SIP Trunking using the Optimum Business SIP Trunk Adaptor and the 3CX IP-PBX

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Goal

The purpose of this configuration guide is to describe the steps needed to configure the 3CX IP-PBX for proper operation with Optimum Business SIP Trunking.

Prerequisites

Please follow the instructions in the Optimum Business SIP Trunk Set-up Guide. The Set-up Guide was left by the Optimum Business technician at installation. If you do not have the Set-up Guide, go to **optimumbusiness.com/sip** to download a copy. The guide describes the steps needed to configure the LAN side of the Optimum Business SIP Trunk Adaptor.

Important:
The Cablevision network only supports inband DTMF tones. In order for the 3CX IP-PBX to operate correctly with the Cablevision network, the Optimum SIP Trunk Adaptor must be enabled to convert out-of-band DTMF tones sent by the PBX to inband DTMF tones. To enable this conversion, log into the Optimum SIP Trunk Adaptor using the login and password specified in the Optimum SIP Trunk Adaptor Set-up Guide. On the **SIP Trunk Configuration** page, you **must** check the **Convert Inband DTMF** checkbox, and click the **Submit** button to update this setting. This is Step 3 of the Optimum Sip Trunk Set-up Guide.

This configuration guide provides the configuration steps for both PBX registration and static IP or non-registration modes of PBX operation.

PBX Information

Manufacturer:	3CX
Model:	Standard Edition
Software Version:	v12.0.32495.362
Does the PBX send SIP Registration messages (Yes/No)?	Yes

3CX PBX Configuration

The steps below describe the basic configuration required to enable the 3CX PBX to use Optimum Business SIP Trunking for inbound and outbound calling. Please refer to the 3CX documentation for other advanced PBX features.

The configuration described here assumes that the PBX is already configured and operational with station side phones using assigned extensions or DIDs. This configuration is based on 3CX version 12.0.

Basic Setup

The 3CX Phone System is a software-based VoIP IP-PBX for Microsoft Windows. In the lab, the PBX was set up by downloading the 3CX Phone System to a Windows7 PC that comes with one Ethernet port. The PBX's Ethernet port, the local SIP phones, and Optimum Business Sip Trunk Adaptor's LAN port should be in the same LAN segment. The Optimum Business Sip Trunk Adaptor's LAN port and the PBX's Ethernet port have been assigned with IP addresses of 192.168.1.200 /24 and 192.168.1.155 /24 respectively.

Initially, the 3CX Phone System Setup Wizard must be completed first.

As soon as the PBX is downloaded, the 3CX Phone System Setup Wizard will start to install the PBX. From here basic settings such as LAN IP address, Administrator Login, adding extensions, and VOIP Gateway will be configured. Upon finishing, open the 3CX Windows Management Console that can be accessed from the Programs group. It will start by prompting a login. Enter login information and thereafter PBX configuration can begin.

Creating Extensions

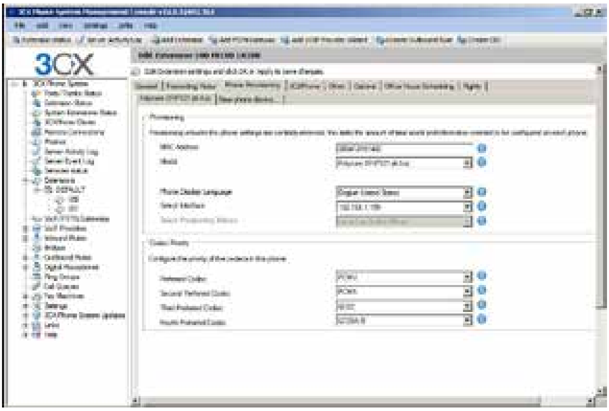
Navigate to **3CX Phone System ▸ Extensions ▸ 100** and click **100** to start setting up extension 100 for the phone. When creating new extensions, click **Add Extension** from top.

Note: the 3CX Phone System is implemented as Windows services. These Windows services are subject to firewall rules of the Windows PC (i.e.: firewall may block SIP registration packets from the SIP phones) and may be shut down due to certain default Windows settings. To prevent the firewall rules from blocking the desirable inbound traffic, certain firewall rules may need to be removed; to keep the PBX services running without being put to sleep, the setting of “Put the computer to sleep” should be set to “Never”.

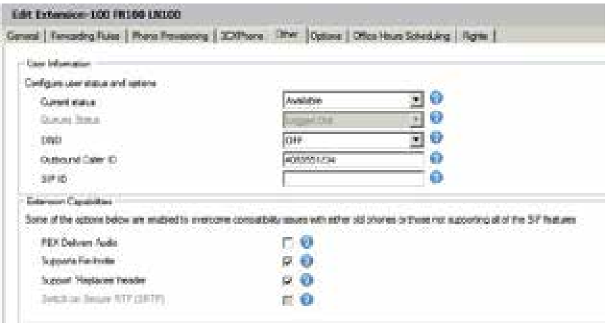
Select the **General** tab. Enter the first name of the user in the **First Name** field and enter the last name of the user in the **Last Name** field. Enter a password in the **Password** field and leave other fields as default. When done click **OK** at the bottom of the page.

Note: the SIP phone assigned for this extension must use the authentication information from this page in order to successfully register with the PBX.

Select the **Phone Provisioning** tab, enter the SIP phone's MAC address in the **MAC Address** field. Select the phone's model from the drop-down list of the **Model** field and enter the PBX's IP address ("192.168.1.155" in this example) in the **Select Interface** field. Leave other fields as default and then click **OK** at the bottom of the page.



Select the **Other** tab and enter the DID assigned for the extension in the **Outbound Caller ID** field. Leave other fields as default and then click **OK** at the bottom of the page.

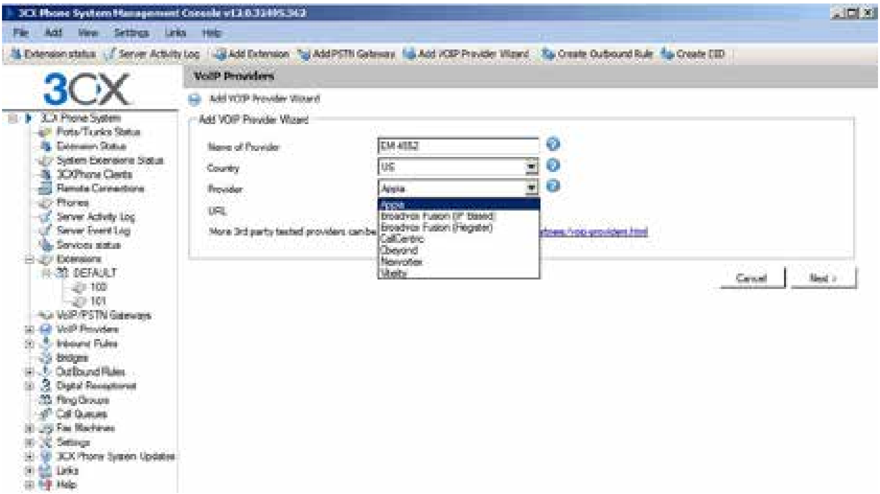


For additional extensions navigate to **Extensions** and then click **Add Extension**. Simply repeat above process for each new extension added.

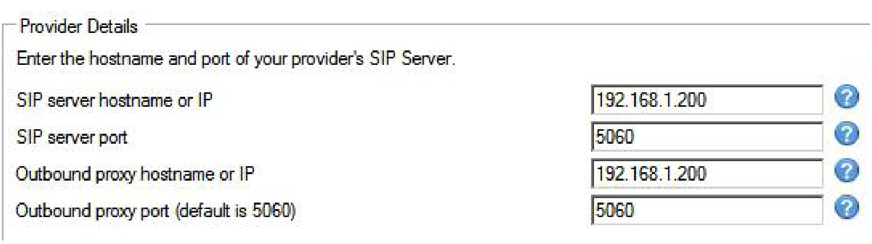
VoIP Provider Setup

Navigate to **VoIP Providers** to set up the Optimum Business SIP Trunk Adaptor as a VoIP provider for SIP registration mode. To add a new VoIP provider, click **Add Provider** under the VoIP Provider heading.

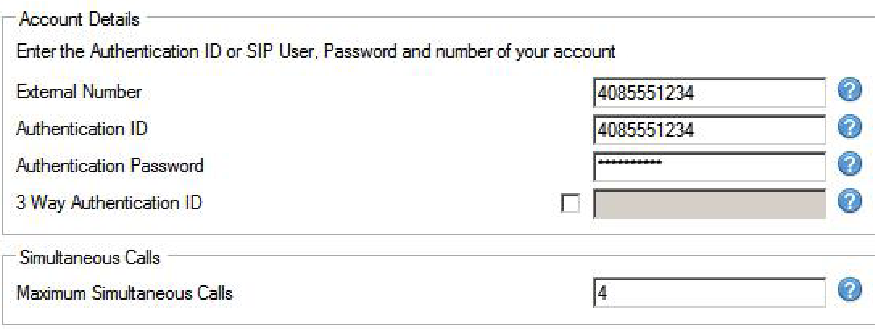
Enter a descriptive name in the **Name of Provider** field (“EM-4552” was used in this example), select the country and then the preferred Provider from menu. When done click **Next** at the bottom of the page.



Enter the Optimum Business SIP Trunk Adaptor’s IP address in both the **SIP server hostname or IP** field and the **Outbound proxy hostname or IP** field. This is the IP Address you entered in Step 2 of the Optimum Business SIP Trunk Set-up Guide. Enter **5060** in both the **SIP server port** and **Outbound proxy port** fields and then click **Next**.



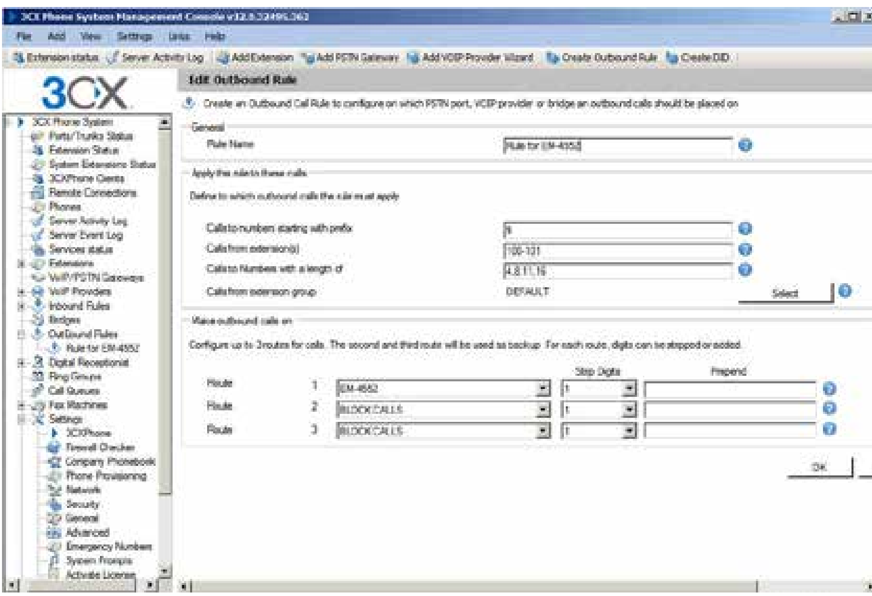
Enter Pilot DID in the **External Number** field. Enter the authentication ID in the **Authentication ID** field and password in the **Authentication Password** field. Enter the maximum number of simultaneous calls in the **Maximum simultaneous calls** field and then click **Next**.



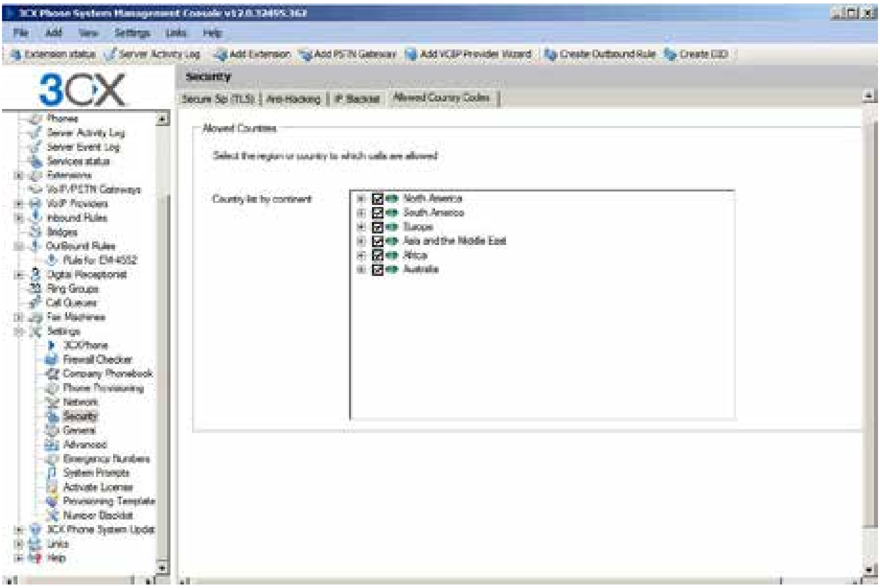
Dial Plan

Navigate to **Outbound Rules** then click **Add Outbound Rule**. It must be given a name. Enter **9** in the **Calls to numbers starting with prefix** field (this allows dialing "9" first to access the SIP trunks). Enter **100-101** in the **Calls from extension(s)** field (this allows extension 100,101 in this example to access the SIP trunks). Enter **4,8,11,16** in the **Calls to Numbers with a length of field** (this allows "9+ 3-digit, 9+ 7-digit, 9+ 10-digit, 9+ 15-digit" dialing). Leave other fields as default and click **Finish**.

Note: For 911 calls a separate rule needs to be created and added above this rule otherwise the 9 will be stripped.



For International Calls the country code should be checked within included country codes. To verify this navigate to **Settings ▸ Security ▸ Allowed Country Codes**.

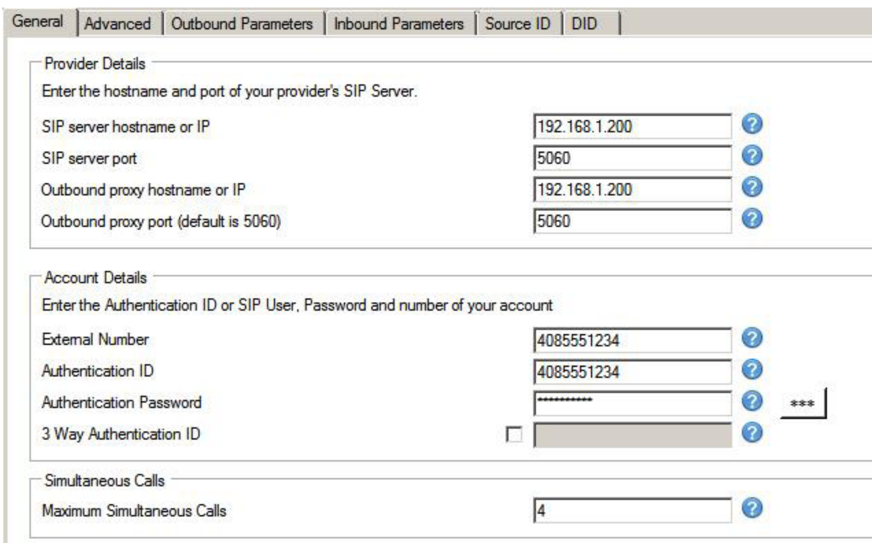


Note: The DTMF tone duration generated by the phones needs to be increased from the default value of 180ms–200ms to 600ms. The PBX does not have the capability to change the DTMF settings, the change must be done on the phones.

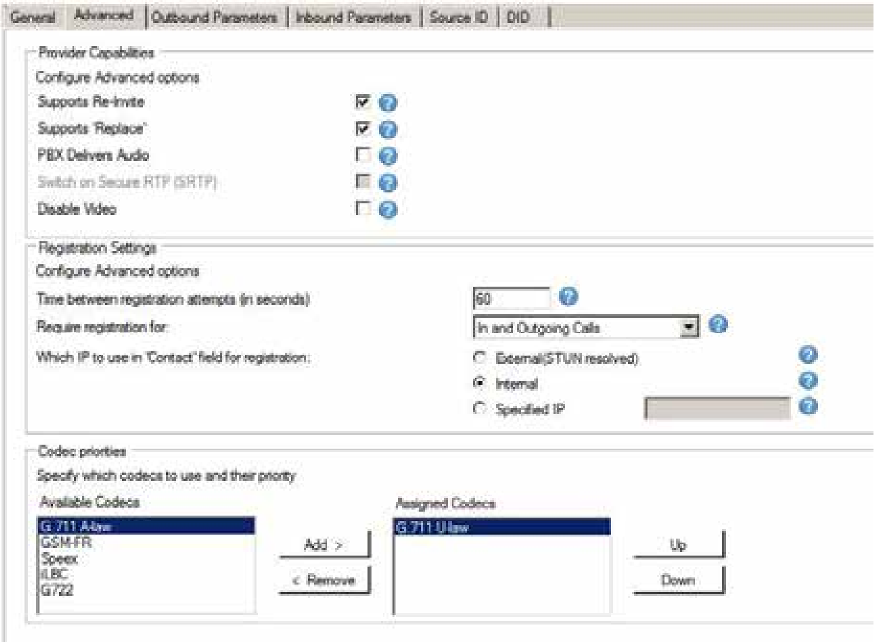
Important:
The Cablevision network only supports inband DTMF tones. In order for the 3CX IP-PBX to operate correctly with the Cablevision network, the Optimum SIP Trunk Adaptor must be enabled to convert out-of-band DTMF tones sent by the PBX to inband DTMF tones. To enable this conversion, log into the Optimum SIP Trunk Adaptor using the login and password specified in the Optimum SIP Trunk Adaptor Set-up Guide. On the **SIP Trunk Configuration** page, you **must** check the **Convert Inband DTMF** checkbox, and click the **Submit** button to update this setting. This is Step 3 of the Optimum Sip Trunk Set-up Guide.

SIP Registration

Navigate to **VoIP Providers ▸ EM-4552** and then click the **Advanced** tab to configure parameters for registration and codec priority. **SIP server hostname or IP** and **Outbound proxy hostname or IP** will again be the Optimum Business SIP Trunk Adaptor's IP address. This IP address was assigned to the Optimum Business SIP Trunk Adaptor in Step 2 of the Optimum Business SIP Trunk Set-up Guide. Below reflects previous set-up configuration under **General**.



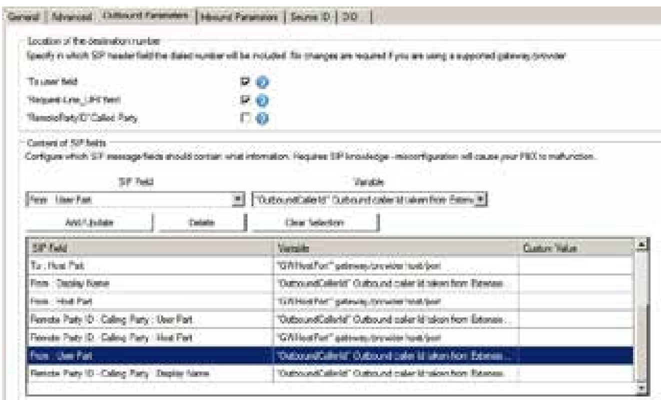
For Provider Capabilities, check **Supports Re-Invite** and **Supports Replace**. Then enter time between registration attempts in the **Time between registration attempts field**. For DTMF capability be sure to leave **PBX Delivers Audio** unchecked. Tone duration may be modified through the phone. Select the radio button of **Internal** for the **Which IP to use in 'Contact' field for registration** field. Assign desired codec. Leave other fields as default and click **OK**.



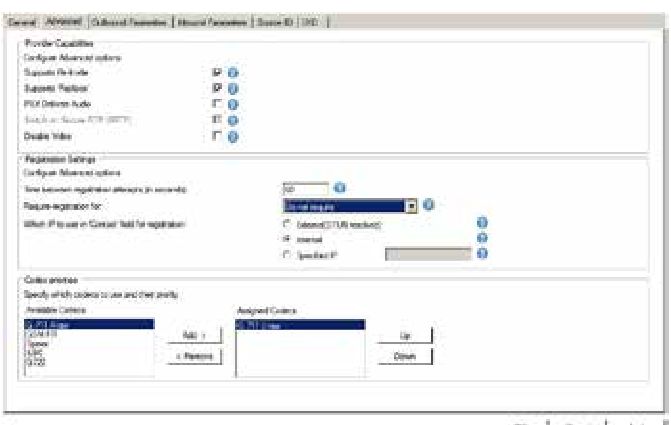
Static IP Mode

Navigate to **VoIP Providers ▸ EM-4552** and then click **Outbound Parameters** to control caller ID for outbound calls in static IP mode.

Select **From: User Part** from the drop-down list of the **SIP Field**.
In the corresponding variable **select "OutboundCallerId" Outbound caller Id taken from Extension.** Click the **Add/Update** button. Leave other fields as default and click **OK**.



Now navigate to **VoIP Providers ▸ EM-4552** and next to **Require registration for**: change to **Do not require** to deliver calls without authentication.



Verify Status

To verify registration status of the extensions navigate to **Extension Status** to check if the phones have successfully registered with the Optimum Business SIP Trunk Adapor.

Extension Status

Disconnect Call | Show Filter

	Status	Extension	User Status	DND	Queues	Name
	Registered (idle)	100	Available	OFF	OUT	FN100 LN100
	Registered (idle)	101	Available	OFF	OUT	FN101 LN101

Once the PBX has set up the Optimum Business SIP Trunk Adaptor as its SIP Trunk service provider, it should be able to register successfully. To verify registration, navigate to **Ports/Trunks Status** to check if PBX has successfully registered with Optimum Business SIP Trunk Adaptor.

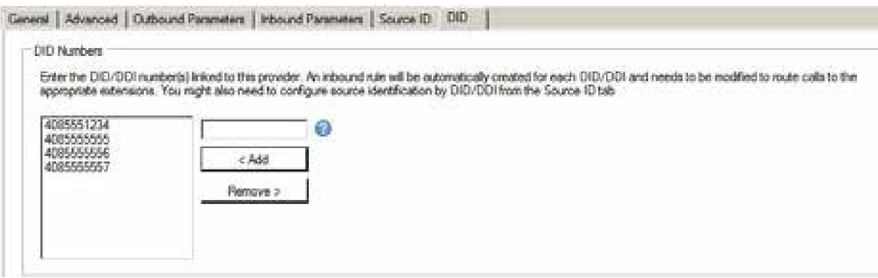
Ports/Trunks Status

Disconnect Call

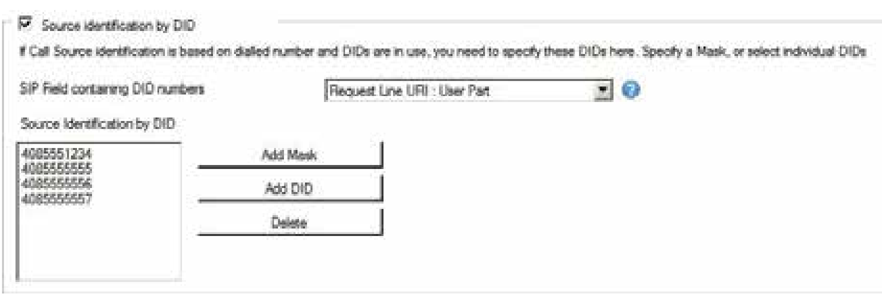
	Status	Virtual Extension Number	Type	Name
	Registered (idle)	10000	Provider	EM-4552

DID Assignment

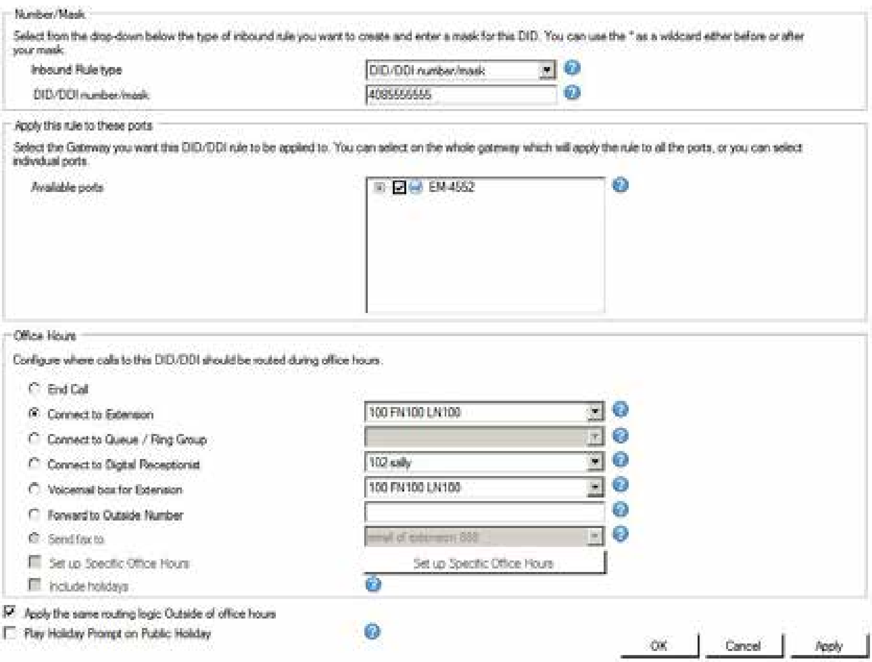
Navigate to **VoIP Providers ▸ EM-4552** and then click the **DID** tab to enter the DIDs assigned for the SIP trunk service. Enter each DID one at a time in the field next to the **?** icon and then click the ◂ **Add** button. When done click **OK**.



Navigate to **VoIP Providers ▸ EM-4552** and click the **Source ID** tab. Check the **Source identification by DID** checkbox to specify that dialed numbers from incoming calls may be routed to the extensions. Click **Add DID**. From the pop-up box, check the **Select all** checkbox and then click **OK**. After the DIDs are added, leave other fields as default then click **OK**.

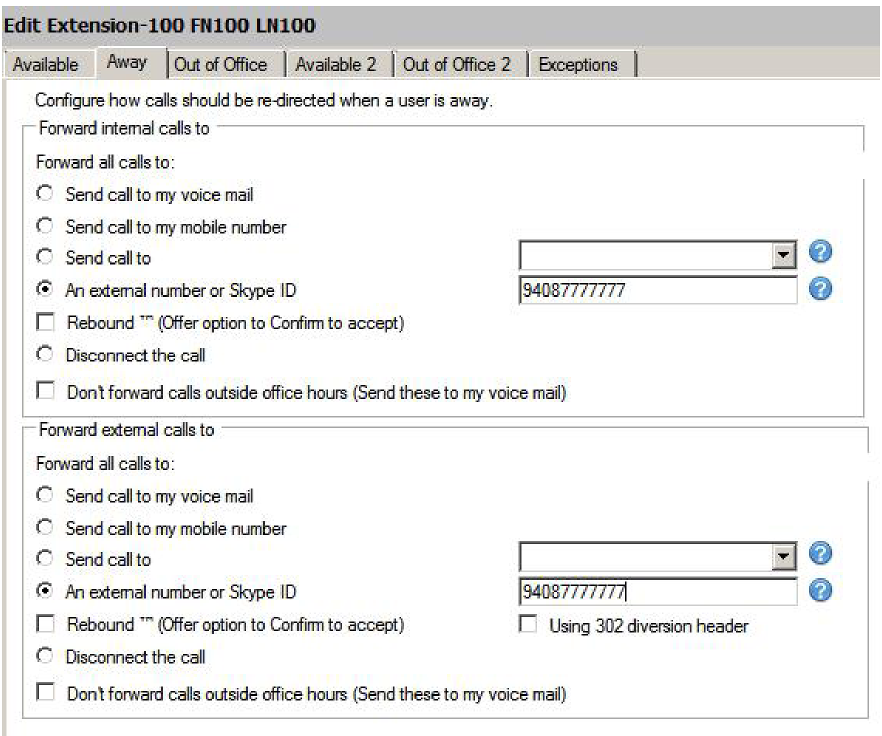


Navigate to **VoIP Providers** ▸ **EM-4552**. The PD will appear here and remaining DIDs will appear after it as sub tabs. Click on each DID, one at a time, to map to corresponding extension. By way of example, extension 100 will be assigned to 4085555555. Select the radio button next to **Connect to Extension** and choose extension 100. Leave other fields as default and then click **OK**.



Call Forward

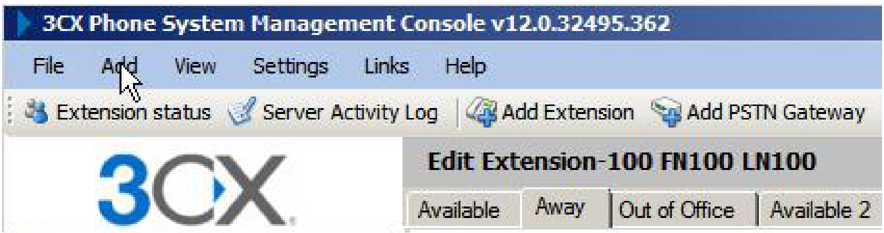
Navigate to **Extensions** and select the extension desired for Call Forwarding. Upon selecting the extension, click on **Forwarding Rules** on top and from here configure the forwarding preference according to the different statuses shown. For example if call forwarding is desired when away, click **Away** then click on **An external number or Skype ID** from either the internal or external option and enter desired forwarding number. When finished click **OK**.



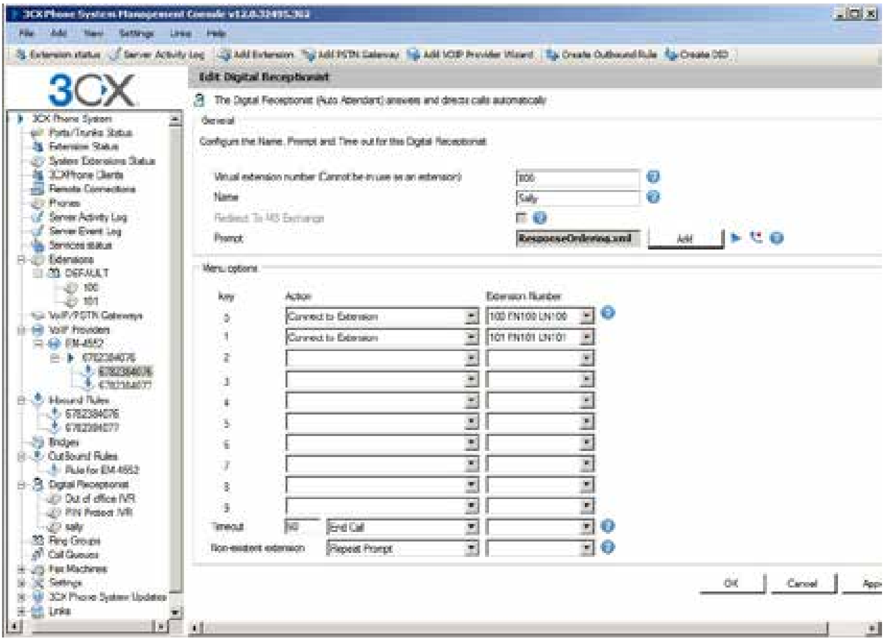
Make sure the Call Forwarding configuration corresponds to its current status. To change current status of the extension, from the **Edit Extension** section after clicking on **Extensions** click the **Other** tab and change **Current status** to desired preference.

Auto-Attendant

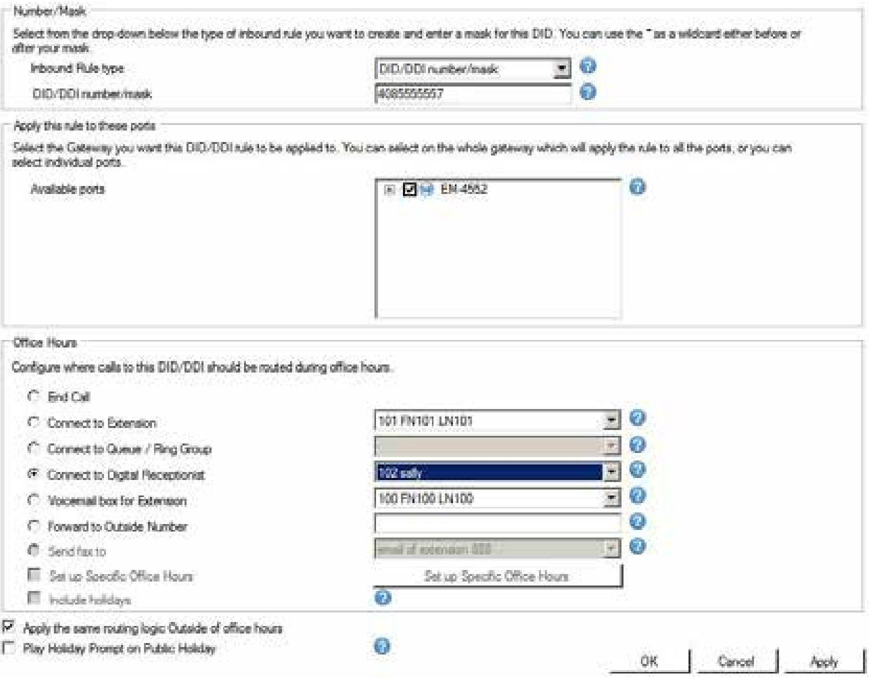
From **Add** button above select **Digital Receptionist**.



Upon clicking **Digital Receptionist**, give the auto-attendant an extension, name, and select the desired prompt. Under **Menu options** select how the auto-attendant should behave in accordance with each key. For example both 0 and 1 below direct the auto-attendant to extensions 100 and 101. When finished click **OK**.

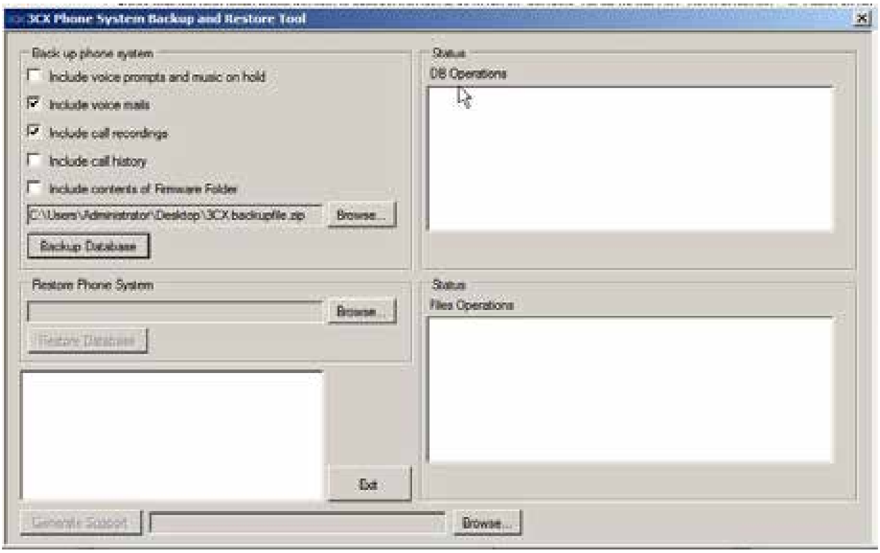


Thereafter navigate to **VoIP Providers ▸ EM-4552**. Click the DID desired for auto-attendant then click on radio button of **Connect to Digital Receptionist**. Be sure to link it to extension of AA (in this example 102). When finished click **OK.**



Backup/Restore

To Backup/Restore, from Program Groups select **Backup and Restore Tool**.



Select the desired preferences and when done click **Backup Database.** To restore click **Restore Database** just below.