

Roby Technology Co., Limited

PBX-04 User Manual

www.chinaroby.com

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1 Introduce

This Article

This article is the user manual for the PBX-04 series products. It also includes the application notes for how to use CHINAROBY products to build a telephony system for small office. Through this article, we hope that users can build the IP telephony system via PBX-04 series products. The PBX-04 series PBXs include PBX-04, PBX-08 so far, since they have almost the same software and structure so we will use PBX-04 as the demo unit on this article. Same method is available to the PBX-04 series products.

PBX-04.

The PBX-04 series PBXs are open source embedded IP PBX systems. They run uClinux and Asterisk and support rich IP PBX features. They have big advantages on its inherent open source software structure and ultra low power consumption (<5 watt in idle state, environment friendly).

2 Configure the device via GUI

2.1 Access the GUI

The PBX-04 GUI is immigrated from Asterisk Now 2.0 version. The default IP for PBX-04 is 192.168.1.100. Put the default ip in your web browser and it will redirect to the setting page of PBX-04, the default password for the web access is:

Username: admin

Password: admin

If you can't access the PBX-04, please check if you have connect the RJ45 cable to the WAN port and your computer is in the same network 192.168.1.xxx as the PBX-04.

Note: the recommend web browser of PBX-04 is Firefox.

2.2 System Status

When you have entered the PBX-04 setting page, the system status will be showed and you can see the system status as below:

System Status

System Status
Uptime : 15:38:26 up 22:44, load average: 0.00, 0.00, 0.00

Trunks

Status	Trunk	Type	Username	Port/Hostname/IP
	Ports 1	Analog		Ports 1
	Ports 2	Analog		Ports 2
	Ports 3	Analog		Ports 3
	Ports 4	Analog		Ports 4

Conference Rooms 6060
Not in use

Parked Calls
No Parked Calls

Extensions

● Free ● Busy ● Unavailable ● Ringing

Extension	Name/Label	Status	Type
7001	test1	Messages : 0/1	SIP/IAX User
7002	7002	Messages : 0/0	SIP/IAX User
7049	wells	Messages : 0/0	SIP/IAX User
7469	Grace	Messages : 0/0	SIP/IAX User
7569	Forrest	Messages : 0/0	SIP/IAX User
7789	peter	Messages : 0/0	SIP/IAX User
7806	edwin	Messages : 2/0	SIP/IAX User
7969	Gilly	Messages : 0/0	SIP/IAX User
6090	Support		Call Queue
6000	test		Voice Menu
6050	Check Voicemails		VoiceMailMain
-- *No Extension assigned			Directory

2.3 Configure Hardware

The Configure Hardware page lists the available telephony ports in your system. You can configure the hardware to comply with your local telephony environment.

Type	Ports	
FXS Ports	--	
FXO Ports	1 , 2 , 3 , 4	Edit

Tone Region ⓘ **Tone Region:** Please choose your country or your nearest neighboring country for default Tones (Ex: dialtone, busy tone, ring tone etc.)

Reset all Previous Digital Trunks Information

Advanced Settings

Module Name : wctdm24xxp

Opermode ⓘ : USA

a-law override ⓘ : ulaw

fxs honor mode ⓘ : apply opermode to fxo modules only

booststringer ⓘ : normal

fastringer ⓘ : normal

lowpower ⓘ : normal

ring detect ⓘ : standard

MWI mode ⓘ : None

[Cancel Changes](#) [Update Settings](#)

Note: Hover on the (i) and you can see the comment of every settings.

2.4 Trunks

Trunks are used to make outbound call to the real world. There are different trunks we can set here.

Trunk	Analog Ports		
Ports 1	1	Edit	Delete
Ports 2	2	Edit	Delete
Ports 3	3	Edit	Delete
Ports 4	4	Edit	Delete

We have put the PBX-04 with four FXO ports so there are four analog trunks in this setting page. VoIP trunks (SIP&IAX2) are also available in the PBX-0X.

Create New SIP/IAX trunk

Type: SIP

Provider Name ⓘ : voipbuster

Hostname : sip.voipbuster.com

Username : test

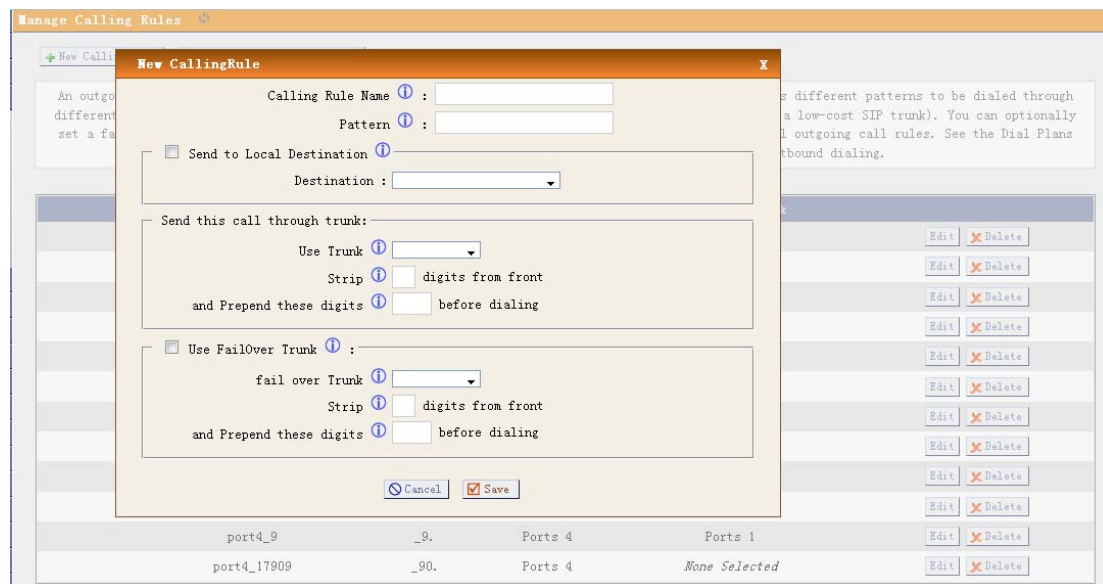
Password : xxxxxxx

[Cancel](#) [Add](#)

More info about how to set up the trunks, please refer the application notes.

2.5 Outgoing Calling Rules

Outgoing Calling Rules defines the calling permission and the routing rules when making calls.



- **Calling Rule Name:** The name of your calling rule
- **Pattern:** Describe what numbers should use this rule:
 - X ... Any Digit from 0-9
 - Z ... Any Digit from 1-9
 - N ... Any Digit from 2-9
 - [12345-9] ... Any Digit in the brackets (in this example, 1,2,3,4,5,6,7,8,9)
 - Wildcard, matches anything remaining; i.e. _9011. Matches anything starting with 9011 (excluding 9011 itself)
 - ! ... Wildcard, causes the matching process to complete as soon as it can unambiguously determine that no other matches are possible
- For example, the extension _NXXXXXX would match normal 7 digit numbers, while _1NXXNXXXXX would represent a three digit area code plus phone number, preceded by a one.
- **Use/Trunk:** Describe which trunk should be used in this rule
- **Strip:** Define how many digits should be removed from the dialstring.

Two samples for calling rule setting:

- 1) Cut the first digit for all dialstring start with 9, and make outgoing call via port1:
Calling Rule Name: **Out_9**
Pattern: **_9.**
Use/Trunk: **Ports 1**
Strip: **1** digits from the front
In this case, if you dial 983018766 in your extension, 83017306 will be sent via port1
- 2) Cut the first digit for all dialstring start with 0, and prepend 86 then dial via voipbuster trunk.

Calling Rule Name: **Out_voipbuster**

Pattern: **_0.**

Use/Trunk: **Voipbuster**

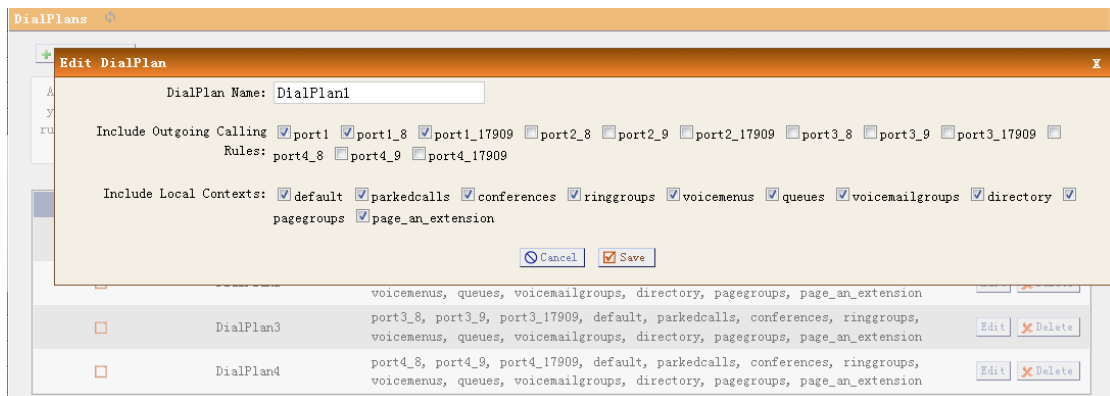
Strip: **1** digits from the front

And prepend these digits **86**

In this case, if you dial 075583054606 in your extension, 8675583016406 will be sent via voipbuster trunk

2.6 Dial Plans

A Dial Plan is a collection of Outgoing Call Rules. Dial Plans are assigned to Users to specify the dialing permissions they have. For example, you might have one Dial Plan for local calling that only permits users of that Dial Plan to dial local numbers, via the "local" outgoing calling rule. Another user may be permitted to dial long distance numbers, and so would have a Dial Plan that includes both the "local" and "longdistance" outgoing calling rules.



2.7 Users

This page allow administrator to create extensions for every user.

The screenshot shows the 'Create New User' form in a PBX administration interface. The form is divided into several sections: General, VoiceMail, Technology, VoIP Settings, and Other Options. The General section includes fields for Extension (6000), Name, DialPlan (DialPlan), CallerID (6000), and OutBound CallerID. The VoiceMail section has checkboxes for enabling voicemail, and fields for Voicemail Access PIN code, Mailbox (6000), and Email Address. The Technology section includes checkboxes for SIP and IAX, and fields for Analog Station, flash (750), rxflash (1250), and Codec Preference (First: u-law, Second: GSM, Third: None, Fourth: None, Fifth: None). The VoIP Settings section includes fields for MAC Address, Line Number (1), and SIP/IAX Password, and checkboxes for NAT, Can Reinvite, DTMF Mode (RFC2833), and insecure (no). The Other Options section includes checkboxes for 3-Way Calling, In Directory, Call Waiting, CTI, and Is Agent, and dropdown menus for Pickup Group (1) and Call Group (1). At the bottom, there are 'Cancel' and 'Update' buttons.

General:

Extension: The number you can dial to reach this user.

Name: CallerID name of the user.

CallerID: The CID string when you dial to other internal users.

Outbound CallerID: Specify the public CallerID for outbound calls, it is only available when your digital or voip provider support this feature.

VoiceMail:

Voicemail Access PIN code: The password of your voicemail box

Email address: The email address for the voicemail to email function.

Technology:

SIP: enable this option so the extension can be a SIP device. IAX2:

enable this option so the extension can be an IAX2 device.

Analog Station: If you have analog FXS ports in your PBX-04, you can select the port here

for your extension.

flash/rxflash: flash parameter for the users.

Codec preference: specify the preference codec for the users.

Voip Setting:

MAC address: used for polycom phone provisioning.

Line Number: used for polycom phone provisioning.

Linekeys: used for polycom phone provisioning.

SIP/IAX2 password: user password for SIP/IAX2 registration.

NAT: enable this when you use the PBX-04 in public network and the sip devices are in private network.

Can Reinvite: enable this and the PBX-04 will try to negotiate the endpoints to route the media string directly (not through PBX-04). This can reduce the CPU load of the PBX-04 and you will get better voice performance because the media string are sent directly from endpoint to endpoint.

DTMF mode: DTMF uses on conversation, the RFC2833 is the most common.

Insecure: method of authentication,

Other Options:

3-Way Calling: enable/disable 3-way calling

In directory: check this if the user is listed in the directory.

Call waiting: enable/disable Call waiting

CTI: Computer Telephony Integration, allows access to 3rd party applications over Asterisk Manager Interface.

Is Agent: check this if the user is available in call queue.

Pick up Group: Specify the call pick up group.

Call Group: Specify the call group for the user.

2.8 Ring Groups

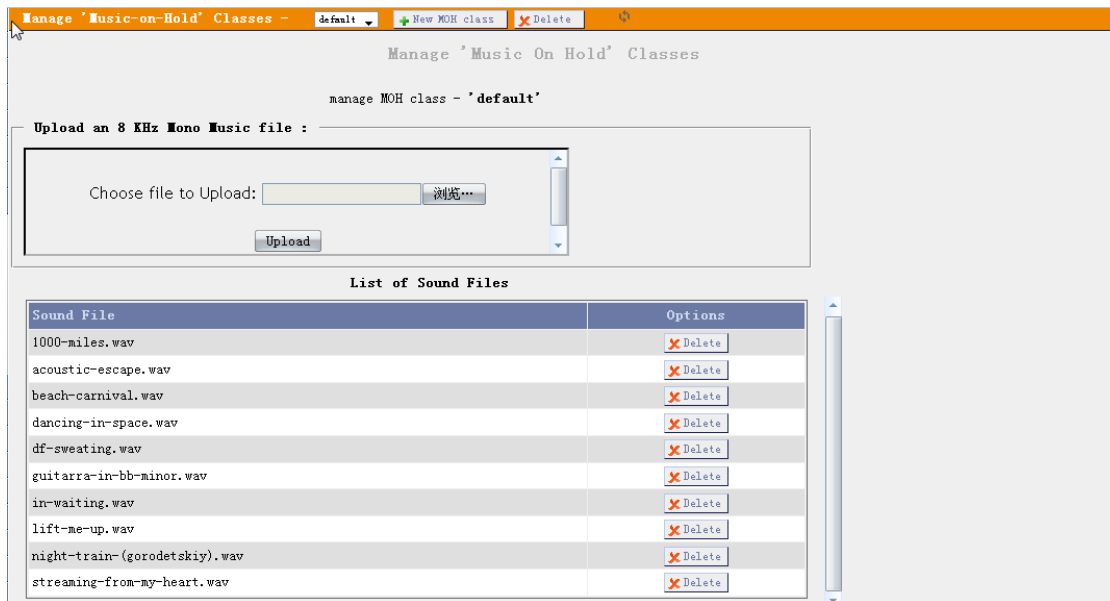
Define the Ringgroups to dial more than one extension simultaneously, or to ring more than one phone sequentially.

The screenshot shows the 'New RingGroup' dialog box in the Asterisk Manager Interface. The dialog has a title bar 'New RingGroup' and a close button 'X'. It contains the following fields and options:

- RingGroup Name :** A text input field.
- Extension for this ring group :** A text input field containing '6400'.
- Ring Group Members :** A list box containing '7806(SIP) admin' and '7969(SIP) gilly'.
- Available Users :** A list box containing '7806(IAX2) admin', '7969(IAX2) gilly', '7789(SIP) peter', '7789(IAX2) peter', '7469(SIP) Grace', '7469(IAX2) Grace', '7001(SIP) test1', and '7001(IAX2) test1'.
- Ring Group Options :** A section containing:
 - Strategy :** A dropdown menu set to 'Ring in Order'.
 - Seconds to ring each member :** A text input field containing '20'.
 - If not answered Goto :** A dropdown menu set to 'Hangup'.
- Buttons:** 'Cancel' and 'Save' (checked) buttons at the bottom right.

2.9 Music on Hold

Customize audio tracks for different queues, parked calls etc.



Manage 'Music On Hold' Classes - default + New MOH class X Delete

Manage 'Music On Hold' Classes

manage MOH class - 'default'

Upload an 8 KHz Mono Music file :

Choose file to Upload: 浏览...

Upload

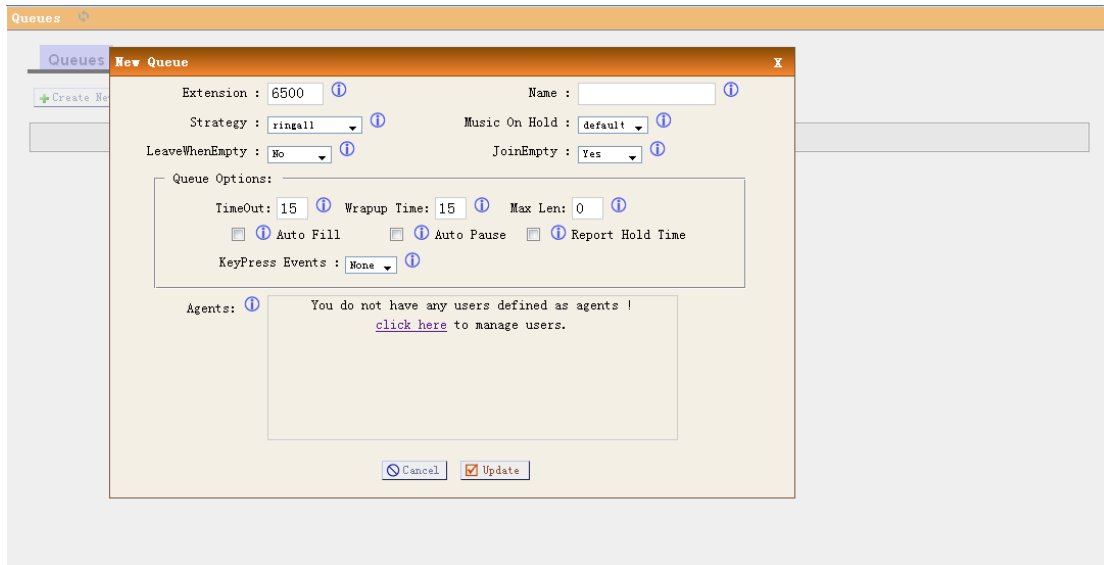
List of Sound Files

Sound File	Options
1000-miles.wav	Delete
acoustic-escape.wav	Delete
beach-carnival.wav	Delete
dancing-in-space.wav	Delete
df-sweating.wav	Delete
guitarra-in-bb-minor.wav	Delete
in-waiting.wav	Delete
lift-me-up.wav	Delete
night-train-(gorodetskiy).wav	Delete
streaming-from-my-heart.wav	Delete

/

2.10 Call Queues

Call queues allow calls to be sequenced to one or more agents.



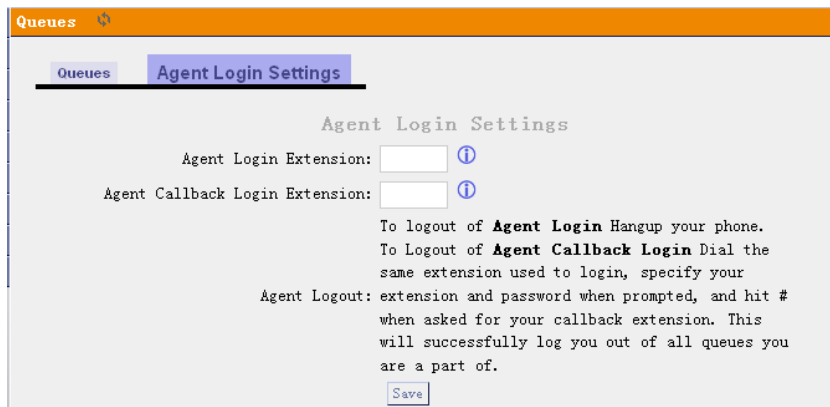
- **Extension:** This option defines the numbered extension that may be dialed to reach this Queue.
- **Name:** This option defines a name for this Queue, i.e. "Sales". 'Name' is a label to help you see this queue in the queue list.
- **Strategy:** This option sets the Ringing Strategy for this Queue. The options are
RingAll: Ring All available Agents simultaneously until one answers.
RoundRobin: Take turns ringing each available Agent.
LeastRecent: Ring the Agent which was least recently called
FewestCalls: Ring the Agent with the fewest completed calls.
Random: Ring a Random Agent.
RRmemory: RoundRobin with Memory, Remembers where it left off in the last ring pass.
- **Agents:** This selection shows all Users defined as Agents in their User conf. Checking a User here makes them a member of the current Queue.
- **Music On Hold:** Select the 'Music on Hold' Class for this Queue. 'Music on Hold' classes can be managed from the 'Music On Hold' panel.
- **LeaveWhenEmpty:** This option controls whether callers already on hold are forced out of a queue that has no agents. There are three options.
Yes: Callers are forced out of a queue when no agents are logged in.
No: Callers will remain in a queue with no agents.
Strict: Callers are forced out of a queue with no agents logged in, or if all logged in agents are unavailable.
- **Join Empty:** This option controls whether callers can join a call queue that has no agents. There are three options,
Yes: Callers can join a call queue with no agents or only unavailable agents
No: Callers cannot join a queue with no agents
Strict: Callers cannot join a queue with no agents or if all agents are unavailable.

Queue Options:

- **Timeout:** How many seconds an Agent's phone will ring before the Queue tries to ring the next Agent.
- **Wrapup Time:** How many seconds after the completion of a call an Agent will have

before the Queue can ring them with a new call. The default is 0, which is no delay.

- **MaxLen:** How many calls can be queued at once. This count does not include calls that have been connected with Agents, it only includes calls that have not yet been connected. Default is 0, which is no limit. When the limit has been reached, a caller will hear a busy tone and advance to the next calling rule after attempting to enter the queue.
- **AutoFill:** Defining this option causes the Queue, when multiple calls are in it at the same time, to push them to Agents simultaneously. Thus, instead of completing one call to an Agent at a time, the Queue will complete as many calls simultaneously to the available Agents.
- **AutoPause:** Enabling this option pauses an agent if they fail to answer a call. This means that the agent is still logged into the queue, but they will not receive calls from the queue. Once paused, an agent can unpause by logging into the queue using the regular agent login extension.
- **Report Hold Time:** Enabling this option causes Asterisk to report, to the Agent, the hold time of the caller before the caller is connected to the Agent.
- **KeyPress Events:** If a caller presses a key while waiting in the queue, this setting selects which voice menu should process the key press.

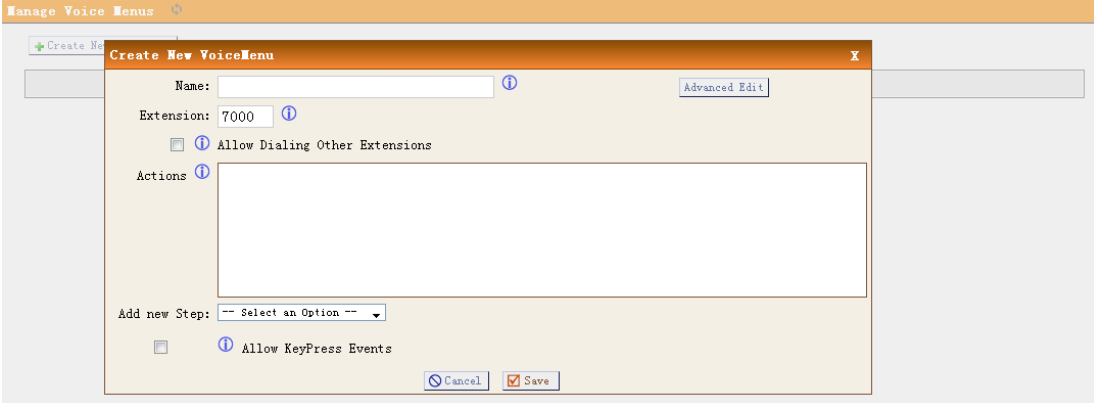


The screenshot shows the Asterisk configuration interface for Queues. The 'Agent Login Settings' tab is selected. It contains two input fields: 'Agent Login Extension:' and 'Agent Callback Login Extension:'. Below these fields is a detailed instruction for logging out: 'To logout of Agent Login Hangup your phone. To Logout of Agent Callback Login Dial the same extension used to login, specify your Agent Logout: extension and password when prompted, and hit # when asked for your callback extension. This will successfully log you out of all queues you are a part of.' A 'Save' button is located at the bottom of the settings area.

- **Agent Login Extension:** Extension to be dialed for the Agents to Login to the Specific Queue. This is an extension that all the Agents can Call to Login to their specified Queues.
- **Agent Callback Login Extension:** Extension to be dialed for the Agents to Login to the Queues they are apart of. Same as Agent Login Extension, except you do not have to remain on the line.

2.11 Voice Menu (IVR)

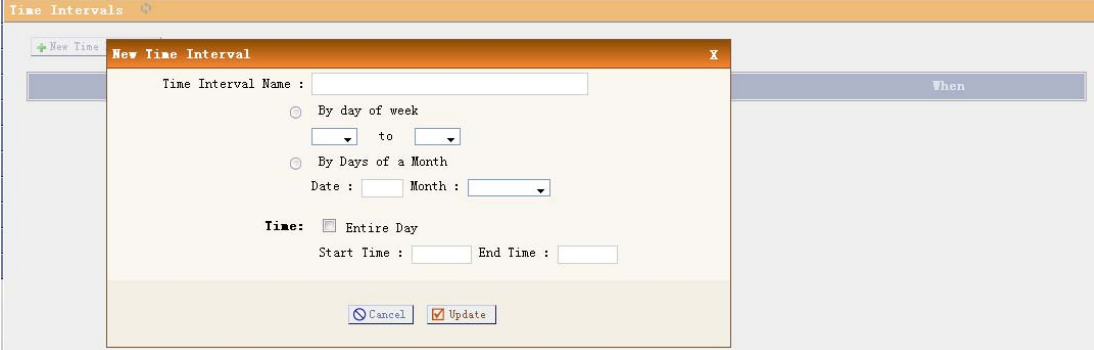
Menus allow for more efficient routing of calls from incoming callers. Also known as IVR (Interactive Voice Response) menus or Digital Receptionist.



- **Name:** Name of this Voice Menu
- **Extension:** If you want this Voicemenu to be accessible by dialing an extension, then enter that extension number.
- **Dial other Extensions:** Is the caller allowed to dial extensions other than the ones explicitly defined.
- **Actions:** A sequence of actions performed when a call enters the menu.
- **Add a new step:** Add additional steps performed during the menu.
- **KeyPress Events:** Allow key press events will cause the system to listen for DTMF input from the caller and define the actions that occur when a user presses the corresponding digit.

2.12 Time Intervals

Time Intervals are defined ranges of time that will be used by call routing features.



The screenshot shows a software window titled "Time Intervals" with a "New Time Interval" dialog box open. The dialog box contains the following fields and options:

- Time Interval Name :** A text input field.
- By day of week:** A radio button option with two dropdown menus and a "to" label between them.
- By Days of a Month:** A radio button option with "Date :" and "Month :" labels and a dropdown menu.
- Time:** A checkbox labeled "Entire Day".
- Start Time :** and **End Time :** Two text input fields.
- Buttons:** "Cancel" and "Update" (with a checked checkbox icon).

- **Name:** Name of the time Interval
- **By day of week:** Define the day range by week for time interval
- **By days of a month:** Define the day range by Month for time interval
- **Time /Entire day:** Define if the time interval is available for the whole day or only for the specified hours.

2.13 Incoming Calling Rules

Create, modify, prioritize and delete incoming call rules for handling Incoming calls based on service provider and/or the number called based on Time Intervals.

The screenshot shows the 'Incoming Calling Rules' configuration window. A modal dialog titled 'New Incoming Rule' is open, containing the following fields:

- Trunk : [Dropdown menu]
- Time Interval : [Dropdown menu]
- Pattern ⓘ : [Text input field]
- Destination : [Dropdown menu]

At the bottom of the dialog are 'Cancel' and 'Update' buttons. The background window displays a table of existing rules:

Time Interval	Destination	Edit	Delete
none (no TimeIntervals matched)	Goto User 7789	Edit	Delete
Trunk - Ports 3			
Time Interval	Destination	Edit	Delete
none (no TimeIntervals matched)	Goto User 7469	Edit	Delete

- **Trunk**: Which service provide should use this trunk for its incoming calls.
- **Time Interval**: ranges of time that will be used in this rule.
- **Pattern**: Incoming call pattern.
- **Destination**: where should the incoming call is routed.

2.14 Voicemail

General settings for voicemail function.

General Settings | Email Settings for VoiceMails | SMTP Settings

General VoiceMail Settings

Extension for checking messages ⓘ : 6050

Direct Voicemail Dial ⓘ :

Max greeting (in seconds) ⓘ : 30

Dial '0' for Operator ⓘ :

Message Options

Maximum messages per folder ⓘ : 25

Max message time ⓘ : 2 minutes

Min message time ⓘ : 5 seconds

Playback Options

Say message Caller-ID ⓘ :

Say message duration ⓘ :

Play envelope ⓘ :

Allow users to review ⓘ :

General Voicemail Settings:

- **Extension for checking Message:** This option, i.e. "2345" defines the extension that Users call in order to access their voicemail accounts.
- **Direct VoiceMail Dial:** Check this to enable direct voicemail dial. For instance, if John's extension is 6001, you would be able to directly dial into John's voicemailbox by dialing #6001 to leave him a message.
- **Max Greeting:** Set the maximum number of seconds for a User's voicemail greeting.
- **Dail 'O' for Operator:** Enable Callers to exit the voicemail application and connect to an operator extension. The operator extension must be defined from the 'Options' panel.
- **Maximum messages per folder:** This select box sets the maximum number of messages that a user may have in any of their folders.
- **Maximum Message Time:** This select box sets the maximum duration of a voicemail message in seconds. Message recording will not occur for times greater than this amount.
- **Minimum message Time:** This select box sets the minimum duration of a voicemail message in seconds. Messages below this threshold will be automatically deleted.
- **Say Message Caller-ID:** If this option is enabled, the Caller ID of the party that left the message will be played back before the voicemail message begins playing.
- **Say Message Duration (in minutes):** If this option is set, the duration of the message in minutes will be played back before the voicemail message begins playing.
- **Allow callers to Review:** Checking this option allows the caller to review their message before it is submitted as a new voicemail message.
- **Play Envelope:** Turn on/off playing introductions about each message when accessing them from the voicemail application.

VoiceMail to Email: with this function configured, when there is a new voicemail for users, the PBX-04 will automatically send the voicemail to the user's email address set in the user's profile.

VoiceMail to Email Preference:

preferences

General Settings | **Email Settings for VoiceMails** | SMTP Settings

Send messages by e-mail only ⓘ

Attach recordings to e-mail ⓘ

Template for Voicemail Emails

From: asterisk@yourcompany.null

Subject: New voicemail from \${VM_CALLERID} for \${VM_MAILBOX}

Message: Hello \${VM_NAME}, you received a message lasting \${VM_DUR} at \${VM_DATE} from, (\${VM_CALLERID}). This is message \${VM_MSGNUM} in your voicemail Inbox.

Cancel Save

Template Variables: \t : TAB

- \${VM_NAME} : Recipient's firstname and lastname
- \${VM_DUR} : The duration of the voicemail message
- \${VM_MAILBOX} : The recipient's extension
- \${VM_CALLERID} : The caller id of the person who left the message
- \${VM_MSGNUM} : The message number in your mailbox
- \${VM_DATE} : The date and time the message was left

- **Send messages by e-mail only:** If this option is set, then voicemails will not be checkable using a Phone. Messages will be sent via e-mail, only. Note: You need to have an smtp server configured for this functionality.
- **Attach recording to e-mail:** This option defines whether or not voicemails are sent to the Users' e-mail addresses as attachments. Note: You need to have an smtp server configured for this functionality.

SMTP server setting

Notification Emails

General Settings | Email Settings for VoiceMails | **SMTP Settings**

SMTP Settings

Smt server ⓘ:

Port ⓘ:

Cancel Save

- **SMTP Server:** The IP address or hostname of an SMTP server that your Astfin box may connect to, without authentication, in order to send e-mail notifications of your voicemails; i.e. mail.yourcompany.com
- **Port:** The port number on which the SMTP server is running; generally port 25.

Note: for Setup example for the Voicemail to Email please refer the application note.

2.15 Conferencing

MeetMe conference bridging allows quick, ad-hoc conferences with or without security.

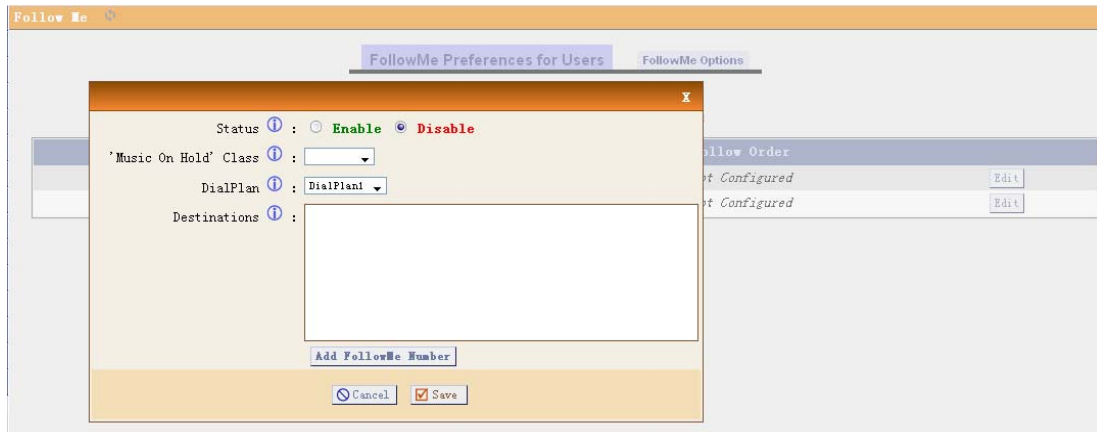
The screenshot shows a web-based interface for managing conference rooms. A modal window titled "New Conference Bridge" is open. It features the following fields and options:

- Extension:** A text input field containing "6300".
- Marked/Admin user Extension:** An empty text input field.
- Password Options:**
 - Pin Code:** An empty text input field.
 - Admin PinCode:** An empty text input field.
- Conference Room Options:** A group of six checkboxes:
 - Play hold music for first caller
 - Close conference when last marked user exits
 - Enable caller menu
 - Announce callers
 - Quiet Mode
 - Wait for marked user

At the bottom of the dialog, there are two buttons: "Cancel" and "Update".

- **Extension:** This is the number dialed to reach this Conference Bridge.
- **Marked/Admin user Extension:** If the conference bridge is to have marked users or admin users, then those users should enter the conference bridge using a separate extension. Admin conference users can lock and unlock the conference and can kick the most recent conference participant. Marked users are special users whose entrance and exit, if the Wait for Marked user or Close conference when last marked user exits can either begin or end the conference altogether.
- **Pin Code:** set an optional pin code, Ex: "1234" that must be entered in order to access the Conference Bridge.
- **Administrator PIN Code:** Defining this option sets a PIN for Conference Administrators.
- **Play Hold Music for First Caller:** Checking this option causes Asterisk to play Hold Music to the first user in a conference, until another user has joined the same conference.
- **Enable Caller Menu:** Checking this option allows a user to access the Conference Bridge menu by pressing the * "Asterisk" key on their dialpad.
- **Announce Callers:** Checking this option announces, to all Bridge participants, the joining of any other participants.
- **Quiet Mode:** Do not play enter/leave sounds
- **Wait for Marked User:** Prevent conference participants from hearing each other until the marked user has joined.

2.16 Follow Me

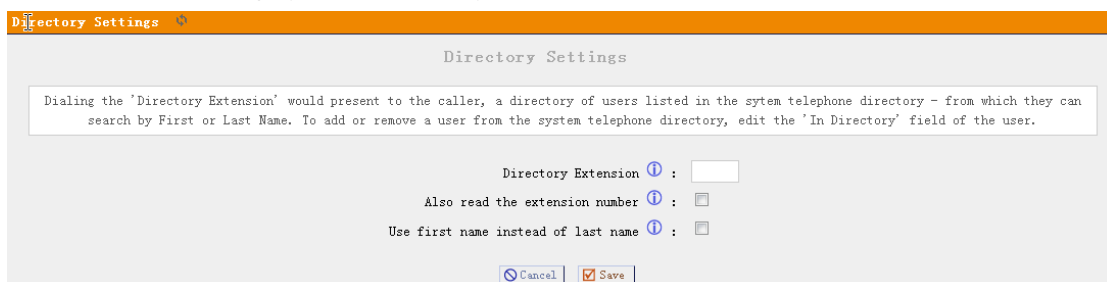


- **Status:** Enable/Disable FollowMe for this user.
- **Music On Hold class:** that the caller would hear while tracking the user.
- **DialPlan:** DialPlan that would be used for dialing the FollowMe numbers. By default this would be the same dialplan as that of the user.";
- **Destinations:** List of extensions/numbers that would be dialed to reach the user during FollowMe.



2.17 Directory

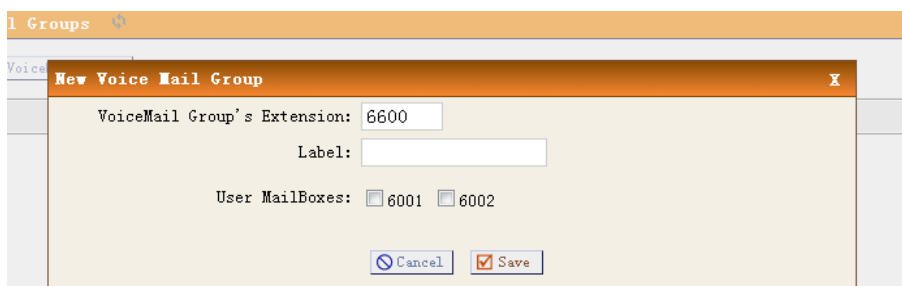
Preferences for 'Dialing by Name Directory'



- **Directory Extension:** Extension to dial for accessing the Name Directory
- **Read Extension number:** In addition to the name, also read the extension number to the caller before presenting dialing options
- **Use first Name instead of Last Name:** Allow the caller to enter the first name of a user in the directory instead of using the last name

2.18 Voicemail Group

Define 'VoiceMail Groups' to leave a voicemail message for a group of users by dialing an extension.



2.19 Voice Menu prompts

Record or Upload custom VoiceMenu prompts.

The screenshot shows the 'Custom Voice Menu Prompts' page. At the top, there is a header 'Custom Voice Menu Prompts' with a refresh icon. Below it, the title 'List of Custom Voice Menu Prompts' is displayed. There are two buttons: 'Record a new Voice Menu prompt' and 'Upload a Voice Menu prompt'. A message box in the center states: 'No custom Voice Menu prompts found !!'. Below this message, a paragraph explains: 'You can record a new VoiceMenu Prompt by clicking on the 'Record a new Voice Menu prompt' or click on the 'Upload a Voice Menu prompt' button to upload a custom voice menu.'

2.20 BackUp

Backup or Restore the configure files.

The screenshot shows the 'Backup / Restore Configurations' page. The title is 'Manage Configuration Backups'. There is a '+ Create New Backup' button. Below it, a section titled 'List of Previous Configuration Backups :' contains a table with the following data:

S.No	Name	Date	Options		
1	backup_2009feb04_103930	Feb 04, 2009	Download from Unit	Restore Previous Config	Delete
2	backup_2009feb04_103739	Feb 04, 2009	Download from Unit	Restore Previous Config	Delete

Note: Restored the backup won't take effect on the network setting. You need to modify the network setting in the GUI and save/reboot.

2.21 Active Channels

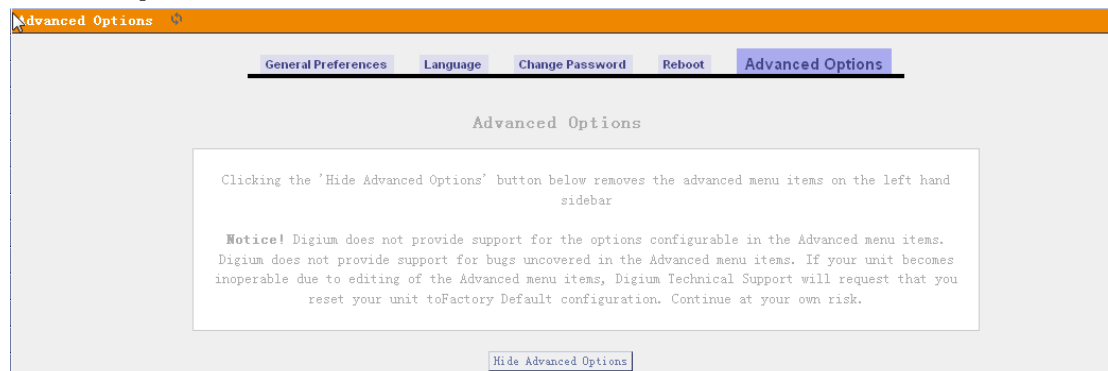
Displays current Active Channels on the PBX, with the options to Hangup or Transfer.

The screenshot shows the 'Channel Management' page. At the top, there is a header 'Channel Management' with a refresh icon. Below it, there is a 'Refresh Now' button. The title is 'Active Channels - 1'. Below the title, it says 'Refreshing Active Channels in 1 Seconds'. There is a table with the following data:

Channel	State	Seconds	Application	Transfer	Hangup
SIP/6002-011f2580	Up	4	Voicemail (\${ARG1}, u)	Transfer	Hangup

2.22 Advance Options

In the Options Panel, choose Advanced Options--> show Advanced Options then the advanced options will be showed in the left menu.

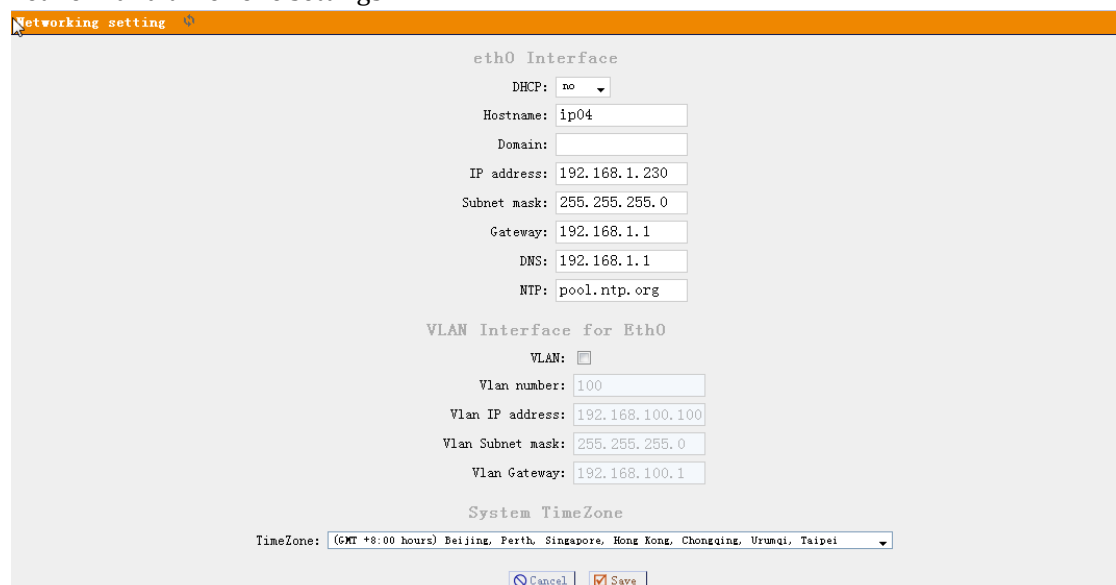


The advanced options include:

- Call Detail Records
- Active Channels
- Bulk Add
- File Editor
- Asterisk CLI
- IAX Settings
- SIP Settings
- Network Settings
- Firmware update

2.23 Advance Options—Network Settings

Network and time zone settings.



Note: you need to reboot the device to make the ip and timezone take effect.

2.24 Advance Options—Call Detail Records

Shows the call details.

CDR Viewer (CDR-CSV)

CDR viewer << prev next >>

Viewing 1-7 of 7 (most recent first) View: 10

Account Code	Source	Destination	Dest. Context	Caller ID	Channel	Dest. Channel	Last app.	Last data	Start time	Answer Time	End Time	Duration	Billable seconds	Disposition	AMA flag	Unique ID	Log userfield
1	8806	s	default	8806	Tap/2-1		BackGround	demo-instruc	2009-02-02 08:57:00	2009-02-02 08:57:02	2009-02-02 08:57:51	51	29	ANSWERED	DOCUMENTATION	1233572220.2	
2	8806	s	default	8806	Tap/2-1		BackGround	demo-comprat	2009-02-02 08:59:46	2009-02-02 08:59:47	2009-02-02 08:59:54	8	7	ANSWERED	DOCUMENTATION	1233572206.1	
3	8806	s	default	8806	Tap/1-1		BackGround	demo-comprat	2009-02-02 08:59:30	2009-02-02 08:59:32	2009-02-02 08:59:40	10	8	ANSWERED	DOCUMENTATION	1233572190.0	
4	8806	#	default	8806	Tap/1-1		Hangup		2009-02-02 08:58:32	2009-02-02 08:58:33	2009-02-02 08:58:44	12	11	ANSWERED	DOCUMENTATION	1233572012.1	
5	8806	#	default	8806	Tap/2-1		Hangup		2009-02-02 08:51:16	2009-02-02 08:51:18	2009-02-02 08:51:28	12	10	ANSWERED	DOCUMENTATION	1233571876.0	
6	8806	#	default	8806	Tap/2-1		Hangup		2006-12-31 19:01:14	2006-12-31 19:01:15	2006-12-31 19:01:26	12	11	ANSWERED	DOCUMENTATION	1167609674.1	
7	8806	#	default	8806	Tap/1-1		Hangup		2006-12-31 19:00:55	2006-12-31 19:00:56	2006-12-31 19:01:08	12	11	ANSWERED	DOCUMENTATION	1167609651.0	

[Manager CDR Files](#)

2.25 Advance Options—Firmware Update

Update the firmware of your device

Update Appliance Firmware

Download image from a :

HTTP URL TFTP Server

TFTP Server :

File Name

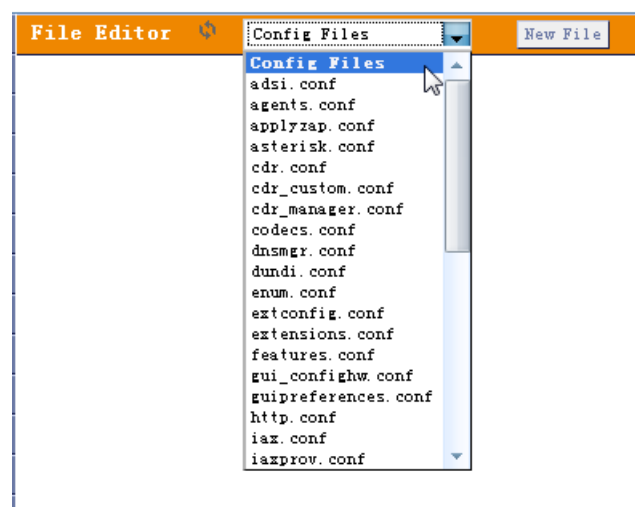
Reset Configs

HTTP and TFTP update is available for the firmware update.

- **TFTP server:** TFTP server which include the update firmware
- **File Name:** name of the new firmware, please make sure that you are using a md5 firmware for the updating.
- **Reset Configs:** enable this if you want to reset the networking and asterisk configs after upgrade.

2.26 Advance Options—File Editor

Here you can modify the asterisk configure files directly.



Note: Please make sure you know what the meaning in the files before trying to modify the files.

3 Application notes

3.1 Install hardware

The PBX-0X series IP PBXs use interchangeable FXO/FXS modules. The FXO and FXS signaling use different modules. Below are the available modules for the system.

S100M (FXS-100) : Single FXS module

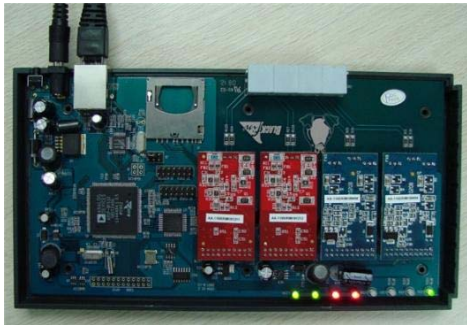
X100M(FXO-100) : Single FXS module

FXO: use to connect to the PSTN line

FXS: use to connect to the analog phone.

Install illustration:

- 1) PBX-04 with two fxo two fxs modules.



3.2 Different methods to access the PBX

There are several ways to access the PBX-0X series products. Different ways has different usage. The web/SSH/telnet accesses are base on network connection, and the console port access is via the console cable which allows you to access the devices on a lower level.

➤ Web access

It is the most common way to access the PBX-0X. Most settings can be done through the web interface. Simply put the device's IP address in your web browser (better use Firefox) and enter the username and password to access the device. The web access username/password is **admin/admin**

➤ SSH access

This is the advance way to access the device, you can use the putty software to access the device. in the ssh access, you can access the Linux directly and do more advance linux setting and debug. The SSH user/password is **root/ 12xerXes06**

➤ Telnet access

The telnet access is similar with the SSH access but it is not suggested because it is not as convenient as SSH access.

3.3 Make free internal calls

Making internal calls are the base requirement for a telephony system. Below are the settings for this usage. It is base on PBX-04 but setting is the same in other PBX-0X products.

At the beginning, we need to add some extensions to make internal calls. Each extension acts as an internal number. There are three types of extensions we can add: SIP, IAX2 and ZAP.

Before set up the extensions, we need to go to the **Options --> General Preferences** to set the user extensions range. The default user extensions range is from 6000~6299. The extension 6000 is used for auto-attendant so don't register on this extension.

General Preferences

General Preferences | Language | Change Password | Reboot | Advanced Options

Global OutBound CID :

Global OutBound CID Name :

Operator Extension :

Ring Timeout :

Extension preferences:

User Extensions : to

Conference Extensions : to

VoiceMenu Extensions : to

RingGroup Extensions : to

Queue Extensions : to

VoiceMail Group Extensions : to

Then go to page **Dial Plan-->Create New Dialplan** to create a default Dial Plan.

Then go to page **Users-->Create New User** to create the extensions: 6001

The screenshot shows the 'Create New User' configuration window with the following details:

- General:** Extension: 6001, Name: Edwin, DialPlan: (empty), CallerID: 6001, OutBound CallerID: (empty)
- Enable Voicemail for this User:** Enable Voicemail for this User, VoiceMail Access PIN code: (empty), Email Address: 6001
- Technology:** SIP, IAX, Analog Station: None, flash: 750, rxflash: 1250, Code Preference: First: u-law, Second: G729, Third: None, Fourth: None, Fifth: None
- VoIP Settings:** SIP Address: 6001, Line Number: 1, LineKeys: 1, SIP/IAX Password: 6001, NAT: Can Reinvite: , DTMF Mode: RFC2833, insecure: no
- Other Options:** 3-Way Calling, In Directory, Call Waiting, CTI, Is Agent, Pickup Group: 1

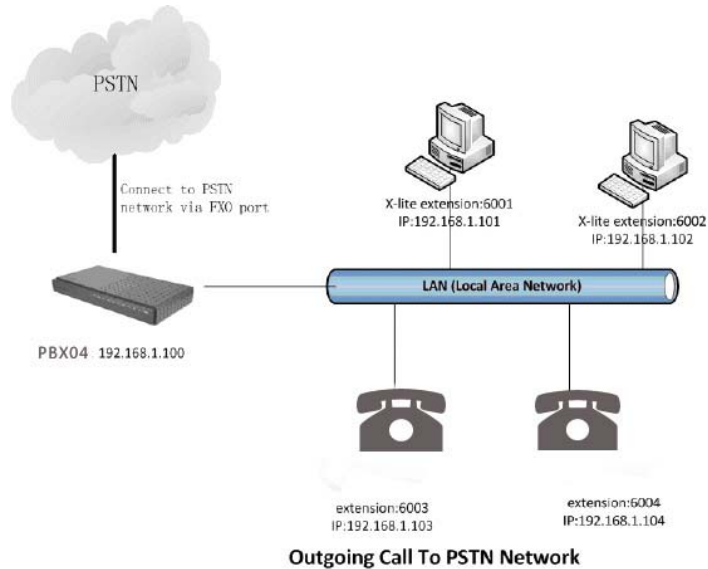
Use the same method to add the extensions: 6002, 6003 and 6004. In our system picture, we use softphone x-lite to register on 6001 and 6002. Use IP-PHONE IP phone to register on the extensions 6003 and 6004. Then these four extensions can communicate with each other use the numbers 6001, 6002, 6003 and 6004.

3.4 Make outbound calls to PSTN

There are many kinds of trunking you can use to make outgoing calls. It includes: Analog FXO trunk, Digital E1/T1/BRI Trunk, SIP trunk, IAX trunk etc.

3.4.1 Analog/FXO trunking

For the /04/08, you can install FXO module and use the FXO trunking to make outgoing call via your local PSTN line. The set up is as per below:



Step 1: Create FXO trunk

Go to page Trunks--> Add New Analog Trunk

The screenshot shows the 'New Analog Trunk' configuration window. The 'Trunk Name' is set to 'PSTN'. The 'Channels' are set to 1 and 2. The 'Advanced Options' section includes the following settings:

Parameter	Value
Busy Detection	Yes
Busy Pattern	500, 500
Answer on	No
Polarity Switch	
Call Progress	No
Use CallerID	Yes
CallerID	As Received
CID Signalling	Bell - USA
Flash Timing	750
Busy Count	3
Ring Timeout	8000
Hangup on	No
Polarity Switch	
Progress Zone	US
Caller ID Start	Ring
Pulse Dial	No
mailbox	
Receive Flash Timing	1250

Buttons: Cancel, Add

Note: The port1 and port2 of PBX-04 are slotted with FXO modules. Always click "Apply Changes" in the right top corner when you do some changes.

Step 2: Create Outgoing Calling Rules

Go to page **Outgoing Calling Rules**.

Calling Rule Name : OUT_PSTN
Pattern : _9.
 Send to Local Destination
Destination :
Send this call through trunk:
Use Trunk : PSTN
Strip : 1 digits from front
and Prepend these digits : before dialing
 Use FailOver Trunk :
fail over Trunk :
Strip : digits from front
and Prepend these digits : before dialing
Cancel Save

The pattern `_9.` and strip 1 digits means all calls start with 9 will be cut the first digit and sent out via this rule. for example, if you dial 983018049, the PBX-04 will send 83018049 to port1 or port2.

Step 3: Add New DialPlan

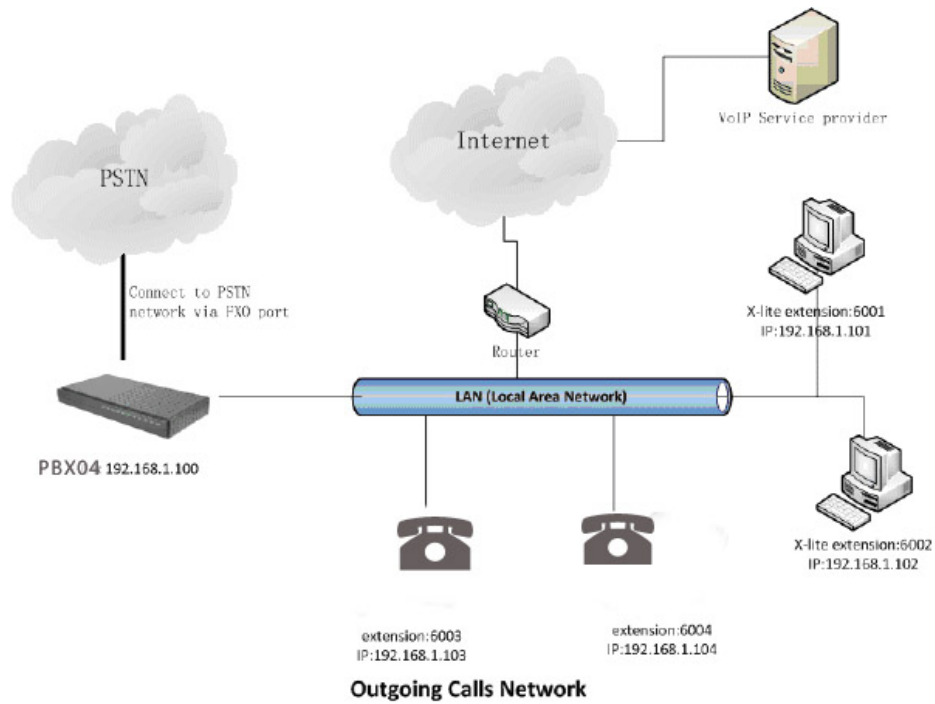
Go to page **Dial Plans**--> **Crear New Dial Plans**

DialPlan Name: DialPlan1
Include Outgoing Calling Rules: OUT_PSTN
Include Local Contexts: default parkedcalls conferences ringgroups voicemenus queues voicemailgroups directory pagegroups page_an_extension
Cancel Save

Set the DialPlan1 to default dial plan so every new extension will use this dialplan in default. Then you can use your extensions to dial out via the port1 and port2.

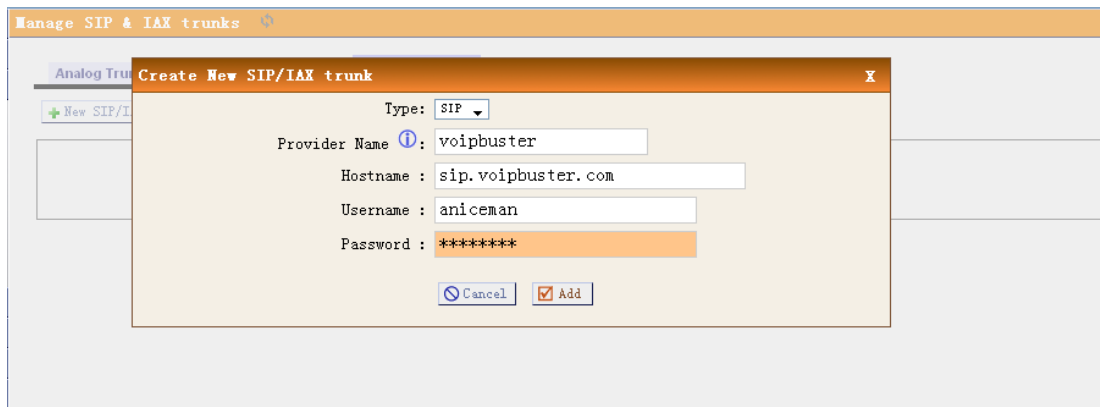
3.4.2 VoIP trunking

Via the voip trunking we can dial call via the voip service to reduce our cost when making international calls.



Step 1: Add Voip trunks

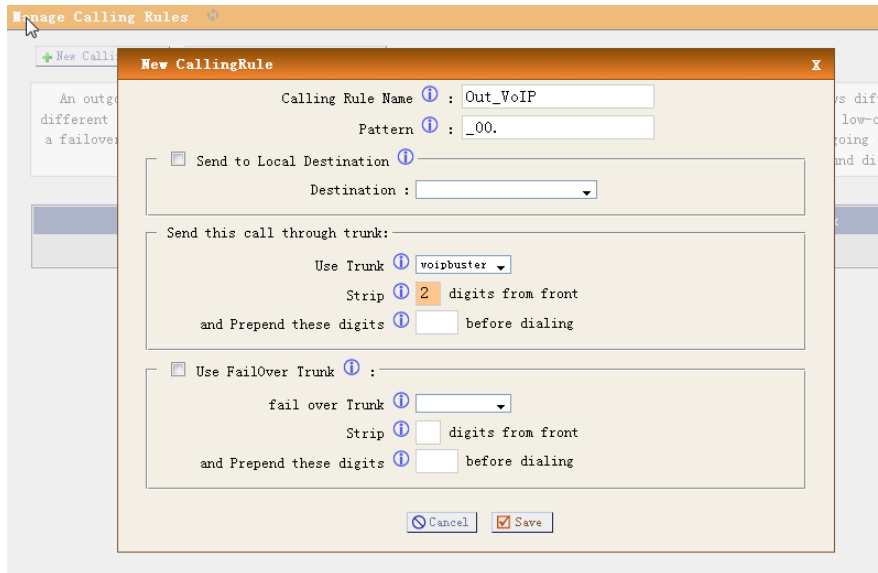
Go to page Trunks--> Voip Trunks--> Add New Sip trunks



We use the Voipbuster as our voip service provider here.

Step 2: Add voip calling rule

Go to page Outgoing Calling Rules.



All calls start with 00 will be sent out via our voip service provider.

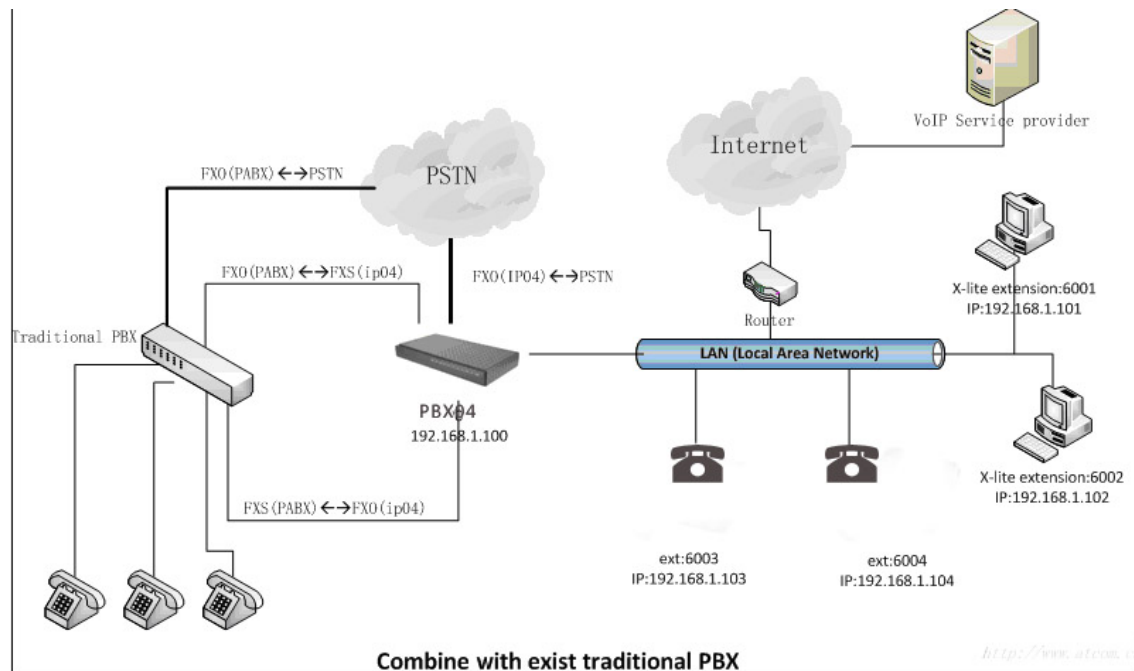
Step 3: Add this new calling rule to the dial plan1

All extensions which use dialplan1 are able to use the voipbuster service now

3.5 Combine the PBX-04 with exist PBX

Introduce:

Assume that we already have a (3-8 3fxo 8extensions) traditional PABX in our office and we want to add more pstn lines/extensions or use voip solution in the exist solution. We can combine the PBX-04 with the exist PABX solution use below structure.



1/ Connect the FXO port of the PABX to PBX-04's FXS port. so the PABX will be one of the PBX-04's FXS extensions and all the extensions under pabx can use all the fxs functions from PBX-04, the functions include:

- make calls to the PBX-04's other extensions
- make calls use the PBX-04 voip trunk
- make PSTN via PBX-04's PSTN trunk

2/ Connect the FXS port for the PABX to PBX-04's FXO port. So the PBX-04 will be one of the PABX extensions and all the extensions under pabx can use all the fxs functions from pabx, the functions include:

- make calls to the pabx's other extensions
- make PSTN via pabx's PSTN trunk

3.6 Intercommunication between two PBX-0X

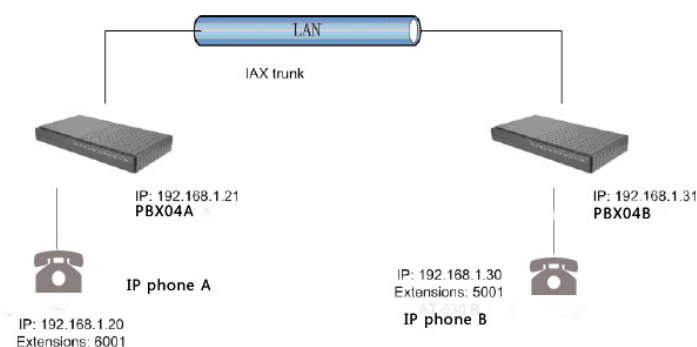
Introduce:

This application note shows how to link two PBX-04 in different location. With this function, we can link branches together with PBX-04. Same method can be used when connect more than 2 PBX-04 in different branches.

3.6.1 Link two PBX-04s in the same network

The simplest case to link two PBX-0X together is in the same network. We start from this and then try to expand to different network. We use PBX-04 here, same method for other PBX-0Xs products.

Below is the structure of how to link two PBX in the same LAN



The method of connecting two PBX-04s in different location is: 1) register the PBX-04A as an extension in PBX-04B(via IAX2 trunk) so the extensions in PBX-04A can make calls to PBX-04B's extensions via this "special" trunk. 2) use the reverse method in PBX-04B to register to PBX-04A.

In above structure:

- 1) IP-PHONE A registers to PBX-04A as an extension 6001.
- 2) IP-PHONE B registers to PBX-04B as an extension 5001.
- 3) All the extensions under PBX-04A are in the format 6XXX.
- 4) All the extensions under PBX-04B are in the format 5XXX
- 5) Extensions under PBX-04A can make calls to extension under PBX-04B use format 5XXX.
- 6) Extensions under PBX-04B can make calls to extension under PBX-04A use format 6XXX.
- 7) The two PBX-04 links each other via IAX2 trunk.

Step 1: Set up a extension 6005 in PBX-04A

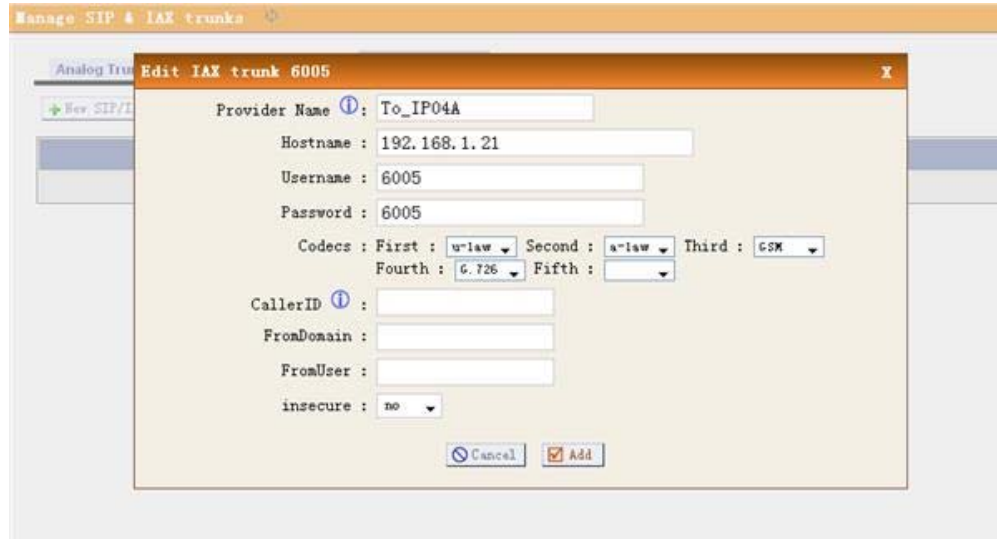
Extension: 6005 ; Phone number of this extension

Name: User_PBX-04B ;

Password: 6005 ;IAX2 Log on password

Caller ID: 6005 ; Caller ID

Step 2: Set up an IAX trunk in PBX-04B to link to PBX-04A via this User_PBX-04B extension. In the page Trunks--> Add Voip Trunk



Step 3: Set Calling Rule in PBX-04B, all calls start with 6 will be sent to PBX-04A. In the page: Outgoing Calling Rules--> Add New Calling Rule



Step 4: Add this new calling rule "Out_PBX-04A" to the exist dial plan. In the page: DialPlan -> Edit DialPlan1



Active the change and apply the test:

1/Register an IP phone IP-PHONEB to PBX-04B with 5001 extension.

2/Register an IP phone IP-PHONEA to PBX-04A with 6001 extension.

3/Use 5001 to dial 6001. And you can see 6001 is ringing and you can pick up the calls.

Above is the way to router PBX-04B's call to PBX-04A, the method to link PBX-04A to PBX-04B is the same as above

3.6.2 Link two PBX-04s in different location

The generally environment for two PBX-04 in different location is: two PBX-04 are both behind router and using the private IP.

Since the PBX-04 doesn't have the public IP, we need to do port forwarding in the router and make PBX-04 is reachable to others.

Step 1: Set port forwarding in the router for PBX04A

The PBX-04A is behind the router, to register to PBX-04A via the internet, you need to forward the IAX2 port in your router, so all the packets received on the router WAN port (202.8.16.98:4569) will be forwarded to the PBX-04A (192.168.1.21:4569). Below is the setting page in a linksys router:

The screenshot shows the 'UPnP Forwarding' configuration page in a Linksys router. The page has a navigation bar with 'Applications & Gaming' selected, and sub-tabs for 'Port Range Forwarding', 'Port Triggering', 'UPnP Forwarding', and 'DMZ'. The 'UPnP Forwarding' sub-tab is active, showing a table of applications and their forwarding settings. The 'IAX' and 'IAX2' entries are highlighted with a red box.

Application	Ext.Port	TCP	UDP	Int.Port	IP Address	Enabled
FTP	21	<input checked="" type="radio"/>	<input type="radio"/>	21	192.168.1.0	<input type="checkbox"/>
Telnet	23	<input checked="" type="radio"/>	<input type="radio"/>	23	192.168.1.0	<input type="checkbox"/>
SMTP	25	<input checked="" type="radio"/>	<input type="radio"/>	25	192.168.1.0	<input type="checkbox"/>
DNS	53	<input type="radio"/>	<input checked="" type="radio"/>	53	192.168.1.0	<input type="checkbox"/>
TFTP	69	<input type="radio"/>	<input checked="" type="radio"/>	69	192.168.1.0	<input type="checkbox"/>
finger	79	<input checked="" type="radio"/>	<input type="radio"/>	79	192.168.1.0	<input type="checkbox"/>
HTTP	80	<input checked="" type="radio"/>	<input type="radio"/>	80	192.168.1.199	<input checked="" type="checkbox"/>
POP3	110	<input checked="" type="radio"/>	<input type="radio"/>	110	192.168.1.0	<input type="checkbox"/>
NNTP	119	<input checked="" type="radio"/>	<input type="radio"/>	119	192.168.1.0	<input type="checkbox"/>
SNMP	161	<input type="radio"/>	<input checked="" type="radio"/>	161	192.168.1.0	<input type="checkbox"/>
ssh	2020	<input checked="" type="radio"/>	<input type="radio"/>	22	192.168.1.235	<input checked="" type="checkbox"/>
http1	8080	<input checked="" type="radio"/>	<input type="radio"/>	80	192.168.1.29	<input checked="" type="checkbox"/>
http2	8090	<input checked="" type="radio"/>	<input type="radio"/>	80	192.168.1.209	<input checked="" type="checkbox"/>
IAX	4569	<input checked="" type="radio"/>	<input type="radio"/>	4569	192.168.1.21	<input checked="" type="checkbox"/>
IAX2	4569	<input type="radio"/>	<input checked="" type="radio"/>	4569	192.168.1.21	<input checked="" type="checkbox"/>

UPnP Forwarding can be used to set up public services on your network. When users from the Internet make certain requests on your network, the Router can forward those requests to computers equipped to handle the requests. If, for example, you set the port number 80 (HTTP) to be forwarded to IP Address 192.168.1.2, then all HTTP requests from outside users will be forwarded to 192.168.1.2. It is recommended that the computer use static IP address.

You may use this function to establish a Web server or FTP server via an IP Gateway. In this format, Windows XP can be used to configure this through UPnP communication. Be sure that you enter a valid IP Address. (You may need to establish a static IP address with your ISP in order to properly run an Internet service. For added security, [More...](#)

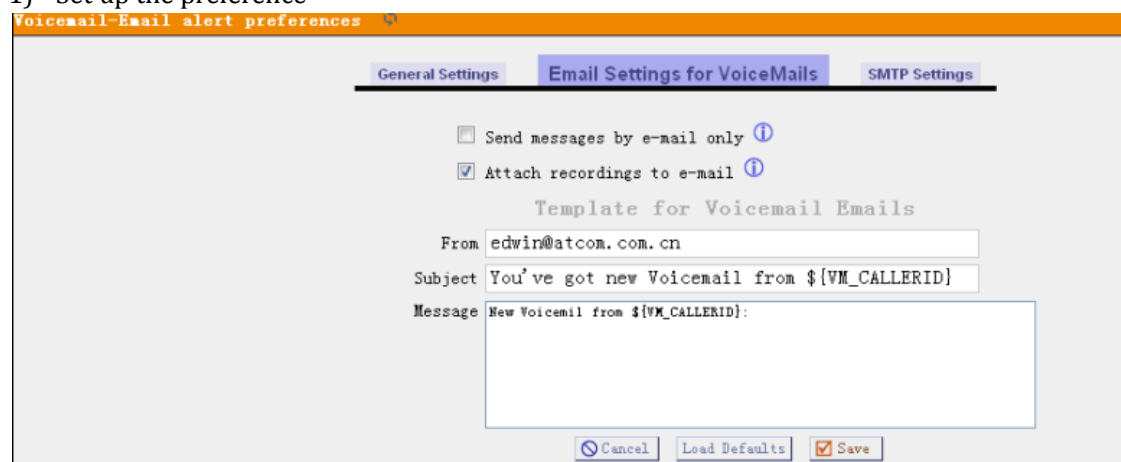
Step 2. Set up the service provider and calling rule in PBX-04B to make it register to PBX-04A. This method is almost the same as above, EXCEPT you need to use the 202.8.16.98 as the service provider instead of 192.168.1.21.

Step 3. Use the same method do port forwarding in routerB for PBX-04B. Your public address from network provider maybe a dynamic ip which will be changed periodically. To overcome the problem of dynamic ip, you may need to use the DDNS service , for more info please google the internet.

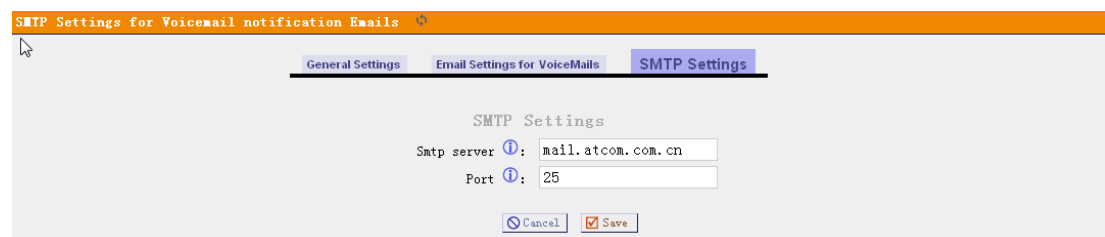
3.7 Voicemail to Email Configure example

The PBX-04 will send a notify Email to your mail box when you have set up the Voicemail to Email function.

1) Set up the preference



2) Configure your SMTP server



If your SSMTP server needs Authentication, you need to put your username and password in the file ssmtp.conf (via SSH access) as below:

[/etc/ssmtp/ssmtp.conf]

```
root=info@chinaroby.com //mailbox account
mailhub=mail.chinaroby.com //smtp server
rewriteDomain=chinaroby.com
hostname=info@chinaroby.com
AuthUser=info@chinaroby.com //mailbox account
AuthPass=xxxxxxx //mailbox password
AuthMethod=LOGIN
FromLineOverride=YES
```

3) Enable the voicemail for users and put the corresponding Email Address.

The screenshot shows a web form titled "Edit User Extension - 6001". It has two main sections. The first section, "General", contains fields for "Extension:" (6001), "Name:" (Alice), "DialPlan:" (DialPlan), "CallerID:" (6001), and "OutBound CallerID:". The second section, "Voicemail", has a checked checkbox "Enable Voicemail for this User" and fields for "VoiceMail Access PIN code:" (6001), "Mailbox:" (6001), and "Email Address:" (Alice@atcom.com.).

3.8 Call Features

3.8.1 Call Pick Up

The default feature code to pick up a call is *8. If there is an incoming call for a user in the call group 2, then the users in the pickup group 2 is able to pick up this call by dialing *8.

The pickup group and call group can be defined in the user setting page.

3.8.2 Call Park

The default call park extension is 700. The call park features code can be found in the file: `/etc/asterisk/features.conf`

Park a call on eye-beam:

--Press XFER button , then it will shows Enter Number + press XFER

--Enter the default park extension 700 and press the XFER button again. The call will be parked to the extension range 701~720

--dial 701~720 to get the parked call in another extension.

3.9 Cron

Cron is the name of program that enables Linux users to execute commands or scripts (groups of commands) automatically at a specified time/date. It is normally used for sys admin commands, like makewhatis, which builds a search database for the man -k command, or for running a backup script, but can be used for anything.

You can start the cron service for PBX by:

`/etc/init.d/cron enable`

`/etc/init.d/cron start`

The crontab file locats in `/etc/config`. More info for how to use cron in linux, please search in the internet.

3.10 Backup and restore file

- 1 In the page "back up" to create new back up
- 2 You can restore this back up file to your computer
- 3 to transfer this back up file to another PBX-0X

- 1/ Put the file in your tftp server
- 2/ Use putty to connect to the PBX-04 via SSH Run below commands
- 3/ `cd /persistent/var/lib/asterisk/gui_backups`
- 4/ `tftp -g -r YOUR_BACKUP_FILE YOUR_TFTTP_IP`
- 5/ go to the backup page and select the file to restore.
- 6/ Reboot the device.

3.11 Call queue agent Login and Logout

There are two kinds of login and logout for the agent.

First, you need to enable the “is agent” in users page for the extensions.

1/ Agent Log in: use your extension to dial Agent Log in extension and enter the username and password to log in. you need to keep the line on for log in. if you hang up the extension. It will log out.

1/ Agent Call Back Log in: use your extension to dial Agent Call Back extension and enter the username and password and new agent extension to log in. you don't need to keep the line on. When there is a call in the call queue, it will ring your extension. To log out, use your extension to dial Agent Call Back extension and enter the username and password and #.

3.12 DISA

DISA - this application allows you to make calls from outside the PBX as if you are inside it.

Purpose and usage

With this application you can allow calls from outside your PBX to be interpreted as if they are inside the PBX.

The principle is the following: somebody from outside the PBX system place a call to one of our numbers. The caller will hear a continuous signal. He/she has to enter a password followed by the pound key. If the password is correct then the caller will hear again a signal which this time is coming from inside the PBX system.

Below is the process to use DISA in PBX0X,

1/: in the voicemenu --> create a new voicemenu, add two steps:

step1: **Answer**

step2: **DISA: Password:xxxxx, DIALPLAN.**

2/ in the incoming rule, point your analog trunk to the DISA voice menu.

Test process:

- 1) make incoming call to your analog port.
- 2) you will hear the dial tone and then press the password followed by #
- 3) you will hear dialtone again, then press the number followed by # to dial the number you wish to dial.

4 FAQ

4.1 What is the user/password of my IP PBX?

The default IP and user/password of the IP PBX is:

Default IP	192.168.1.100
Web login	admin/admin
SSH login	root/12xerXes06

4.2 How to change my IP address?

Go to Options--> Advance Options-->Show Advance Options. Then you can find the network settings in the main menu.

Networking setting

eth0 Interface

DHCP: auto

Hostname: ip04

Domain:

IP address: 192.168.1.128

Subnet mask: 255.255.255.0

Gateway: 192.168.1.1

DNS: 192.168.1.1

NTP: pool.ntp.org

VLAN Interface for Eth0

VLAN:

Vlan number: 100

Vlan IP address: 192.168.100.100

Vlan Subnet mask: 255.255.255.0

Vlan Gateway: 192.168.100.1

System TimeZone

TimeZone: (GMT +8:00 hours) Beijing, Perth, Singapore, Hong Kong, Chongqing, Urumqi, Taipei

There are three types for network settings:

DHCP: Yes PBX-04 will obtain the dynamic IP from your router.

DHCP: auto PBX-04 will use the static IP specified below and pin the default gateway, when there is no response from the default gateway. the PBX-04 will switch to dynamic obtain the IP from your router.

DHCP: No PBX-04 will use the static IP specified below.

The ip setting will affect only after reboot.

4.5 What is the OS and asterisk version used in IP-PBX?

The IP-PBX is built base on uClinux. The pre-load asterisk version is 1.4.21. you can also build your own firmware with your own asterisk version or add new software.

4.6 How to customs my firmware for IP-PBX?

Please consult http://www.openippbx.org/index.php?title=Main_Page for how to get source and make your own firmware for your IP-PBX.