time since the last reboot. |
| Boot | Boot version. |
| Core | Core version. |
| Base | Base version. |
| Program | Program version. This is the main software release version. |
| Recovery | Recovery version. |
| **Status -> System Status -> Network** | |
| MAC Address | Global unique ID of device, in HEX format. The MAC address will be used for provisioning and can be found on the label coming with original box and on the label located on the back of the device. |
| IP Address | IP address of the device. |
| Gateway | Default gateway of the device. |
| Subnet Mask | Subnet mask of the device. |
| DNS | DNS Server of the device. |
| **Status -> System Status -> Disk Usage** | |
| Disk cfg | Displays total, available and used space for disk cfg. |
| Disk data | Displays total, available and used space for disk data. |
| **Status -> System Status -> Resource Usage** | |
| CPU Usage | Displays percentage of CPU usage. |
| Memory Usage | Display available and used space for memory. |


**Figure 5: Status->System Status -> Disk Usage**

## STATUS/CDR

CDR status page shows call detail information as well as statistics. This can be used for business analysis.

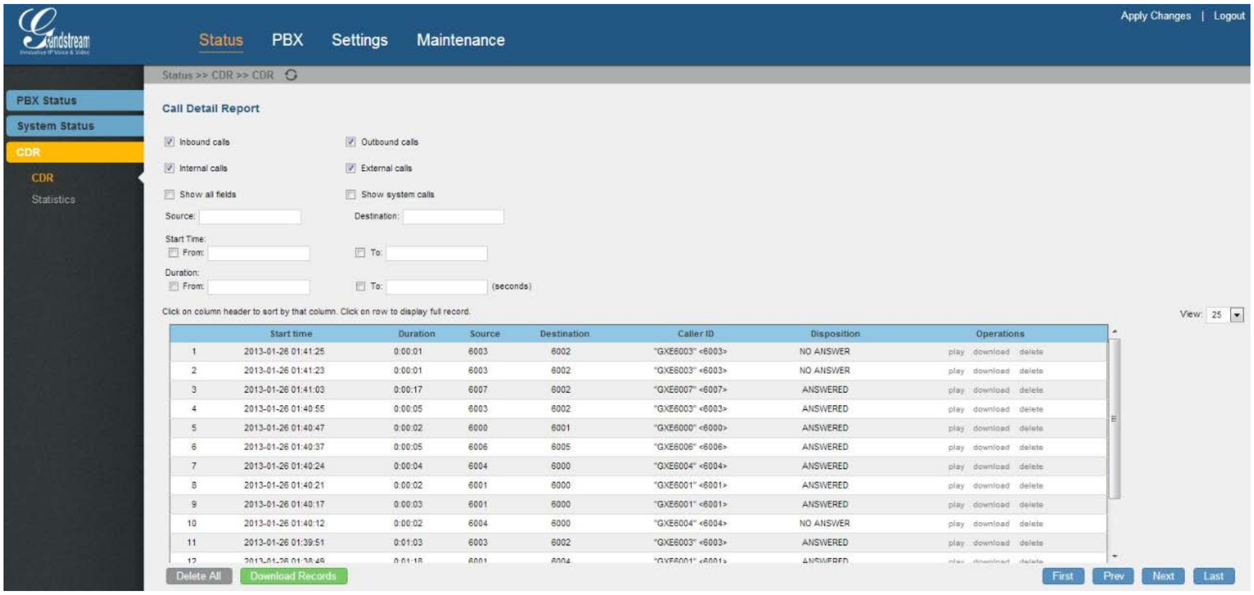


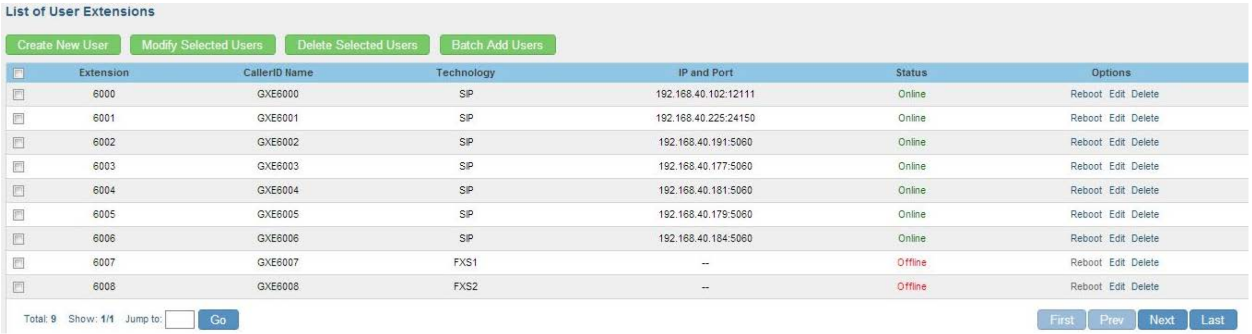

**Figure 6: Status->System Status -> CDR**


**Figure 7: Status->System Status -> CDR Statistics**

# PBX PAGE DEFINITIONS

## BASIC/EXTENSIONS

In this page, users could view, create, edit and delete extensions. The extension status will show in the list with Caller ID Name, IP: Port, connection status and etc.



List of User Extensions

Create New User | Modify Selected Users | Delete Selected Users | Batch Add Users

| Extension | CallerID Name | Technology | IP and Port | Status | Options |
|---|---|---|---|---|---|
| 6000 | GXE6000 | SIP | 192.168.40.102:12111 | Online | Reboot Edit Delete |
| 6001 | GXE6001 | SIP | 192.168.40.225:24150 | Online | Reboot Edit Delete |
| 6002 | GXE6002 | SIP | 192.168.40.191:5060 | Online | Reboot Edit Delete |
| 6003 | GXE6003 | SIP | 192.168.40.177:5060 | Online | Reboot Edit Delete |
| 6004 | GXE6004 | SIP | 192.168.40.181:5060 | Online | Reboot Edit Delete |
| 6005 | GXE6005 | SIP | 192.168.40.179:5060 | Online | Reboot Edit Delete |
| 6006 | GXE6006 | SIP | 192.168.40.184:5060 | Online | Reboot Edit Delete |
| 6007 | GXE6007 | FXS1 | -- | Offline | Reboot Edit Delete |
| 6008 | GXE6008 | FXS2 | -- | Offline | Reboot Edit Delete |

Total: 9 Show: 1/1 Jump to: Go First Prev Next Last

**Figure 8: PBX->Basic->Extensions**

Click on "Create New User" button, the following window will show.

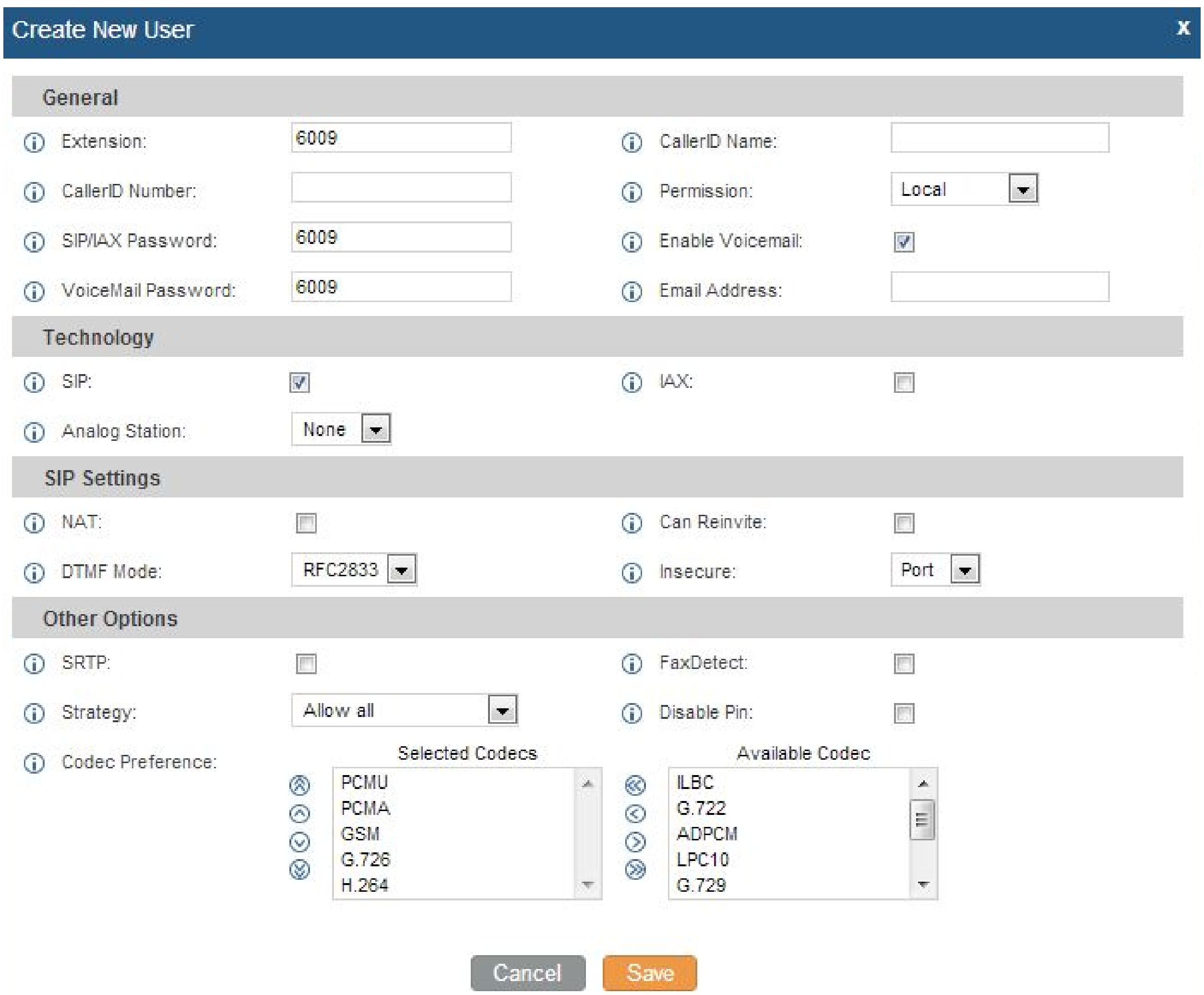



**Figure 9: Create New User**

## BASIC/ANALOG TRUNKS

In this page, users could view, create and manage analog trunks. To create new trunk, click on "Create New Analog Trunk" and fill out the information in the prompted window as below.

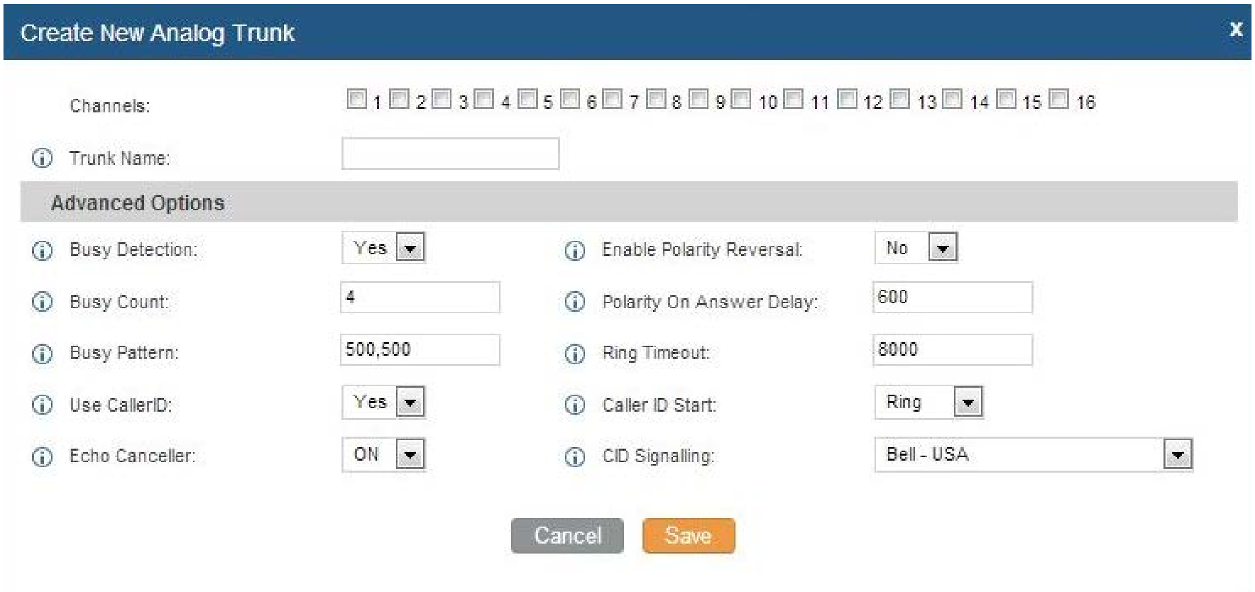



**Figure 10: Create New Analog Trunk**

## BASIC/VOIP TRUNKS

In this page, users could view, create and manage SIP/IAX trunks. To create new trunk, click on "Create New SIP/IAX Trunk" and fill out the information in the prompted window as below.

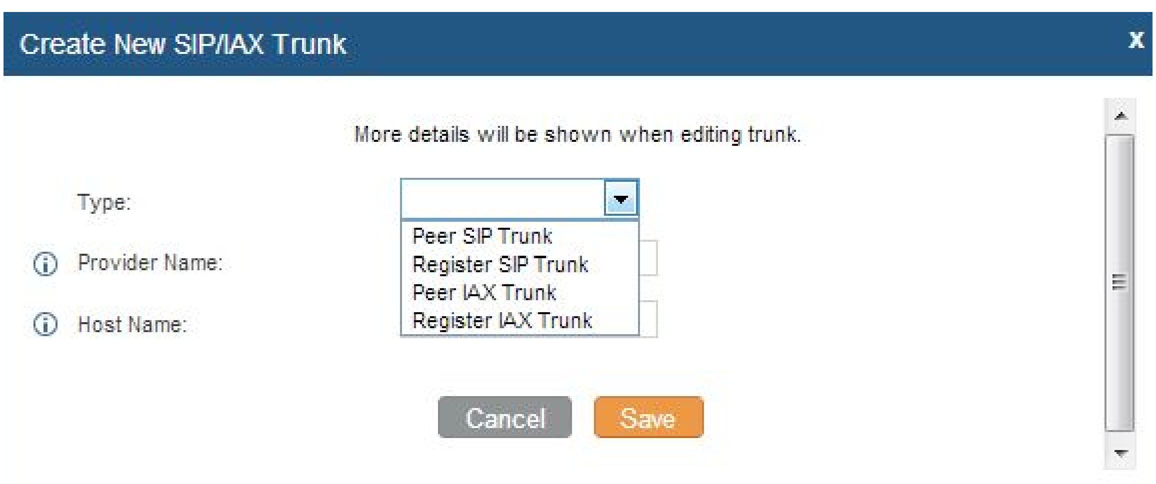



**Figure 11: Create New SIP/IAX Trunk**

## BASIC/OUTBOUND ROUTES

In this page, users could view, create and manage calling rules. To create new route, click on "Create New Calling Rule" and fill out the information in the prompted window as below.

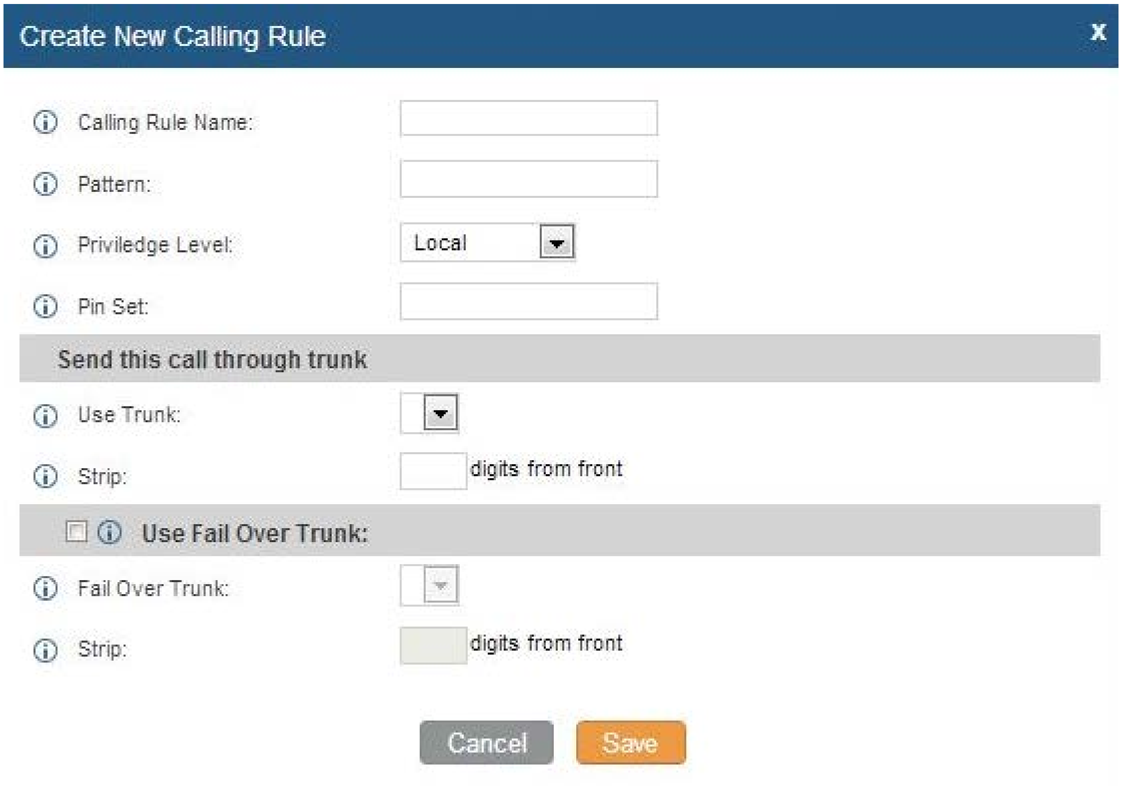



**Figure 12: Create New Calling Rule**

## BASIC/ZERO CONFIG

By default, zero config feature is turned on in GXE5102/5104/5108/5116 so the devices connected in the same LAN will be auto provisioned by the GXE. There are three methods of auto provision: SIP subscribe, DHCP option 66 and mDNS. Basically, when the device boots up, it will send the SUBSCRIBE to LAN. The GXE will find it, create and assign an extension to the device, and then return the url of config file for the device to download.

Here is the Auto Provision Setting:

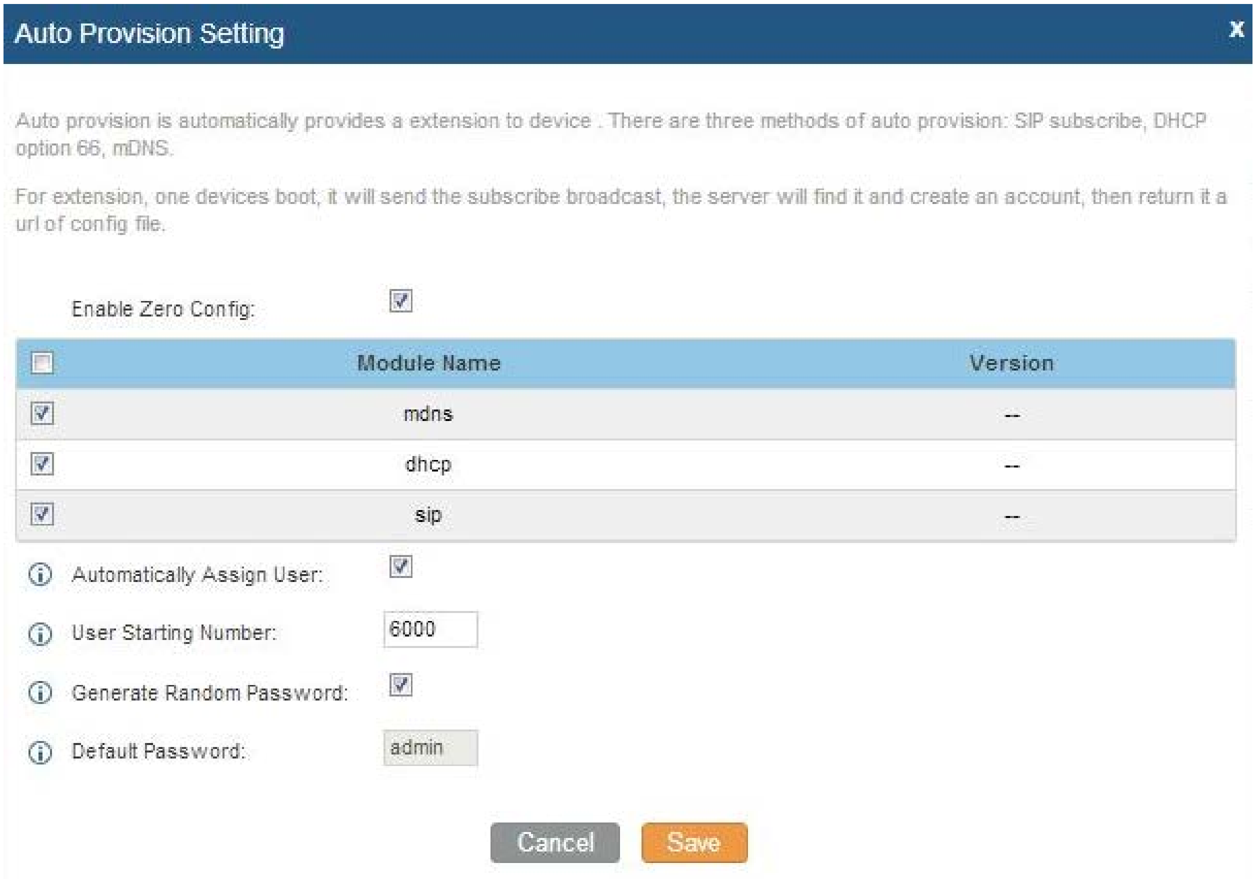
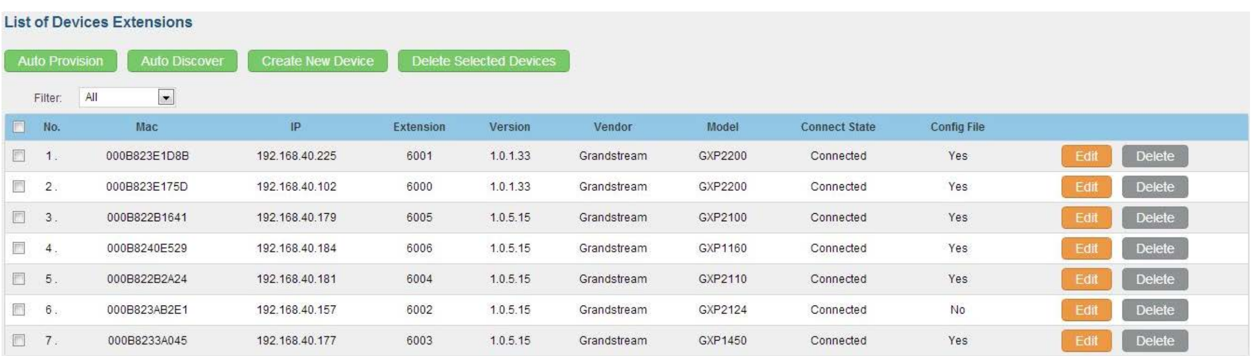



**Figure 13: Zero Config: Auto Provision Setting**

The following picture shows the provisioned devices from the GXE zero config feature.




| No. | Mac | IP | Extension | Version | Vendor | Model | Connect State | Config File | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | 000B823E1D8B | 192.168.40.225 | 6001 | 1.0.1.33 | Grandstream | GXP2200 | Connected | Yes | Edit Delete |
| 2. | 000B823E175D | 192.168.40.102 | 6000 | 1.0.1.33 | Grandstream | GXP2200 | Connected | Yes | Edit Delete |
| 3. | 000B822B1641 | 192.168.40.179 | 6005 | 1.0.5.15 | Grandstream | GXP2100 | Connected | Yes | Edit Delete |
| 4. | 000B8240E529 | 192.168.40.184 | 6006 | 1.0.5.15 | Grandstream | GXP1160 | Connected | Yes | Edit Delete |
| 5. | 000B822B2A24 | 192.168.40.181 | 6004 | 1.0.5.15 | Grandstream | GXP2110 | Connected | Yes | Edit Delete |
| 6. | 000B823AB2E1 | 192.168.40.157 | 6002 | 1.0.5.15 | Grandstream | GXP2124 | Connected | No | Edit Delete |
| 7. | 000B8233A045 | 192.168.40.177 | 6003 | 1.0.5.15 | Grandstream | GXP1450 | Connected | Yes | Edit Delete |

**Figure 14: Zero Config: Provisioned Devices**

## CALL CONTROL/CONFERENCE

In this page, users could view, create, edit and delete conference rooms. The conference room status and activity will show in the list. Click on "Create New Conference Bridge" to create and configure conference room.

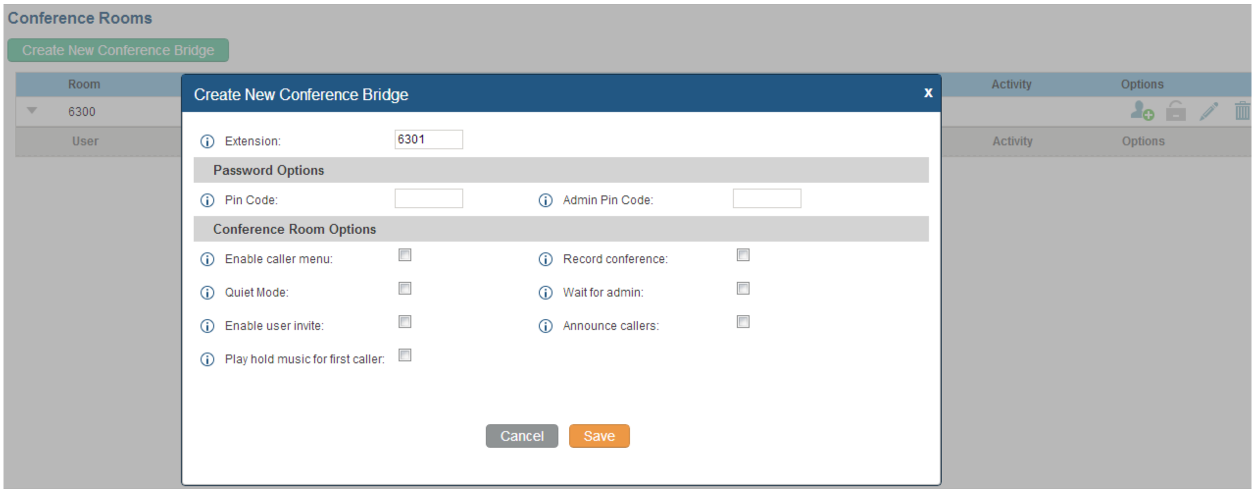



**Figure 15: Create New Conference Bridge**

## CALL CONTROL/IVR

The IVR in the PBX system can be configured under **Call Control**->**IVR** page. Click on "Create New IVR" and fill in the information in the window as below.

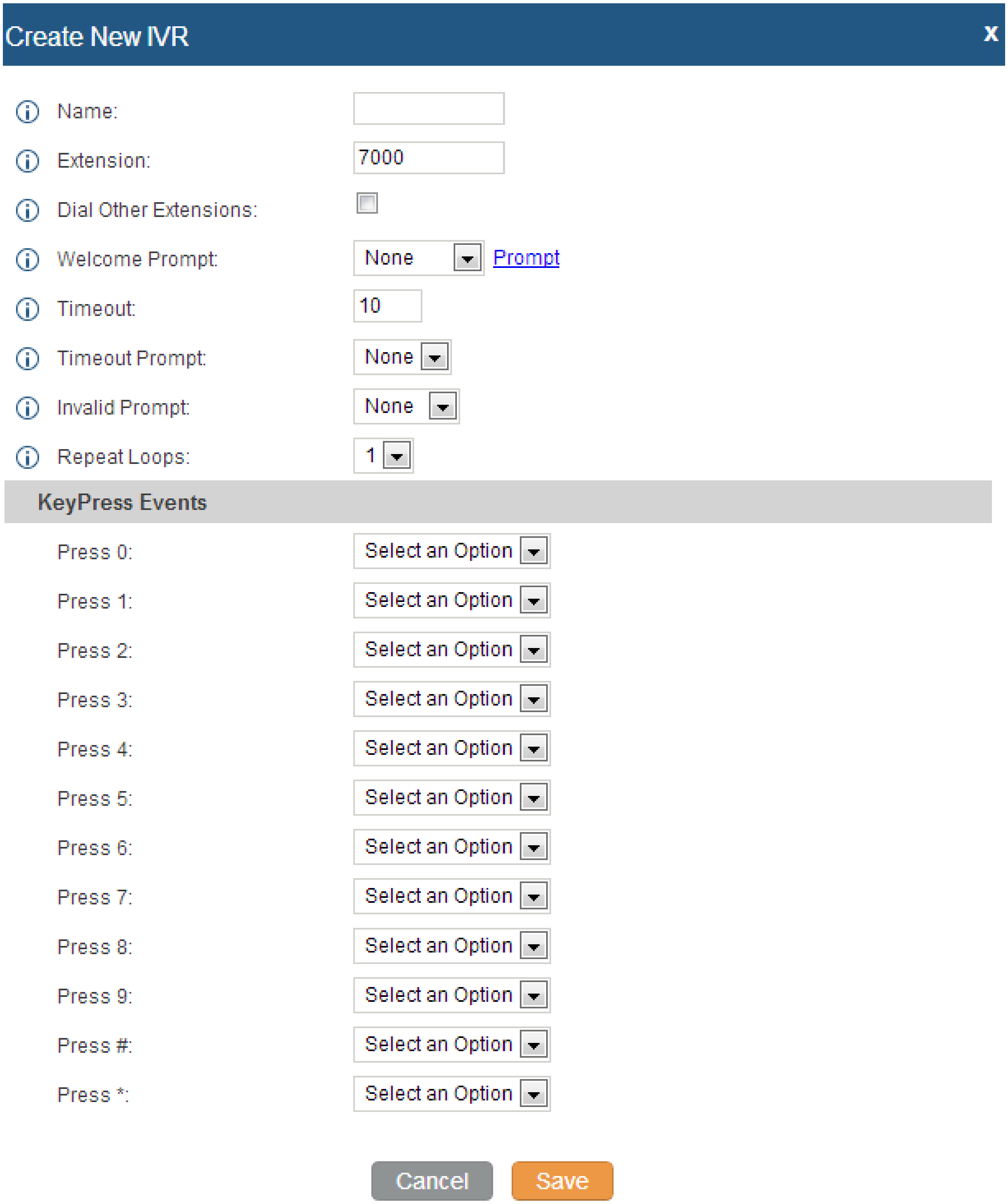



**Figure 16: Create New IVR**

## CALL CONTROL/VOICEMAIL

General Voicemail settings can be configured under **Call Control**->**Voicemail** page. Users could also set up email for the voicemails. Click on "Create New IVR" and fill in the information in the window as below.

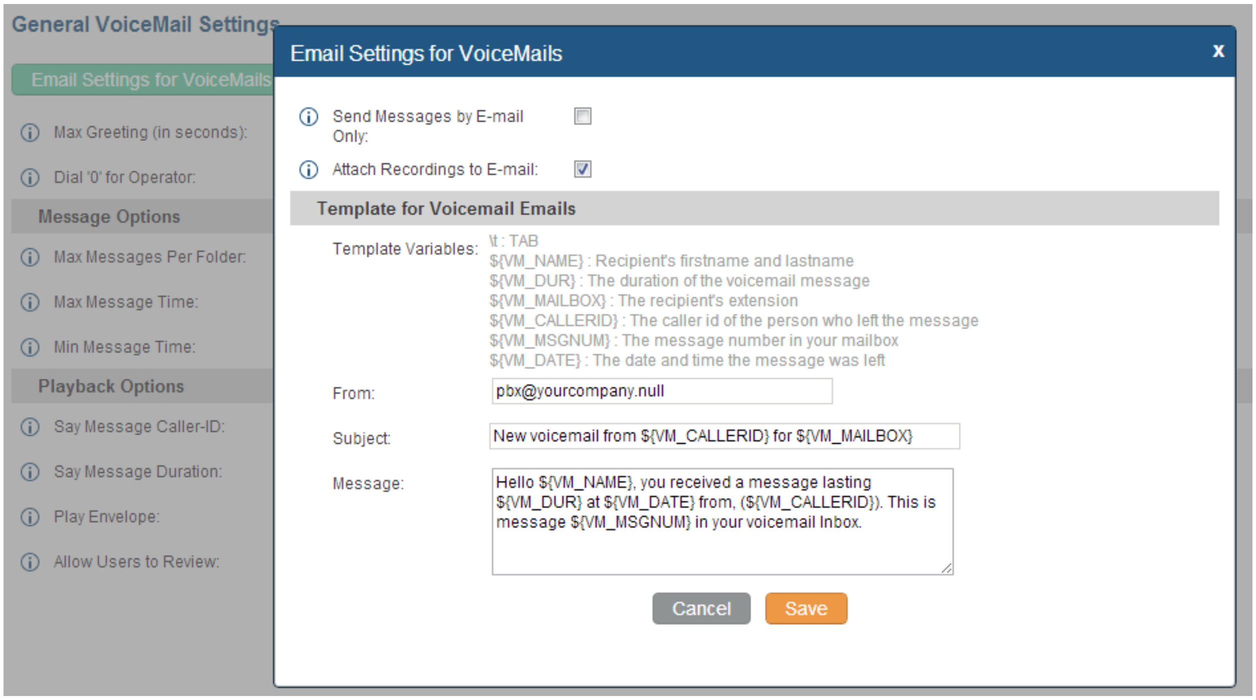



**Figure 17: Voicemail Settings**

## CALL CONTROL/VOICEMAIL GROUPS

In this page, users could create extension for voicemail group which contains members that will receive the voicemail if the group extension has voice messages. Click on "New VoiceMail Group" to add groups.


**Figure 18: Voicemail Groups Settings**

## CALL CONTROL/RING GROUP

In this page, users could create extension for ring group which contains members that will receive the call with specific ring strategy if the group extension has incoming calls.

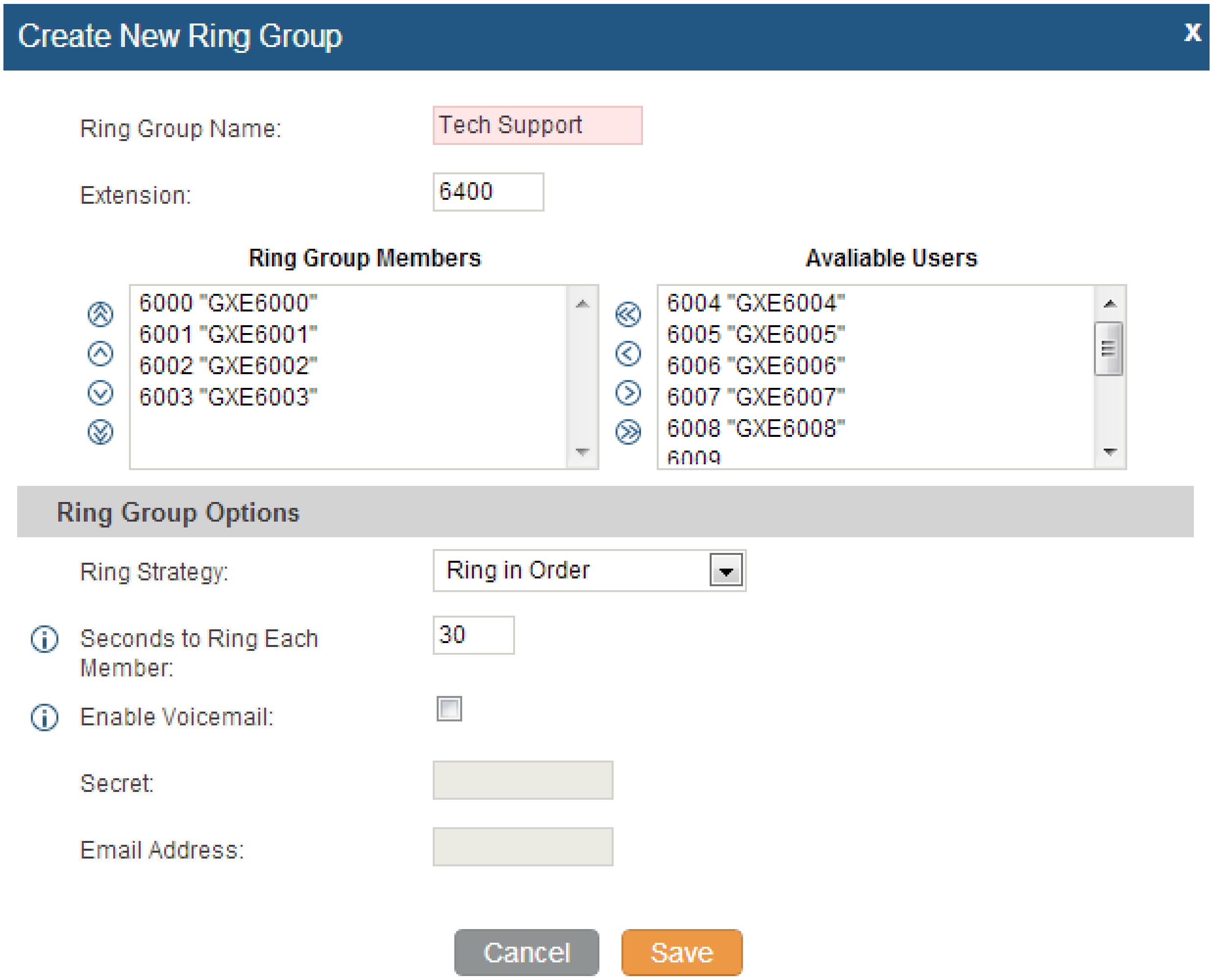
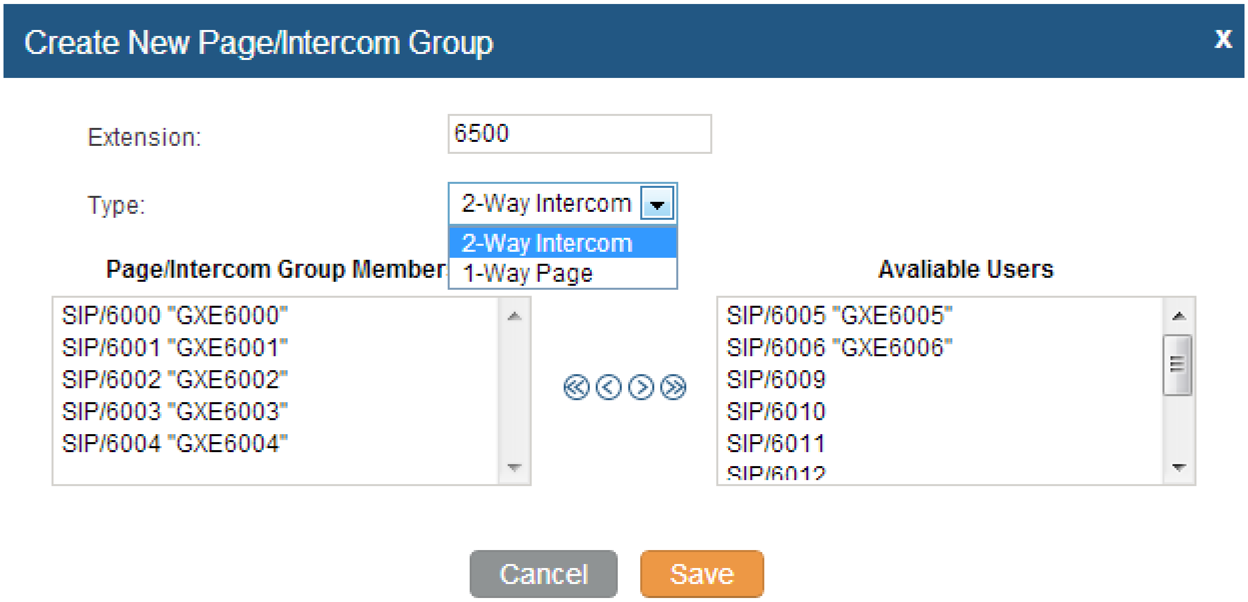



**Figure 19: Ring Group Settings**

## CALL CONTROL/PAGE AND INTERCOM GROUPS

Paging and intercom can be configured in group level or per extension. In this page, users could add paging and intercom groups.



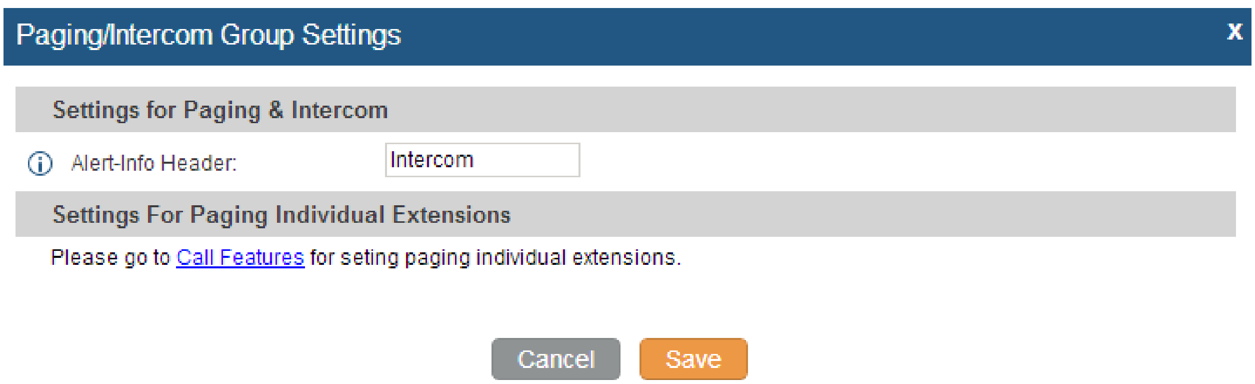




**Figure 20: Paging/Intercom Group Settings**

## CALL CONTROL/FOLLOW ME

Follow Me feature allows users to add internal extensions or external numbers to follow existed extensions when there is incoming call. If the main extension has incoming call rejected or unanswered, the call will be routed to the FollowMe numbers in specified order or simultaneously. The caller will hear music on hold when calling the main extension number.

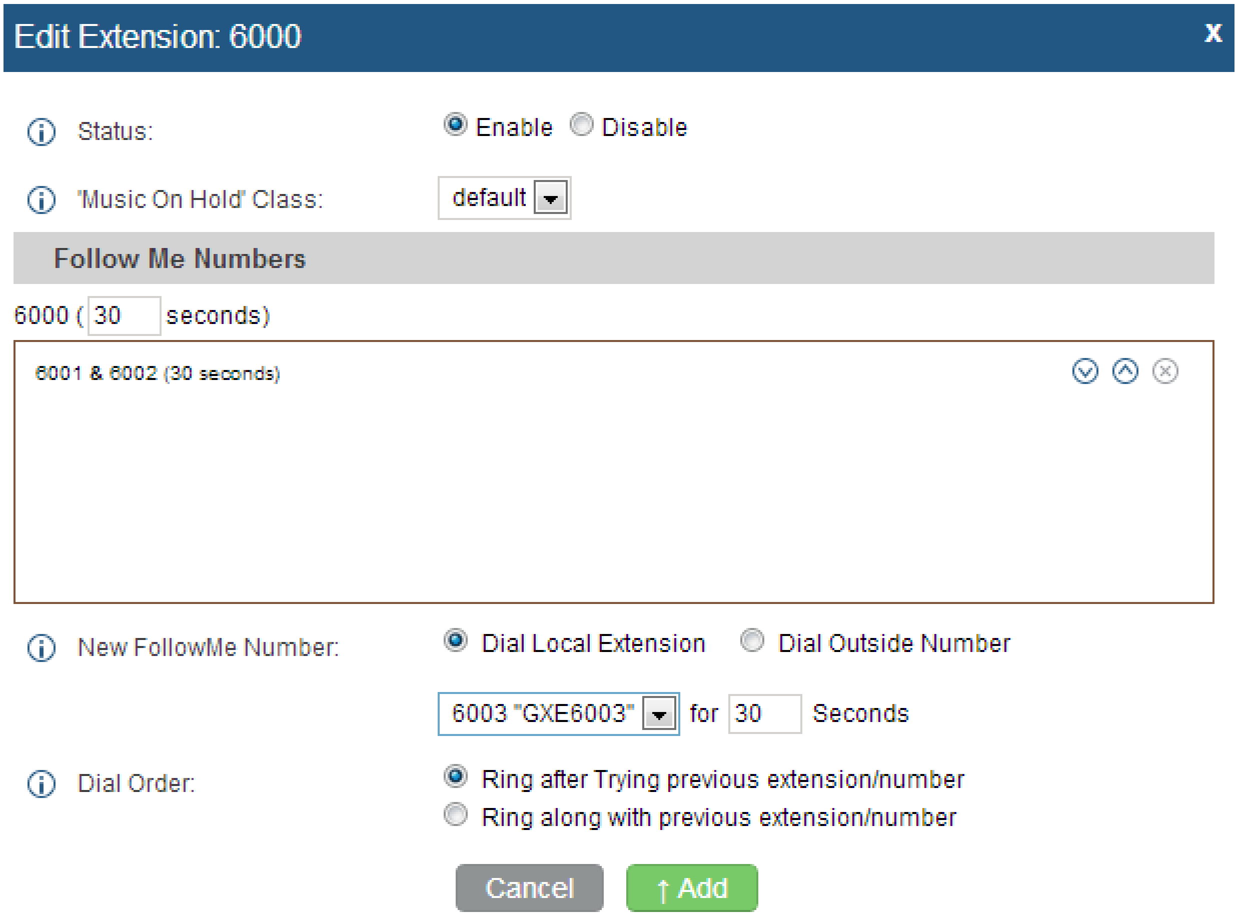



**Figure 21: Follow Me Settings**

## CALL CONTROL/CALL QUEUE

Call queues can be configured under **Call Control**->**Call Queue**. The login and logout code can be configured under "Agent Login Settings".

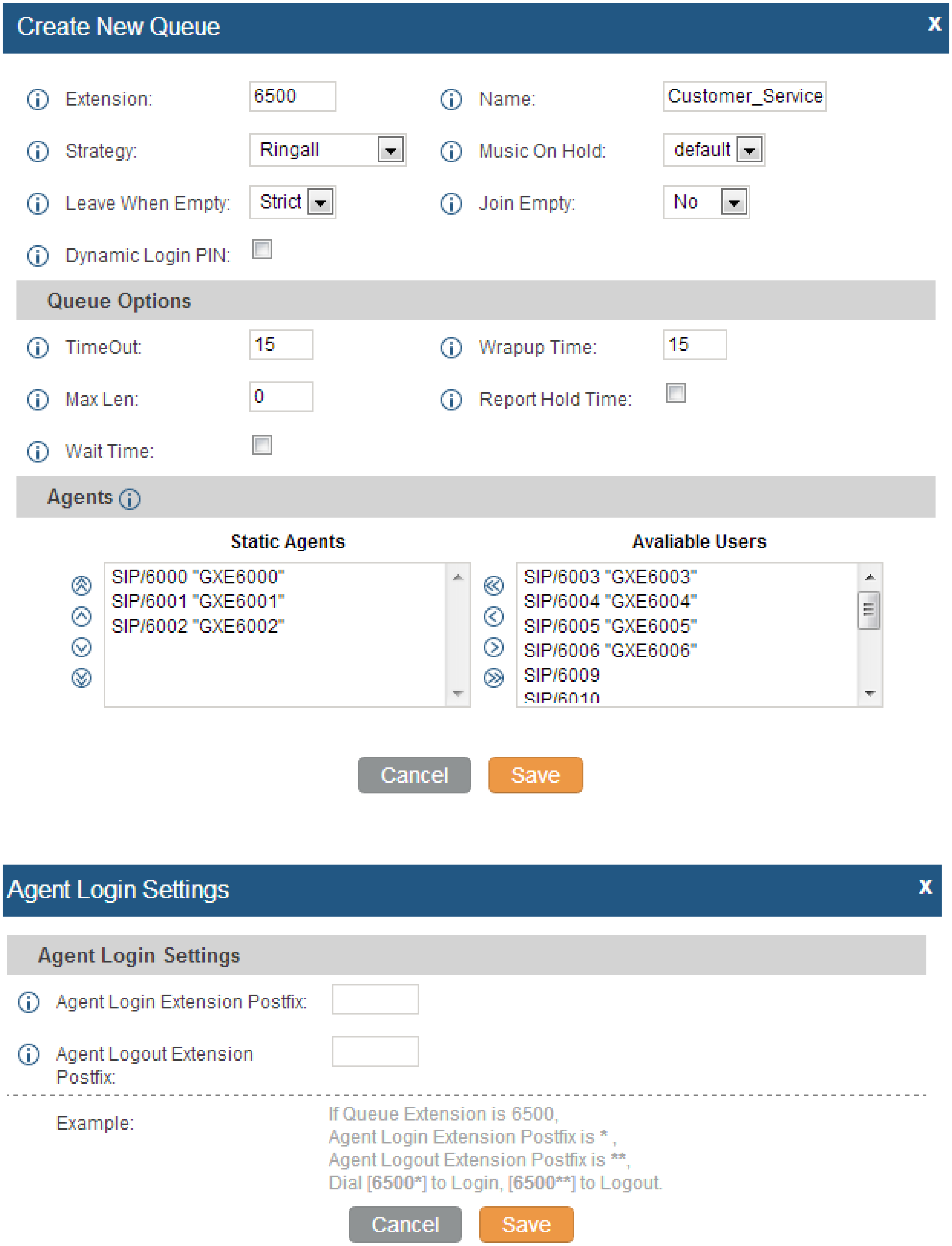



**Figure 22: Call Queue Settings**

**INTERNAL OPTIONS/GENERAL**

| | |
|---|---|
| Global OutBound CID | This is the default global CallerID that is used for all outgoing calls when no other CallerID is defined. If ther "User" tab or "VoIP Trunks" tab does not have defined CallerID neither, this Global OutBound CID will be used for CallerID. |
| Global OutBound CID Name | This is the global CallerID Name that is used for all outgoing calls. If this value is defined, all outgoing calls will have a "CallerId Name" set to this value. Usually this value could be your company name. Leave this value blank if you would like to have the users' "CallerID Name" display on outbound calls. |
| Operator Extension | The operator extension is the number dialed when users press "0" to exit Voicemail. It's also available in IVR option. |
| Ring Timeout | Number of seconds to ring an extension before sending to the user's voicemail box. |

Users could also configure the extension preference for different functions. It is recommended to keep this feature on so the extensions could be properly arranged and used.

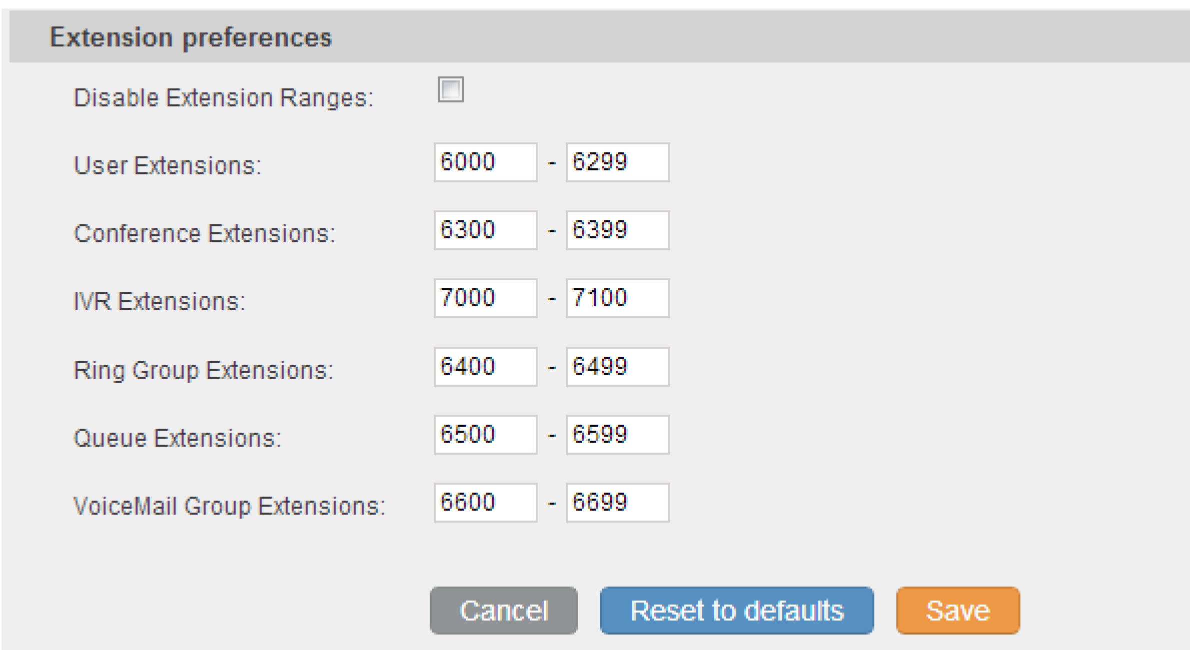



**Figure 23: Extension Preferences**

## INTERNAL OPTIONS/CALL FEATURES

In this page, users could configure feature code for the following call features in the PBX. The default setting is listed in the following table.

| | |
|---|---|
| Blind Transfer | #1 |
| Attended Transfer | *2 |
| Disconnect | *0 |
| Call Parking | #72 |
| Audio Record | *1 |
| Audio Mix Record | *3 |
| Do Not Disturb (DND) Active | *77 |
| Do Not Disturb (DND) Deactive | *78 |
| Call Forward Busy Active | *71 |
| Call Forward Busy Deactive | *72 |
| Call Forward No Answer Active | *73 |
| Call Forward No Answer Deactive | *74 |
| Call Forward Uncondition Active | *75 |
| Call Forward Uncondiion Deactive | *76 |
| Feature Digit Timeout | 1000 |
| Extension to Dial to Park a Call | 700 |
| Extensions for Parked Calls | 701-720 |
| Parked Call Timeout (in secs) | 120 |
| Dial Voice Mail | *98 |
| Voice Mail Main | *97 |
| Agent Pause | *83 |
| Agent Unpause | *84 |
| Paging Prefix | *81 |
| Intercom Prefix | *80 |
| Call Pickup | ** |

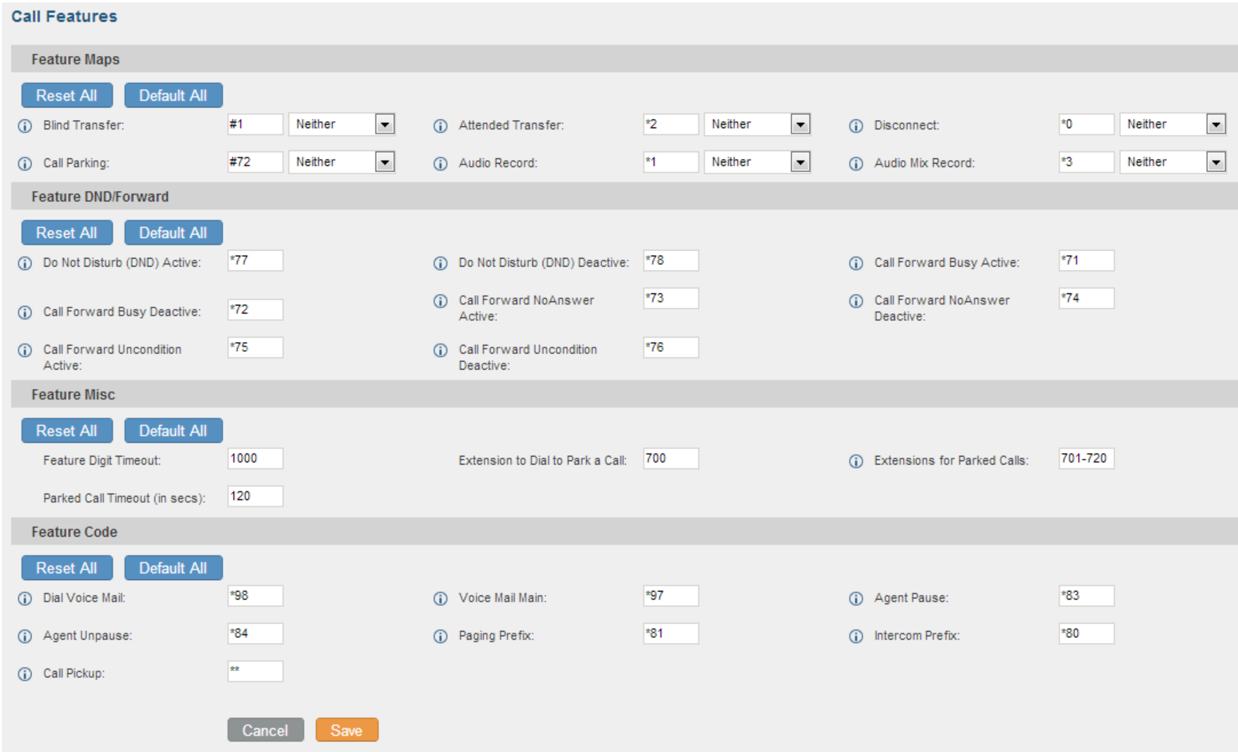



**Figure 24: Call Features**

## INTERNAL OPTIONS/MUSIC ON HOLD

In this page, users could configure music on hold class and the music files. The music file uploaded has to be 8 KHz Mono format with size less than 5M.

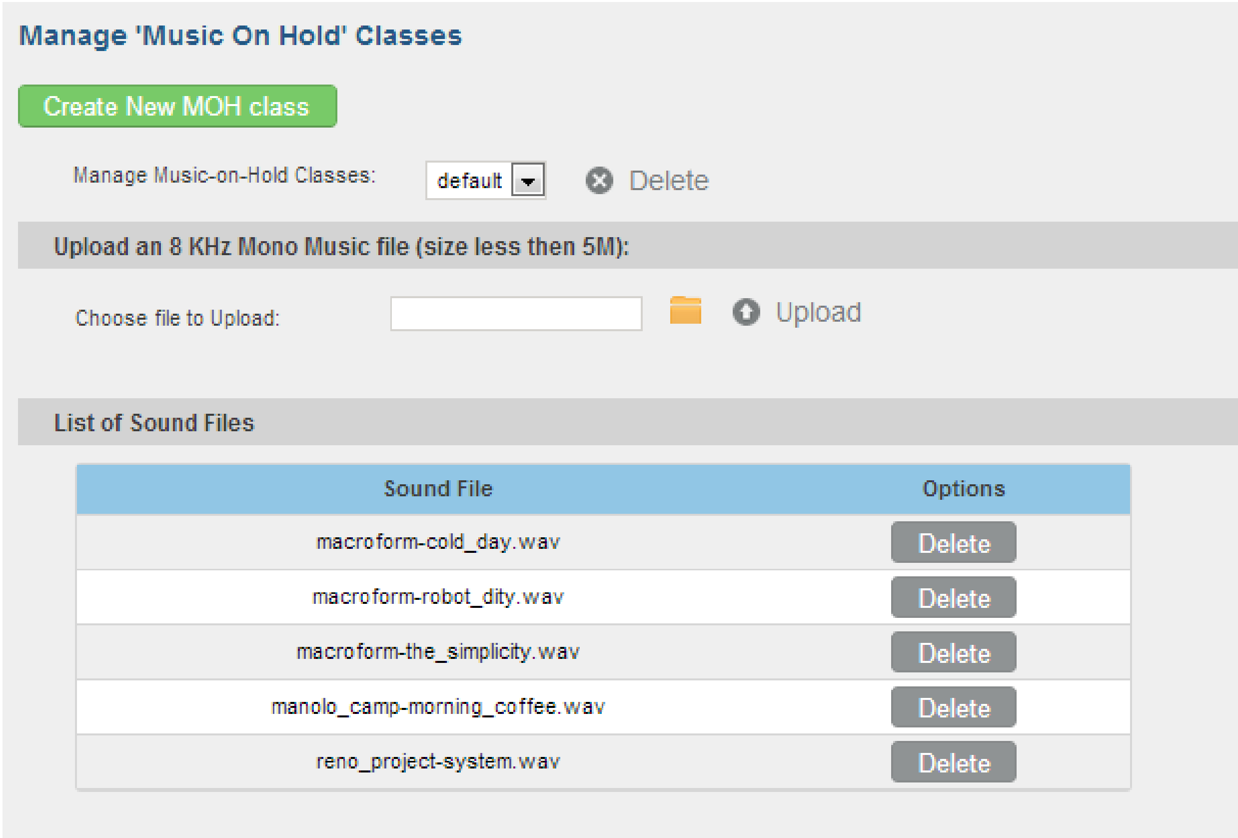



**Figure 25: Music On Hold Settings**

## INTERNAL OPTIONS/IVR PROMPT

In this page, users could record new IVR prompt or upload a new file for IVR prompt. The uploaded file has to be small than 5M in 8KHz mono, 16 bits GSM or WAV format. Or it could be raw ulaw/alaw file with the .ulaw/.alaw suffix.

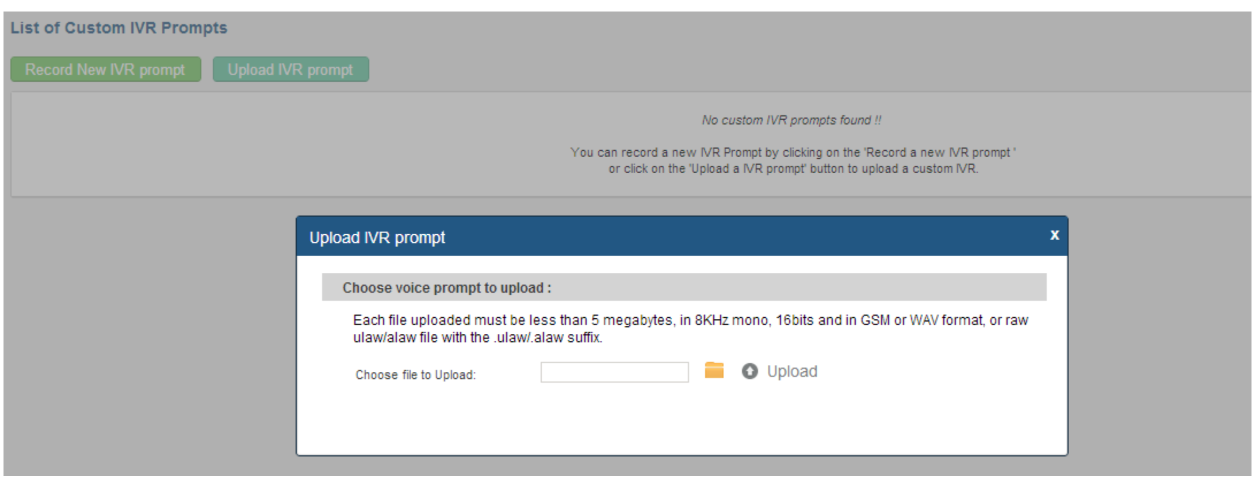



**Figure 26: IVR Prompt Settings**

## INTERNAL OPTIONS/FAX T.38

In this page, users could create and configure FAX extensions on the GXE.

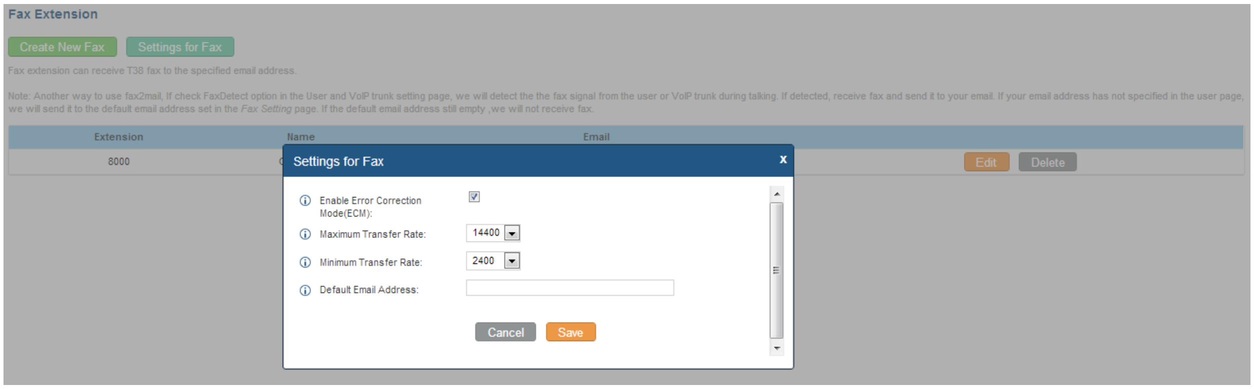



**Figure 27: FAX Settings**

## INTERNAL OPTIONS/RTP SETTINGS

| | |
|---|---|
| RTP Start | RTP port starting address. The default setting is 10000. |
| RTP End | RTP port ending address. The default setting is 20000. |
| Strict RTP | Enables/disables strict RTP protection. When enabled, RTP packets that do not come from the source of the RTP stream will be dropped. The default setting is "Disable". |
| RTP Checksums | Enables/Disables RTP Checksums. The default setting is "Disable". |

## INTERNAL OPTIONS/HARDWARE CONFIG

In this page, users could configure the signaling preference for each FXS and FXO ports, as well as region preference for Tone and Opermode. Other advanced settings such as PCMA Override, FXS Honor Mode, Boost Ringer, Fast Ringer, Low Power, Ring Detect, MWI Mode and etc can also be configured here as the figure shown below.

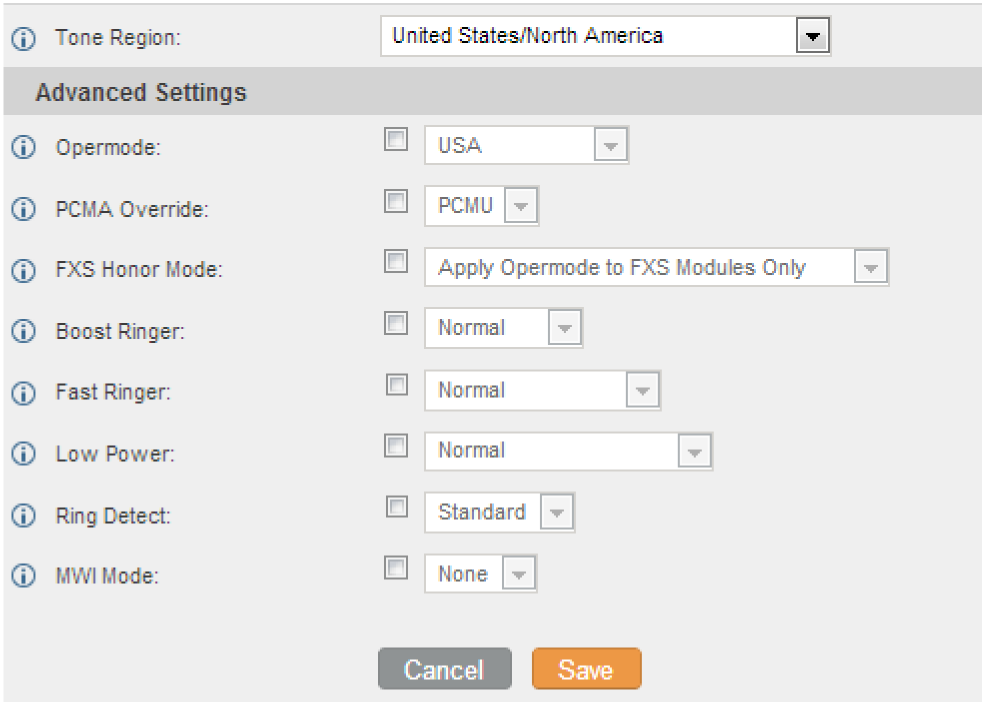



**Figure 28: Hardware Configuration: Advanced Settings**

## INTERNAL OPTIONS/STUN MONITOR

| | |
|---|---|
| STUN Server | Configures the STUN server to query.<br>Valid format:<br>[(hostname \| IP-address) [':' port]<br>The default port number is 3478 if not specified.<br>Leave this field blank to disable STUN. |
| STUN Refresh | Number of seconds between STUN Refreshes. The default setting is 30 seconds. |

## INTERNAL OPTIONS/IAX GENERAL

| | |
|---|---|
| Bind Port | Allows iax2 to listen to another port. The default setting is 4569. |
| Bind Address | Forces iax2 to bind to a specific address instead of all addresses. The default setting is 0.0.0.0. |
| IAX1 Compatibility | Enables/disables iax1 style compatibility. |
| No Checksums | Enables/disables checksums. |
| Delay Reject | Enables/disables iax2 to delay reject of calls to avoid DOS. |
| ADSI | Enables/disables ADSI phone compatibility. |
| Music On Hold Interpret | Specifies Music On Hold class. |

| | |
|---|---|
| Music On Hold Suggest | Suggests Music On Hold for the channel. |
| Language | Configures default language for the channel. This can be used by prompts. |
| Bandwidth | Configures allowed codecs for different bandwidth requirement. The default setting is "Low". |

## INTERNAL OPTIONS/CODECS

The following codes are supported in GXE5102/5104/5108/5116.

- PCMU
- PCMA
- GSM
- ILBC
- G.722
- G.726
- ADPCM
- LPC10
- G.729
- G.723
- H.263
- H.263p
- H.264

## INTERNAL OPTIONS/IAX JITTER BUFFER

| | |
|---|---|
| Enable Jitter Buffer | Enables the use of jitter buffer on the receiving side of a SIP channel. |
| Force Jitter Buffer | Forces the use of jitter buffer on the receiving side of a SIP channel. |
| Drop Count | Configures drop count. |
| MAX Jitter Buffer | Configures the maximum time (in milliseconds) 0 for the buffer. |
| MAX Interpolation Frames | Configures the maximum number of interpolated frames the jitter buffer should return consecutively. |
| Recync Threshold | Jumps in the frame timestamps over where the jitter buffer is resynchronized. This feature is useful to improve the quality of voice with big jumps in/broken timestamps sent from exotic devices and programs. The default setting is 1000. |
| Max Excess Buffer | Configures the maximum number (in milliseconds) to pad the jitter buffer. |
| Min Excess Buffer | Configures the minimum number (in milliseconds) to pad the jitter buffer. |

| | |
|---|---|
| Jitter Shrink Rate | Configures the jitter shrink rate. |

### INTERNAL OPTIONS/IAX REGISTRATION

| | |
|---|---|
| Min Reg Expire | Minimum duration (in seconds) of registrations/subscriptions. The default setting is 60. |
| Max Reg Expire | Maximum duration (in seconds) of incoming registration/subscriptions. The default setting is 3600. |
| IAX Thread Count | Configures number of IAX threads. |
| IAX Max Thread Count | Configures maximum number of IAX threads. |
| Auto Kill | When set to "yes", the connection will be terminated if ACK for the NEW message is not received in 2000ms. Users could also specify number (in milliseconds) in addition to "yes" and "no". |
| Authentication Debugging | Enables/disables IAX related debug output in log messages. |
| Codec Priority | Configures codec negotiation priority to Caller, Host, Disabled or Reqonly. |
| Type of Service | Configures ToS bit for preferred IP routing. |
| Trunk Frequency | Configures frequency of trunk frames measured in milliseconds. |
| Trunk Time Stamps | Enables/disables attaching time stamps to trunk frames. |

### INTERNAL OPTIONS/IAX SECURITY

| | |
|---|---|
| Call Token Optional | A single IP address or a range of IP addresses for which call token validation is not required in the form 11.11.11.11 or 11.11.11.11/22.22.22.22. |
| Max Call Numbers | Limits the amount of call numbers allowed for a single IP address. |
| Max Nonvalidated Call Numbers | Limits the amount of nonvalidated call numbers for all IP addresses combined. |
| Call Number Limits | Limits the call numbers for a given IP range. |

### SIP SETTINGS/GENERAL

| | |
|---|---|
| Realm For Digest Authentication | Realms MUST be globally unique according to RFC 3261. Configure this value as your host or domain name. The default setting is \"asterisk\". If a system name is configured in asterisk.conf, this value will be set to the configured system name. |
| UDP Port to Bind to | The default setting is 5060. |

| | |
|---|---|
| IP Address to Bind to | The default setting is 0.0.0.0, which means binding to all addresses. |
| Domain | Use comma to separate a list of domains that the GXE will be responsible for. |
| Allow Guest Calls | Enables/disables guest calls. |
| Overlap Dialing Support | Enables/disables dialing support. |
| Allow Transfer | Enables/disables all transfers (unless enabled in peers or users) initiated by the endpoint. The Dial() options 't' and 'T' are not related to whether SIP transfers are allowed or not. |
| Enable DNS SRV Lookups (on outbound calls) | Enables/disables DNS SRV lookups on calls. |
| MWI From | When sending MWI NOTIFY requests, this value will be used in the "From:" header as the \"name\" part. If no "fromuser" is configured, the \"user\" part of the URI in the "From:" header will be filled with this value as well. |
| From Domain | Configures the domain in the "From:" field of the SIP header. It may be required by some providers for authentication. |
| Auto Domain | When turned on, the GXE will add local host name and local IP to domain list. |
| Allow External Domains | Allow requests for domains that are not served by the GXE. |

### SIP SETTINGS/SIP JITTER BUFFER

| | |
|---|---|
| Enable Jitter Buffer | Enables/disables the use of jitter buffer on the receiving side of a SIP channel. |
| Force Jitter Buffer | Forces the use of jitter buffer on the receiving side of a SIP channel. |
| Log Frames | Enable/disables jitter buffer frame logging. |
| Max Jitter Buffer | Configures max length of the jitter buffer in milliseconds. |
| Resync Threshold | Jumps in the frame timestamps over where the jitter buffer is resynchronized. This feature is useful to improve the quality of voice with big jumps in/broken timestamps sent from exotic devices and programs. The default setting is 1000. |
| Implementation | The Jitter buffer implementation used on the receiving side of a SIP channel. Users could select "Fixed" (with size always equals to jbmaxsize) or "Adaptive" (with variable size which is the new jb of IAX2). |

### SIP SETTINGS/SIP MISCELLANEOUS

| | |
|---|---|
| Register | Register as a SIP user agent to a SIP proxy (provider). |
| Register Timeout | The interval (in seconds) for the GXE to retry registration. The default setting is 20. |
| Register Attempts | Number of registration attempts before the GXE gives up. The default setting is 0 (keep trying until the server side accepts the registration request). |
| Video Max Bitrate (kb/s) | Maximum bitrate (kb/s) for video calls. The default setting is 384. |
| Support for SIP Video | Enables/disables SIP video support. |
| Generate Manager Events | Generates manager events when SIP UA performs events (e.g. hold). |
| Reject NonMatching Invites | When rejecting an incoming INVITE or REGISTER request, always reject with "401 Unauthorized" instead of notifying the requester that if there is a matching user or peer for the request. |
| NonStandard G.726 Support | If the peer negotiates G726-32 audio, use AAL2 packing order instead of RFC3551 packing order (this is required for Sipura and Grandstream ATAs). |

### SIP SETTINGS/SIP SESSTION TIMER

| | |
|---|---|
| Session Timers | • Originate: always request and run session-timers.<br>• Accept: Run session-timers only when requested by other UA.<br>• Refuse: Do not run session timers.<br>The default setting is "Accept". |
| Session Expires | The maximum session refresh interval (in seconds). The default setting is 1800. |
| Min SE | The minimum session refresh interval (in seconds). The default setting is 90. |
| Session Refresher | Selects the session refresher to be UAC or UAS. The default setting is UAC. |

### SIP SETTINGS/SIP TLS AND TCP SETTINGS

| | |
|---|---|
| TCP Enable | Enables/disables server for incoming TCP connections. The default setting is "No". |
| TCP Bindaddr | IP address for TCP server to bind to (0.0.0.0: binds to all interfaces). The default port number is 5060 if not specified. |
| TLS Enable | Enables/disables server for incoming TLS (secure) connections. The |

| | |
|---|---|
| | default setting is "No". |
| TLS Bindaddr | IP address for TLS server to bind to (0.0.0.0: binds to all interfaces). The default port number is 5061 if not specified.<br><br>**Note:**<br>The IP address must match the common name (hostname) in the certificate. Please do not bind a TLS socket to multiple IP addresses. For details on how to construct a certificate for SIP, please refer to the following document:<br>http://tools.ietf.org/html/draft-ietf-sip-domain-certs |
| TLS Self Signed CA | This is the CA certificate is the TLS server being connected to requires self signed certificate, including server's public key. This file will be renamed as "asterisk.ca" automatically.<br><br>**Note:**<br>The size of your ca file can't be larger than 2MB. |
| TLS Cert | This is the Certificate file (*.pem format only) used for TLS connections. This file will be renamed as "asterisk.pem" automatically.<br><br>**Note:**<br>The size of your certificate can't be larger than 2MB. |
| TLS CA Cert | This file must be named with the CA subject name hash value. It contains CA's (Certificate Authority) public key, which is used to verify the accessed servers.<br><br>**Note:**<br>The size of your certificate can't be larger than 2MB. |
| TLS CA List | The list of files under the CA Cert directory. |

### SIP SETTINGS/SIP NAT

| | |
|---|---|
| External Address | A static address (and port) that will be in outbound SIP messages if the GXE is behind NAT. If it's a hostname, it will only be looked up only. |
| External Host | Specifies an external host, which is similar to External Address except the hostname will be looked up every "External Refresh" interval and Asterisk will perform DNS queries periodically. |
| External Refresh | Configures the refresh interval for the external host. |
| External TCP Port | Configures the externally mapped TCP port when the GXE is behind a |

| | |
|---|---|
| | static NAT or PAT. |
| External TLS Port | Configures the externally mapped TLS port when GXE is behind a static NAT or PAT. The default value is 5061. |
| Local Network Address | A list of network addresses that are considered inside of the NAT network. Multiple entries are allowed, e.g., a reasonable set could be as follows:<br>192.168.0.0/255.255.0.0 |
| NAT Mode | This is a global NAT setting that will affects all peers and users.<br>• No: Use rport if the remote side requires it.<br>• Force rport: Force rport to always be on. This is the default setting.<br>• Yes: Force rport to always be on and perform comedia RTP handling.<br>• Comedia: Use rport if the remote side requires it and perform comedia RTP handling.<br><br>**Note:**<br>"comedia RTP handling" refers to the technique of sending RTP to the port where the other endpoint's RTP comes from. This can also be rephrased as "connection-oriented media". |
| Allow RTP Reinvite | When turned on, the GXE will try to redirect the RTP media stream (audio) to go directly from the caller to the callee.<br><br>• Yes: Enables RTP Reinvite.<br>• NoNAT: Allows media path redirection (reinvite) but only when the peer is not be behind NAT. The RTP core can determine if the peer is behind NAT or not based on the IP address where the media comes from.<br>• Update: use UPDATE for media path redirection, instead of INVITE.<br><br>**Note:**<br>Some devices do not support this (especially if one of them is behind NAT). |

### SIP SETTINGS/SIP ToS

The following options are provided to configure SIP ToS on the GXE5102/5104/5108/5116.

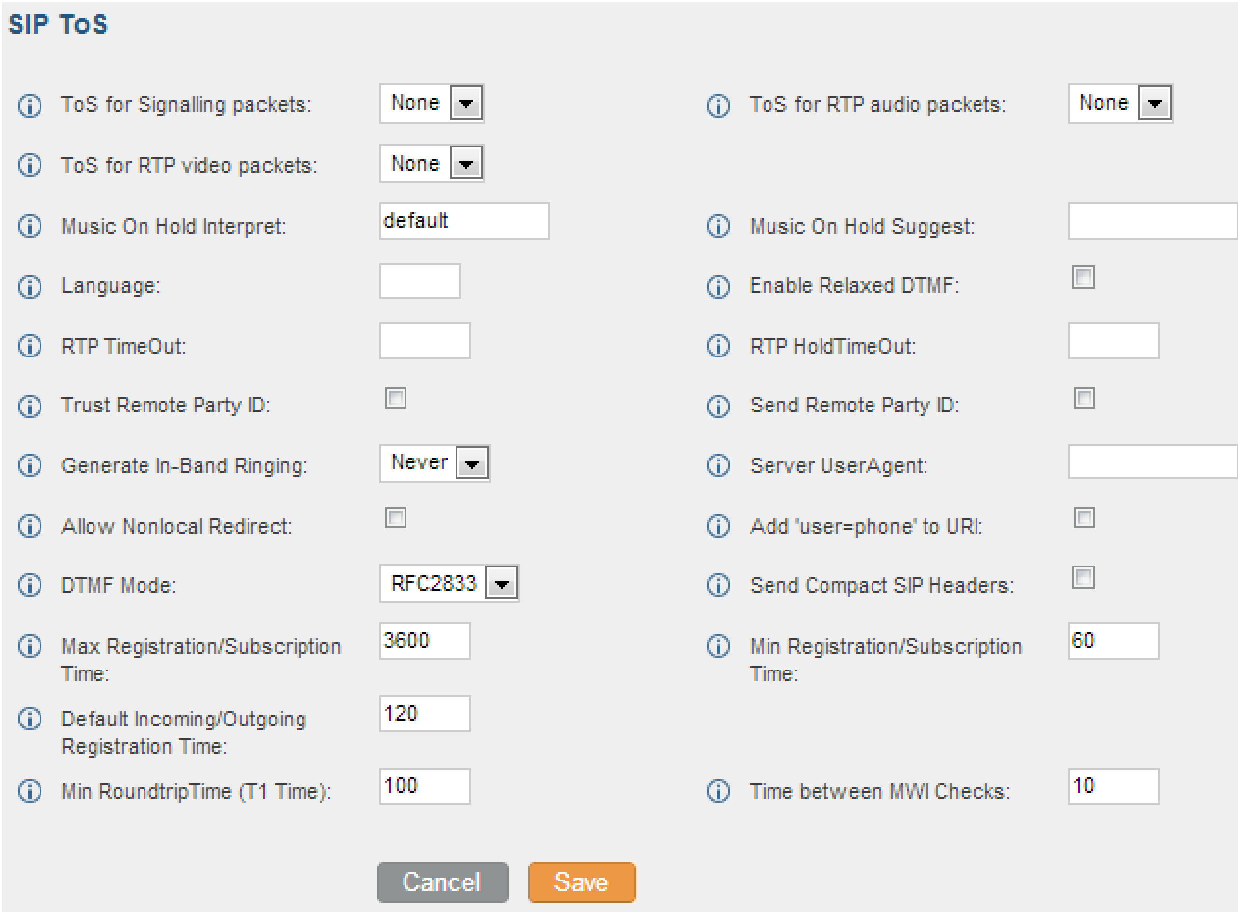



**Figure 29: Hardware Configuration: Advanced Settings**

### SIP SETTINGS/DEBUG NOTIFY

| | |
|---|---|
| Enable SIP Debugging | Enables/disables SIP debugging. |
| Record SIP History | Records SIP history. |
| Dump SIP History | Dumps SIP history at the end of SIP dialog. |
| Subscribe Context | Configures a specific context for SUBSCRIBE requests. This setting is useful to limit subscriptions to local extensions. |
| Allow Subscribe | Enables/disables support for subscriptions. |
| Notify on Ringing | Sends out NOTIFY on ringing status. |

## SETTINGS PAGE DEFINATIONS

### SETTINGS/NETWORK SETTINGS

| | |
|---|---|
| LAN | Set up IP method as Static, DHCP or PPPoE.<br>• Static IP: Enter IP Address, Gateway IP, Subnet Mask, Primary |

| | |
|---|---|
| | DNS, Secondary DNS.<br>• DHCP: Enter alternative DNS Server.<br>• PPPoE: Enter User Name and Password. |
| 802.1X | To enable 802.1X, select 802.1X mode as "EAP-MD5", "EAP-TLS" or "EAP-PEAPv0/MSCHAPv2". Then enter the following information for the selected mode:<br>• Identity<br>• MD5 Password<br>• 802.1X CA Certificate<br>• 802.1X Client Certificate |

## SETTINGS/CHANGE PASSWORD

To change the web access password, enter the old password and new password in this page. Once the web page comes back to the login interface again, enter the new password to login.

## SETTINGS/LDAP SERVER

The GXE5102/5104/5108/5116 allows LDAP clients to connect to the LDAP Server in the GXE. The following options need to be configured first in the GXE.

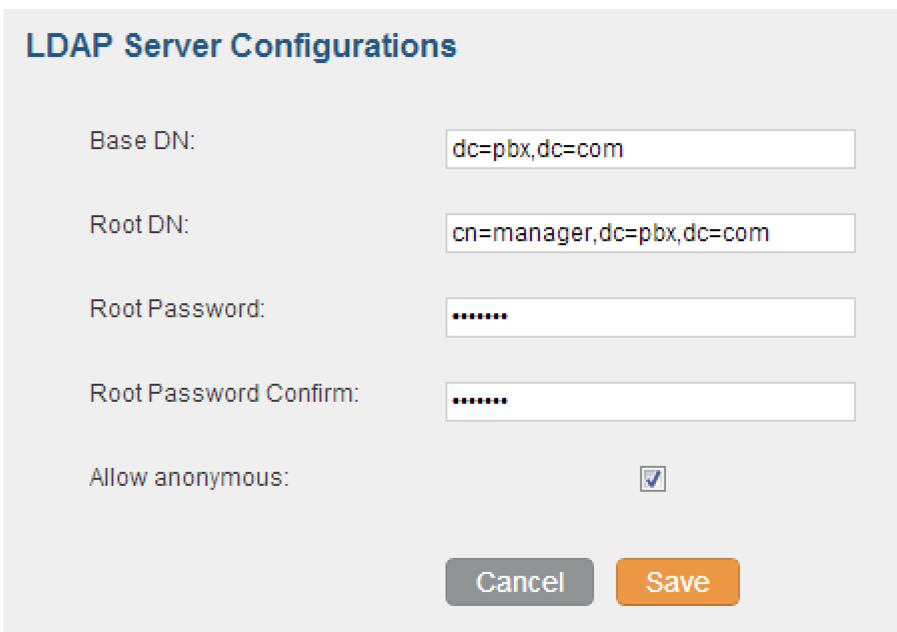



**Figure 30: LDAP Server Configurations**

## SETTINGS/HTTP SERVER

The GXE5102/5104/5108/5116 embedded Web server responds to HTTP/HTTPS GET/POST requests. In this page, users could configure the HTTP server protocol type (HTTP or HTTPS) as well as the port number.

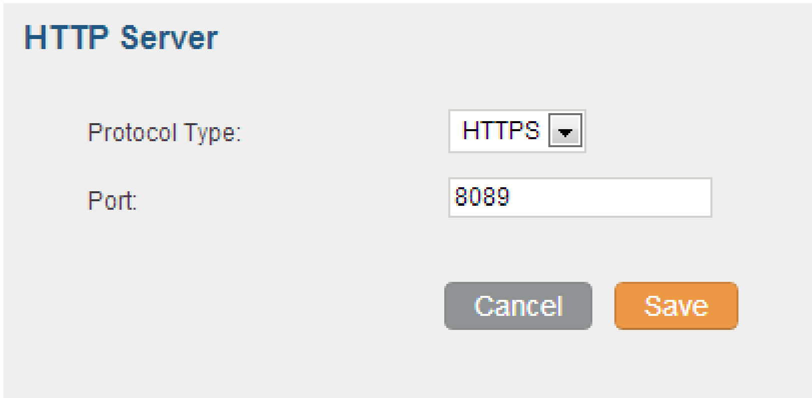



**Figure 31: HTTP Server Configurations**

## SETTINGS/EMAIL SETTINGS

The Email settings in this page configures transport protocol, type (MTA or Client) and Domain for the emails sent for FAX, Voicemail in the GXE5102/5104/5108/5116. embedded Web server responds to HTTP/HTTPS GET/POST requests. In this page, users could configure the HTTP server protocol type (HTTP or HTTPS) as well as the port number.

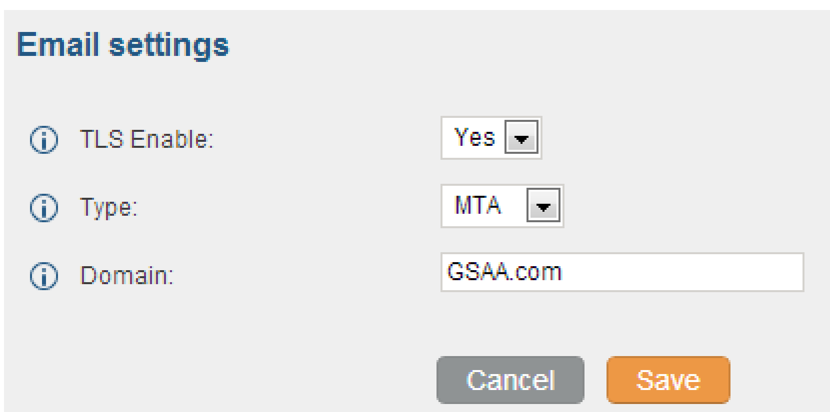



**Figure 32: Email Settings**

## SETTINGS/TIME SETTINGS

| | |
|---|---|
| NTP Server | Defines the URL or IP address of the NTP server. The GXE may obtain the date and time from the server. |
| Enable DHCP Option 2 | Allows device to get provisioned for Time Zone from DHCP Option 2 in |

| | |
|---|---|
| | the local server automatically. The default setting is "Yes". |
| Enable DHCP Option 42 | Defines whether DHCP Option 42 should override NTP server or not. When enabled, DHCP Option 42 will override the NTP server if it's set up on the LAN. The default setting is "Yes". |
| Time Zone | Controls the date/time display according to the specified time zone. |
| Self-Defined Time Zone | This parameter allows the users to define their own time zone.<br>The syntax is: std offset dst [offset], start [/time], end [/time]<br>Default is set to: MTZ+6MDT+5,M4.1.0,M11.1.0<br>**MTZ+6MDT+5**<br>This indicates a time zone with 6 hours offset with 1 hour ahead which is U.S central time. If it is positive (+) if the local time zone is west of the Prime Meridian (A.K.A: International or Greenwich Meridian) and negative (-) if it is east.<br>**M4.1.0,M11.1.0**<br>The 1st number indicates Month: 1,2,3.., 12 (for Jan, Feb, .., Dec)<br>The 2nd number indicates the nth iteration of the weekday: (1st Sunday, 3rd Tuesday…)<br>The 3rd number indicates weekday: 0,1,2,..,6 ( for Sun, Mon, Tues, ... ,Sat)<br>Therefore, this example is the DST which starts from the First Sunday of April to the 1st Sunday of November. |

## MAINTENANCE PAGE DEFINATIONS

### SYSLOG

In this page, users could configure syslog server with different levels. Select the modules you would like to send syslog to the server for different syslog levels.

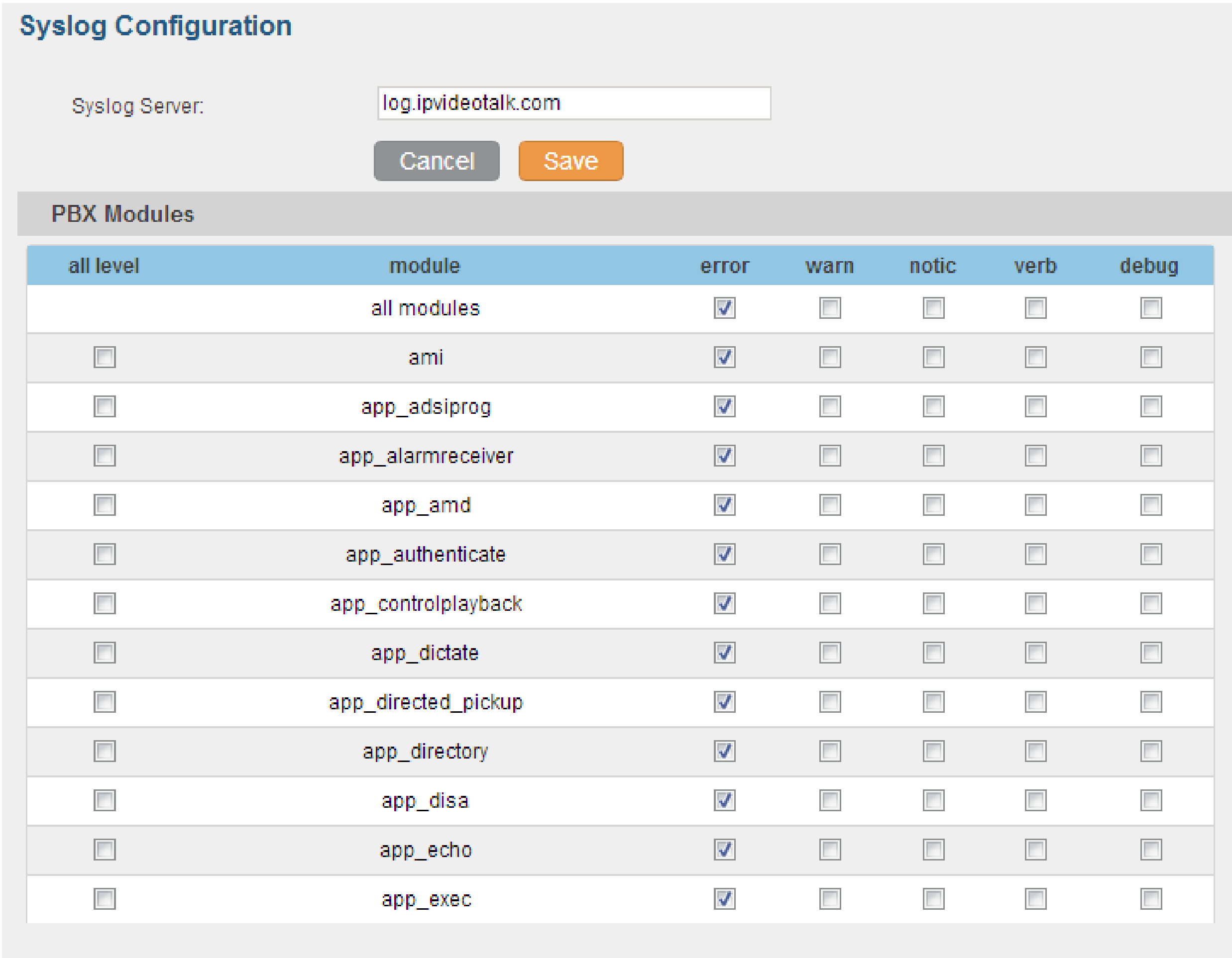



**Figure 33: Syslog Settings**

## UPGRADE

The GXE5102/5104/5108/5116 can be upgraded via network or local uploading.

| | |
|---|---|
| Upgrade Via | Allows users to choose the firmware upgrade method: TFTP, HTTP or HTTPS. |
| Firmware Server Path | Defines the server path for the firmware server. |
| Firmware File Prefix | If configured, only the firmware with the matching encrypted prefix will be downloaded and flashed into the GXE. |
| Firmware File Suffix | If configured, only the firmware with the matching encrypted postfix will be downloaded and flashed into the GXE. |
| HTTP/HTTPS User Name | The user name for the HTTP/HTTPS server. |
| HTTP/HTTPS Password | The password for the HTTP/HTTPS server. |

## MAINTENANCE/BACKUP

Users could backup the configurations on the GXE for restore purpose. Before creating new backup file, select the backup option first.

- If the Config-File is selected only, the backup file will be saved in the flash of the device.
- If Voice-File, Voicemail-File, Voice-Records or CDR is selected, external storage devices (USB Flash drive or SD Card) will be required because the backup file might be too large.

Once backup is done, the list of the backups will be displayed with date and time. Users then can download, restore or delete it from the GXE or the external device.

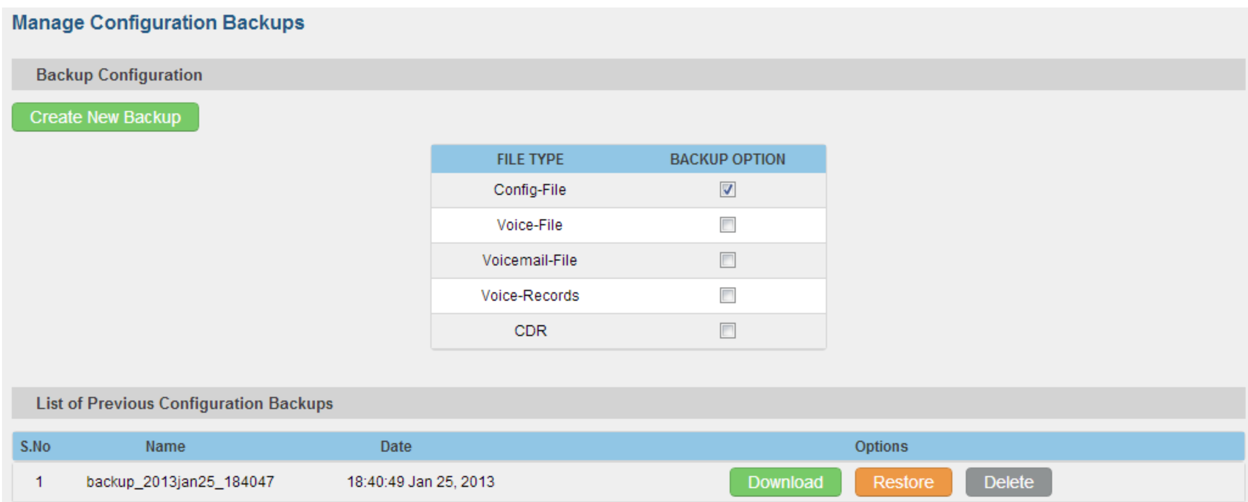



**Figure 34: Backup**

## MAINTENANCE/RESET AND REBOOT

To factory reset the device, select the mode type first. There are three different types for reset.

- User Configuration: All the Extensions, Trunks and Routing configurations, as well as the local settings (network settings, upgrading setting and etc) will be cleared.
- User Data: All the data including voicemail, recordings, IVR Prompt, Music on Hold, CDR and backup files will be cleared.
- All: All the configurations and data will be reset to factory default.

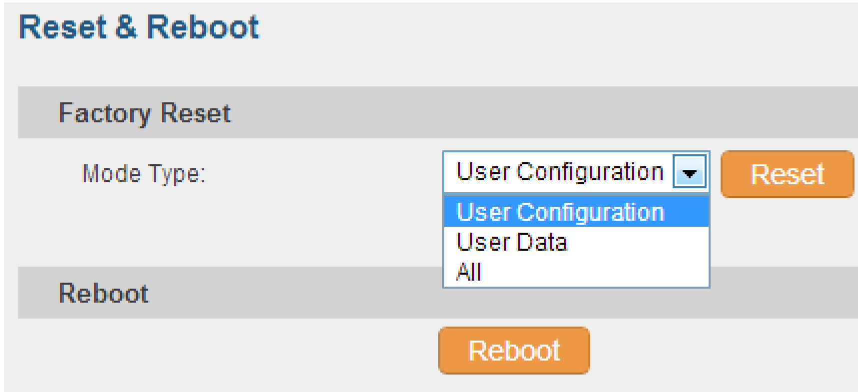



**Figure 35: Reset and Reboot**

## MAINTENANCE/TROUBLESHOOTING

On the GXE, users could capture traces, ping remote host and traceroute remote host for troubleshooting purpose. The captured trace can be downloaded for analysis. Also the instructions or result will be displayed in the web GUI output result.

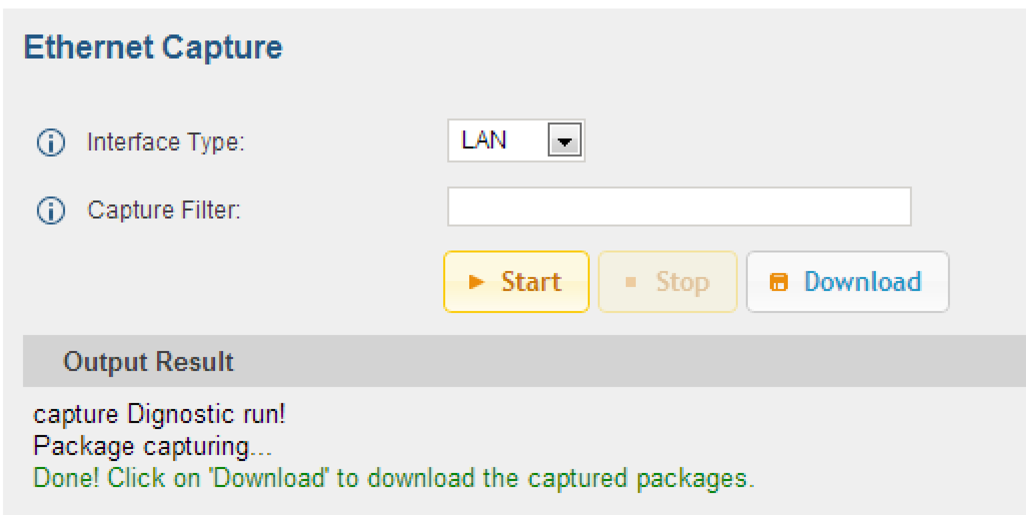



**Figure 36: Ethernet Capture**

# UPGRADING GXE5102/5104/5108/5116

## UPGRADE FROM NETWORK

The GXE5102/5104/5108/5116 can be upgraded via TFTP/HTTP/HTTPS by configuring the URL/IP Address for the TFTP/HTTP/HTTPS server and selecting a download method. Configure a valid URL for TFTP, HTTP or HTTPS; the server name can be FQDN or IP address.

**Examples of valid URLs:**
firmware.grandstream.com

## UPLOAD FIRMWARE LOCALLING

If there is no HTTP/TFTP server, users could also upload the firmware to the GXE5102/5104/5108/5116 directly via Web GUI. Please follow the steps below to upload firmware locally.

- Download the latest GXE5102/5104/5108/5116 firmware file from the following link and save it in your PC;
  http://www.grandstream.com/support/firmware
- Log in the Web GUI as administrator in the PC;
- Go to Web GUI->**Maintenance**->**Upgrade**, Upload the firmware file by clicking on  and select the firmware file from your PC;
- Click on  to start upgrading;
- Wait until the upgrading process is done and the GXE boots up again.

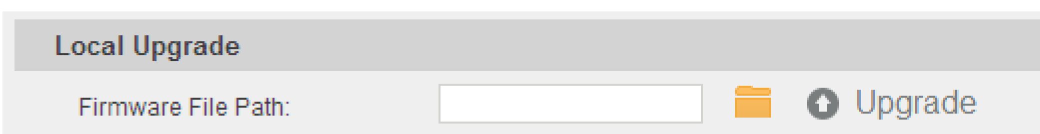



**Figure 37: Local Upgrade**

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⚠ **Note:**

Please do not interrupt or power cycle the GXE5102/5104/5108/5116 when the upgrading process is on.

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## NO LOCAL FIRMWARE SERVERS

For users that would like to use remote upgrading without a local TFTP server, Grandstream offers a NAT-friendly HTTP server. This enables users to download the latest software upgrades for their devices via this server. Please refer to the webpage:
http://www.grandstream.com/support/firmware.

Alternatively, users can download a free TFTP or HTTP server and conduct a local firmware upgrade. A free windows version TFTP server is available for download from :
http://support.solarwinds.net/updates/New-customerFree.cfm
http://tftpd32.jounin.net/.

Instructions for local firmware upgrade via TFTP:

1. Unzip the firmware files and put all of them in the root directory of the TFTP server;
2. Connect the PC running the TFTP server and the GXE5102/5104/5108/5116 device to the same LAN segment;
3. Launch the TFTP server and go to the File menu->Configure->Security to change the TFTP server's default setting from "Receive Only" to "Transmit Only" for the firmware upgrade;
4. Start the TFTP server and configure the TFTP server in the GXE's web configuration interface;
5. Configure the Firmware Server Path to the IP address of the PC;
6. Update the changes and reboot the GXE5102/5104/5108/5116.

End users can also choose to download a free HTTP server from http://httpd.apache.org/ or use Microsoft IIS web server.

# EXPERIENCING THE GXE5102/5104/5108/5116

Please visit our website: http://www.grandstream.com to receive the most up- to-date updates on firmware releases, additional features, FAQs, documentation and news on new products.

We encourage you to browse our product related documentation, FAQs and User and Developer Forum for answers to your general questions. If you have purchased our products through a Grandstream Certified Partner or Reseller, please contact them directly for immediate support.

Our technical support staff is trained and ready to answer all of your questions. Contact a technical support member or submit a trouble ticket online to receive in-depth support.

Thank you again for purchasing Grandstream GXE5102/5104/5108/5116, it will be sure to bring convenience and color to both your business and personal life.

## FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC 15.105 Class B
(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a
particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.