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Optimum Business Trunking and the NEC SL1100 IP PBX Configuration Guide

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Table of Contents

NEC SL1100 IP PBX

1 Overview

The purpose of this configuration guide is to describe the steps needed to configure the NEC SL1100 IP PBX for proper operation Optimum Business Sip Trunking.

2 SIP Trunk Adaptor Set-up Instructions

These instructions describe the steps needed to configure the LAN side of the Optimum Business SIP Trunk Adaptor.

Step 1:

Log on to the Optimum Business SIP Trunk Adaptor

1. Connect a PC to port 4 of the Optimum Business SIP Trunk Adaptor, the silver device labeled Edgewater Networks, 4550 series.

2. Open a Web browser and go to IP Address http://10.10.200.1. A login box will appear.

3. Enter login and password and click 'OK'.
   Login: pbxinstall
   Password: s1ptrunk

Step 2:

Click on the LAN Settings Link

1. Assign an IP Address to the LAN interface of the SIP Trunk Adaptor. The IP address must be on the same subnet as the IP PBX. This changes the address on port 1 of the Optimum Business SIP Trunk Adaptor.

   Note: This will become your local SIP proxy IP address. No other IP addresses will be provided by Cablevision.

2. Optional: Specify a VLAN for your voice traffic. Click the 'Enable Voice VLAN Tagging' check box. The default VLAN ID is 100.

   Note: VLAN 200 should not be used. It is dedicated to port 4 for management.
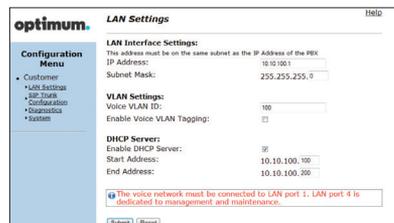
3. Optional: Enable the DHCP server. This will allow the SIP Trunk Adaptor to act as a DHCP server, which will provide IP addresses to the voice network, and create a dedicated voice LAN, as per diagram 2.

4. Click 'Submit'.

Diagram 1 **SIP Trunk Adaptor for IP-PBXs**
Example: Single LAN Configuration
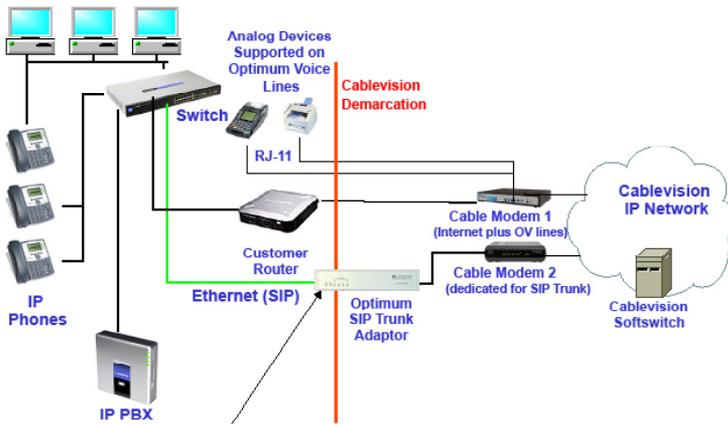
Using a connection from the customer's LAN, the SIP Trunk Adaptor's address can be a statically assigned private IP address. It may not be assigned a Public IP address.

Diagram 2 **SIP Trunk Adaptor for IP-PBXs**
Example: Separate Voice and Data Networks Configuration
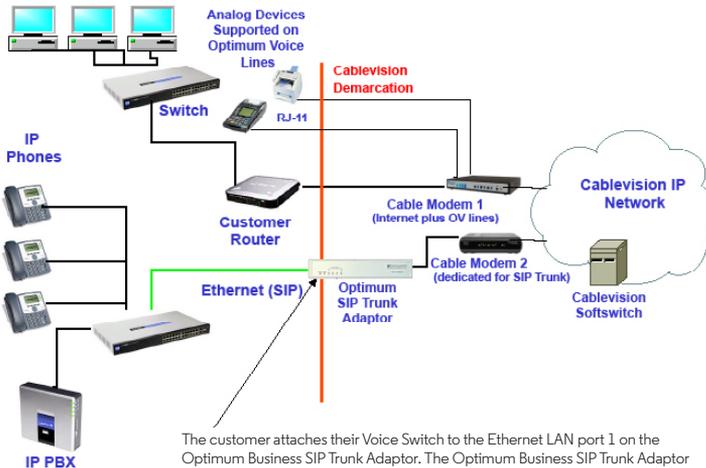
The customer attaches their Voice Switch to the Ethernet LAN port 1 on the Optimum Business SIP Trunk Adaptor. The Optimum Business SIP Trunk Adaptor can be enabled as a DHCP server to provide routing for the separate voice network.

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Step 3:

Click on the SIP Trunk Configuration Link

1. Select your IP PBX make and model from the drop-down menu.

2. Specify how the IP PBX will register to the Optimum Business SIP Trunk Adaptor.

3. The Cablevision network only supports Inband DTMF. Click on the check box next to "Convert Inband DTMF" if you cannot configure your IP PBX to send out Inband DTMF. The DTMF tone duration generated by the phones and/or PBX may need to be increased from their default setting. Some phones and/or PBX have a default setting between 180ms to 200ms. This setting is too low. The recommended setting is 600ms.

4. Click 'Submit'.
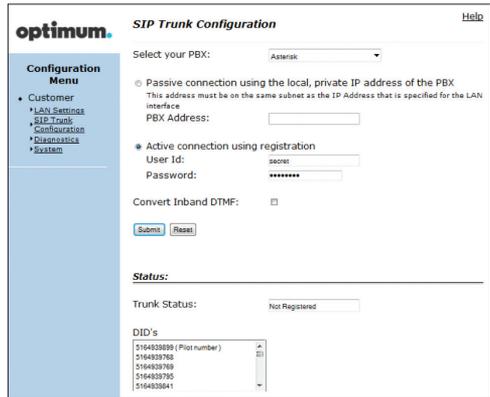
Step 4:

Diagnostics Link

You can make a test call directly from your phone or use the test call application under the Diagnostics link.
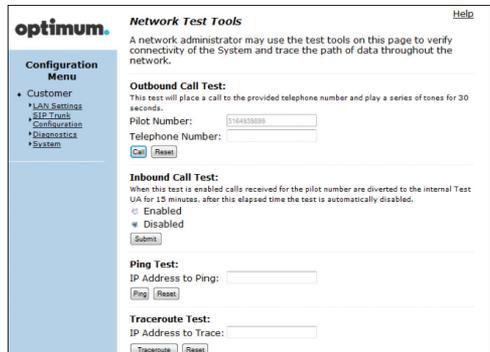
Step 4 continued

Field	Description
Outbound Call Test TelephoneNumber	Specifies an outside phone number to which an outbound call will be initiated. The pilot telephone number of the SIP Trunk will be prepopulated.
Pilot Number	Displays the provisioned pilot number, which is used for outbound and inbound call tests.
Call	Initiates a call outbound to a telephone number entered or inbound to the pilot number displayed.
Inbound Call Test (radio button)	Indicates whether inbound test call will be enabled or disabled. If inbound test calls are enabled, calls made to the pilot number will be redirected to the test UA for fifteen minutes. When the pilot number is dialed, you will hear a test message play.
Submit	Enables or disables the inbound call test.
IP Address to Ping	Verifies basic connectivity to a networking device. Successful ping test results indicate that both physical and virtual path connections exist between the system and the test IP address.
Ping Button	Sends a ping to the IP address specified in the field "IP Address to Ping".
IP Address to Trace	Tracks the progress of a packet through the network. The packet can be tracked through the WAN or LAN interfaces of the adaptor.
Interface (radio button)	Indicates whether a packet will be tracked through the LAN or the WAN.
Traceroute Button	Initiates a traceroute to the specified IP address on either the LAN or the WAN.
Reset	Clears all fields and selections and allows you to enter new information. Reset applies to outbound call test, ping and traceroute.

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3 Additional Set-up Information

Systems

Field	Description
Pbxinstall Link	Select to change the default password for the pbxinstall login ID. Only the password can be changed. The login ID cannot be changed.

Password

Field	Description
Username	Specifies the username for which the password can be changed.
Current Password	Specifies the current password.
New Password	Specifies the new password.
Confirm Password	Confirms the new password.
Submit	Applies the settings configured on this page.
Reset	Clears all fields and selections and allows you to enter new information.

4 International Calling

Optimum Voice Business Trunking offers an optional International Calling Service for direct-dialed calls made from the Customer's business or from any phone via the Optimum Voice International Calling remote access number to destinations outside of the United States, Puerto Rico, Canada and the U.S. Virgin Islands at per minute rates. The Customer must login to the Optimum Business Account Center and activate the service on the Optimum Business Trunk Pilot telephone number to activate the service and manage the monthly International spending limit for the account.

Activating International calling on the Pilot TN will enable International calling for all Direct Inward Dial (DIDs) telephone numbers as well. Blocking International calling for one or more DIDs is managed by the customer directly from the PBX phone system configuration. To minimum the exposure to fraudulent calling, It is recommended to limit International calling capability to those DID's that require it and set up an account spending limit that reflects what is necessary to run the business.

It is the Customer (and/or the Customer Agent's) responsibility to properly secure the customer's PBX to prevent the PBX from being compromised and fraudulent calls from being made by unauthorized (internal or external) users. If fraudulent calls are detected, Cablevision reserves the right to disable International Calling until the PBX is properly secured by the customer.

5 PBX Configuration

The steps below describe the minimum configuration required to enable the PBX to use Optimum Business SIP Trunking for inbound and outbound calling. Please refer to the NEC SL1100 product documentation for more information on 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 NEC SL1100 version/Main Software 04.00.

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

The PBX used for the certification testing comprises of the following:

- NEC SL100 equipped with a VOIPDB-C1 card that supports SIP trunking and a CD-8DLCA (Digital Station Interface) card for phones.

- 2 NEC DT300 series phones.

PBX Information

Manufacturer:	NEC
Model:	SL110
Software Version:	04.00
Does the PBX send SIP Registration messages (Yes/No)?	Yes

Optimum Business SIP Trunk Adaptor

Manufacturer:	Edgewater Network, Inc.
Model:	4552
Software Version:	11.6.19.0.1

NEC SL1100 IP PBX

Note: When configuring/programming the PBX via the PBX's PCPro server, changes will not survive the reboot unless you upload after applying the changes.

The PBX is shipped with a default IP address of 192.168.0.10 on the LAN port. If there is a VoIP DB card shipped with the PBX and is installed and will be used the default IP address of that port is 172.16.0.10.

To configure the SL1100 the SL1100 PCPro program will need to be installed and launched from the PC the SL1100 is connected to. Once launched click the "Connect" button in the top left hand corner.

Select the IP radio button and enter the default IP address you are connecting to, in this example the VoIP DB card is used. Under User Name and Password enter the login for Installer Level; User Name: sltech Password: 12345678.

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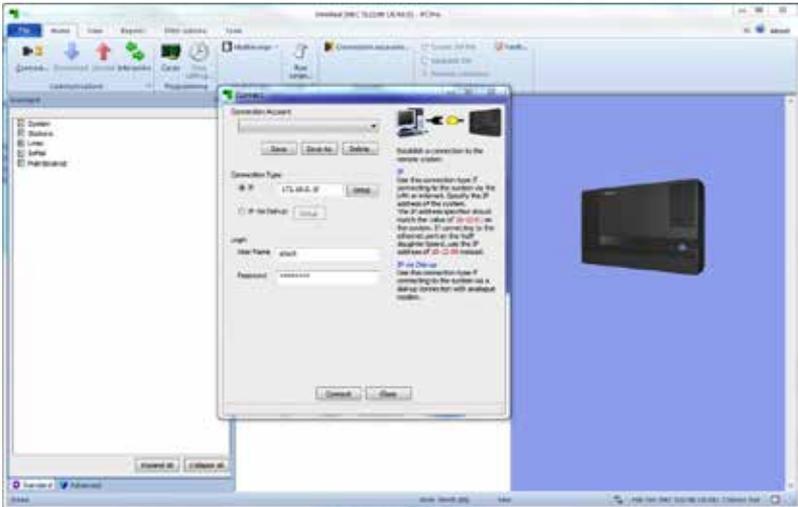
To set the time and date go to System/Config/Time&Date. Set the date and time and hit the **Apply** icon.

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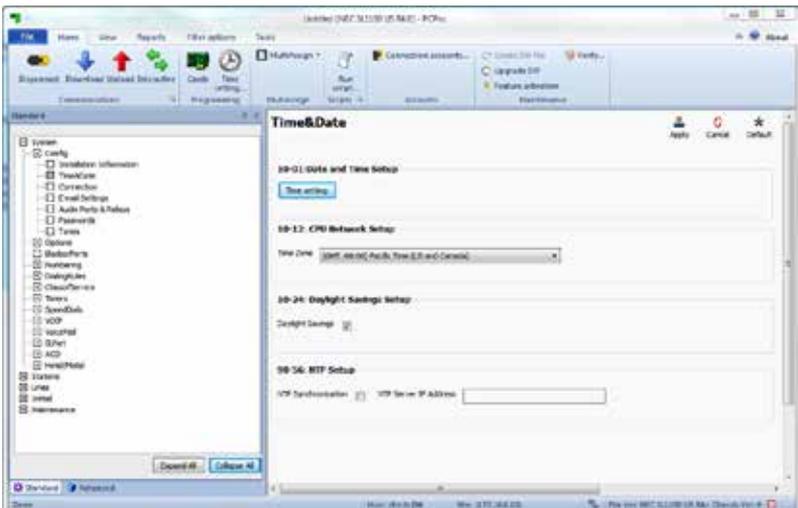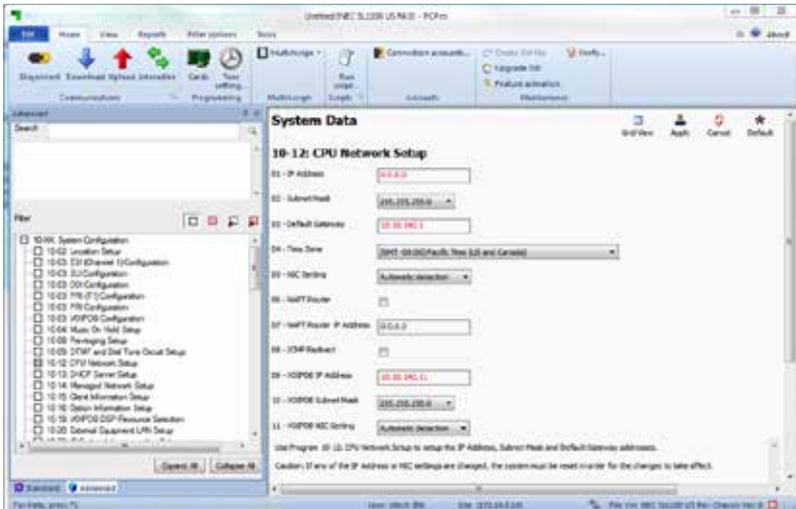
For the rest of the setup click on the Advanced Tab at the bottom of the page. Go to **"10-12: CPU Network Setup"** screen for configuring SIP trunk service via the VoIP port.

Change the **"01 - IP Address"** (Ethernet port's IP address) field to 0.0.0.0.

Set the **"03 - Default Gateway"** field to be the same as the Optimum Business SIP Trunk Adaptor's IP address. (i.e.: 10.10.142.1).

Set the **"09 - VOIPDB IP Address field"** field (i.e.: 10.10.142.11) for the VoIP port's IP address.

Set the **"10 - VOIPDB IP Subnet Mask"** field.

Hit the **Apply** icon.

Note: Changes to IP address and NIC settings require reset to take effect, make sure you upload the changes to the PBX before resetting the PBX. After making these changes, you must reconnect to the PCPro server via the VoIP port and its IP address.

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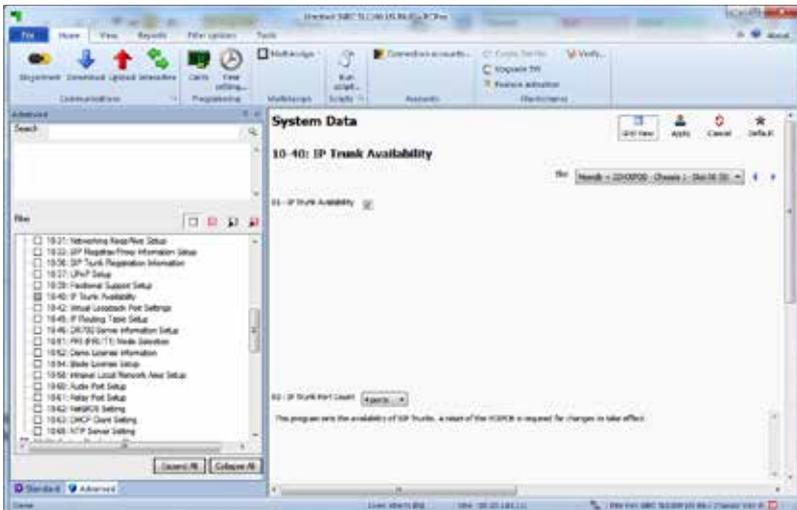
Go to the **"10-40: IP Trunk Availability"** screen.

Check the **"01 - IP Trunk Availability"** checkbox.

Set the **"02 - IP Trunk Port Count"** field to the number of SIP trunks supported.

Note: The number of IP Trunk ports will depend on the IP Trunk licenses (see Home ▸ Feature Activation) that came with the PBX. For example, if you have 12 IP Trunk licenses then the max SIP calls would be 12.

Hit the **Apply** icon.
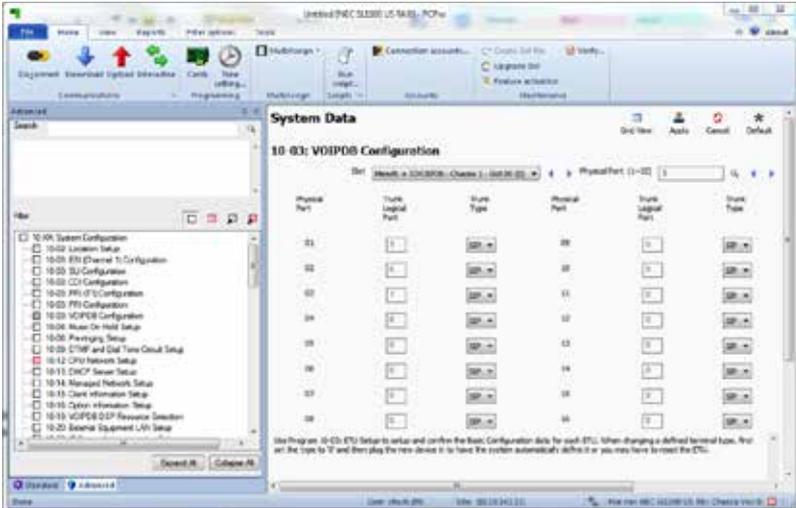
Go to the **"10-03: VOIPDB Configuration"** screen.

Select **"SIP"** Trunk type and allocate the physical ports needed for SIP trunks and note the Trunk logical ports assigned.

Hit the **Apply** icon.

NEC SL1100 IP PBX
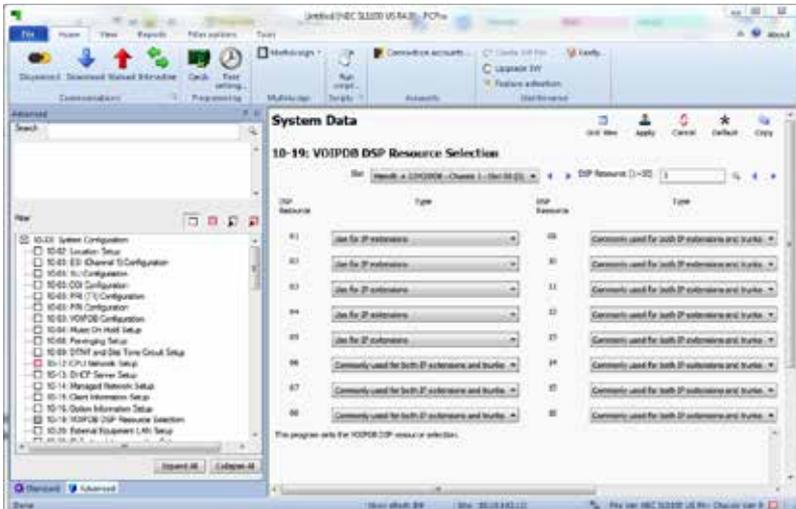
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Go to the **"10-19: VOIPDB DSP Resource Selection"** screen.

Select **"Used for IP trunks"** and allocate the **DSP resource** needed for IP trunks.

Hit the **Apply** icon.
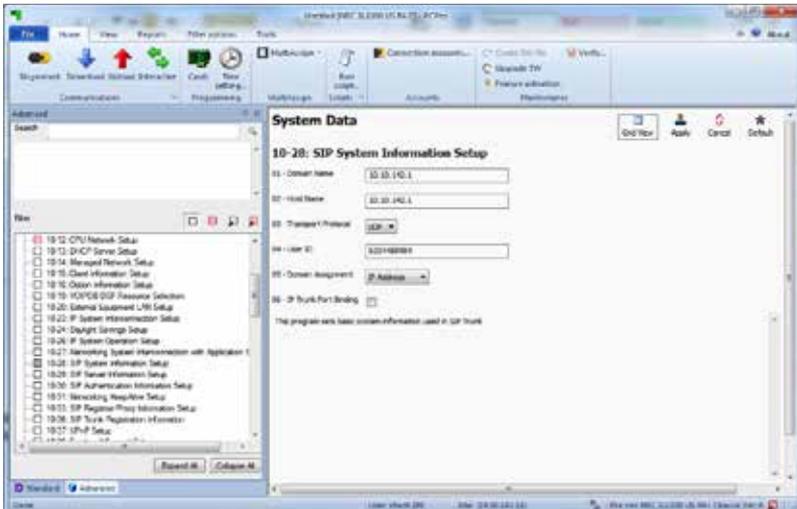
Go to the **"10-28: SIP System Information Setup"** screen.

Enter the Optimum Business SIP Trunk Adaptor's IP address in both the **"01 - Domain Name"** and **"02 - Host Name"** fields.

Select **"UDP"** for the **"03 - Transport Protocol"** field.

Enter the pilot DID in the **"04 - User ID"** field. Note that this DID will be used as the default caller ID for outbound calls.

Select **"IP Address"** for the **"05 - Domain Assignment"** field.

Hit the **Apply** icon.
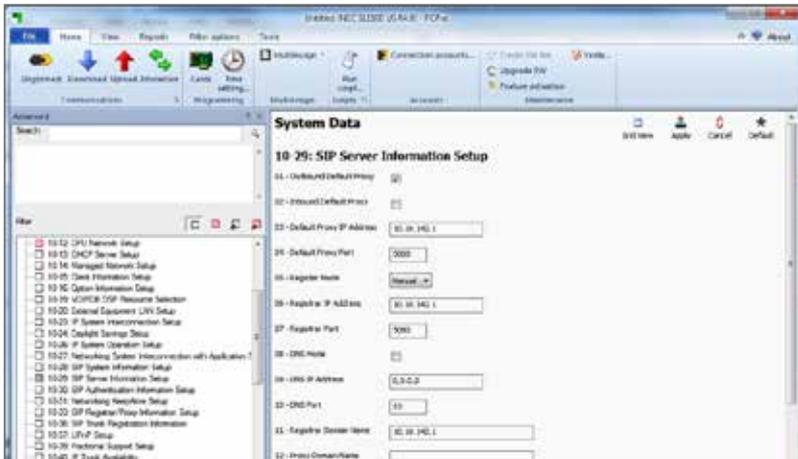
Setting up PBX to communicate with Optimum Business SIP Trunk Adaptor with SIP registration—follow this section only when the Optimum Business SIP Trunk Adaptor is configured to expected SIP registration from the PBX.

Go to the **"10-29: SIP Server Information Setup"** screen.

Check the **"01 - Outbound Default Proxy"** field.

Enter EdgeMarc's IP address in both the **"03 - Default Proxy IP Address"** field and the **"11 - Registrar Domain Name"** field.

Enter **"5060"** in both the **"04 - Default Proxy Port"** field and the **"07 - Registrar Port"** field.

Select "Manual" for the **"05 - Register Mode"** field.

Select "Defaults" for the **"14 - SIP Carrier Choice"** field. Note that this will cause the PBX to use the **"10-28-04"** (User ID) field as the caller ID.

Uncheck the **"16 - Register Sub Mode"** field.

Note: Checking this field will affect inbound calls, allowing only calls to the registered DID.

This must be done every time you change the SIP carrier choice.

Hit the **Apply** icon.
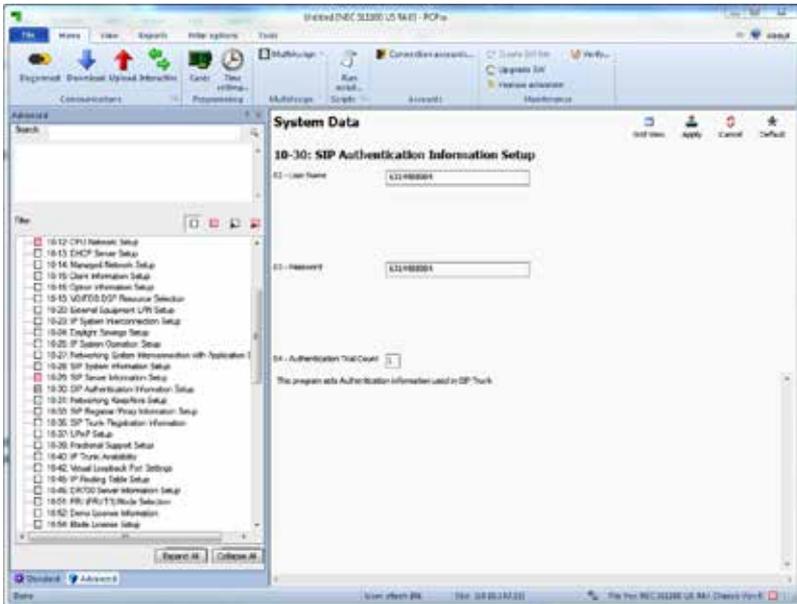
Go to the **"10-30: SIP Authentication Information Setup"** screen.

Enter the **"02 - User Name"** field with the same User ID configured in the Optimum Business SIP Trunk Adaptor. Note that Optimum Business SIP Trunk Adaptor will accept outbound calls from the PBX only when the calling number is the same as the configured User ID.

Enter the **"03 - Password"** field with the same Password configured in the Optimum Business SIP Trunk Adaptor.

Hit the **Apply** icon.

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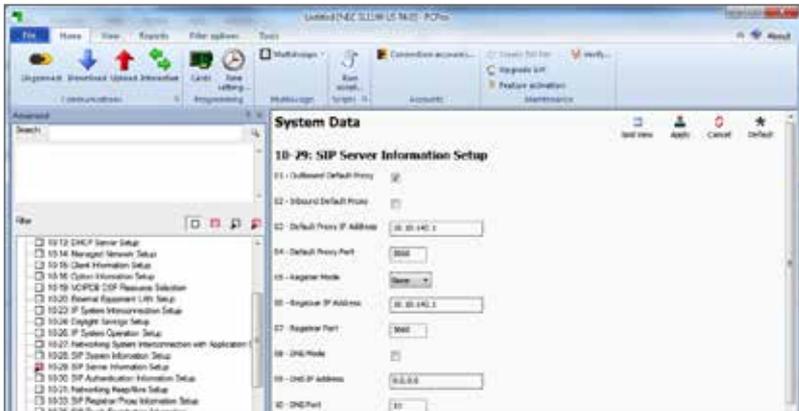
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Setting up PBX to communicate with Optimum Business SIP Trunk Adaptor with static IP address—follow this section only when Optimum Business SIP Trunk Adaptor is configured to communicate with the PBX using static IP address.

Go to the **"10-29: SIP Server Information Setup"** screen.

Check the **"01 - Outbound Default Proxy"** field.

Enter Optimum Business SIP Trunk Adaptor's IP address in both the **"03 - Default Proxy IP Address"** field and the **"11 - Registrar Domain Name"** field.

Enter **"5060"** in both the **"04 - Default Proxy Port"** field and the **"07 - Registrar Port"** field.

Select **"None"** for the **"05 - Register Mode"** field.

Select **"Carrier B"** for the **"14 - SIP Carrier Choice"** field. Note that this will allow the PBX to use the DIDs configured for each extension's caller ID from 21-19. See **"21-19: IP Trunk (SIP) Calling Party Number Setup"** for extensions.

Uncheck the **"16 - Register Sub Mode"** field.

This must be done every time you change the SIP carrier choice.

Hit the **Apply** icon.

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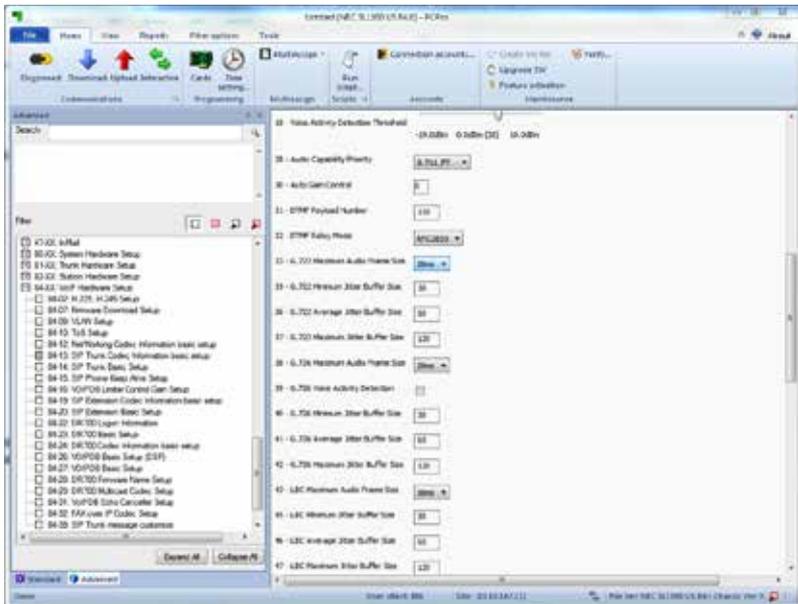
Set the **"Codec Maximum Audio Frame Size"**.

Go to page 84-13.

Set the **"84-13-33 (G.722 Maximum Audio Frame Size)"** and **"84-13-38 (G.726 Maximum Audio Frame Size)"** to "20ms".

Hit the **Apply** icon.

Go to page 84-19.

Set the **"84-19-33 (G.722 Maximum Audio Frame Size)"** and **"84-19-38 (G.726 Maximum Audio Frame Size)"** to "20ms".

Hit the **Apply** icon.

You must repeat this step every time you change the SIP carrier choice.

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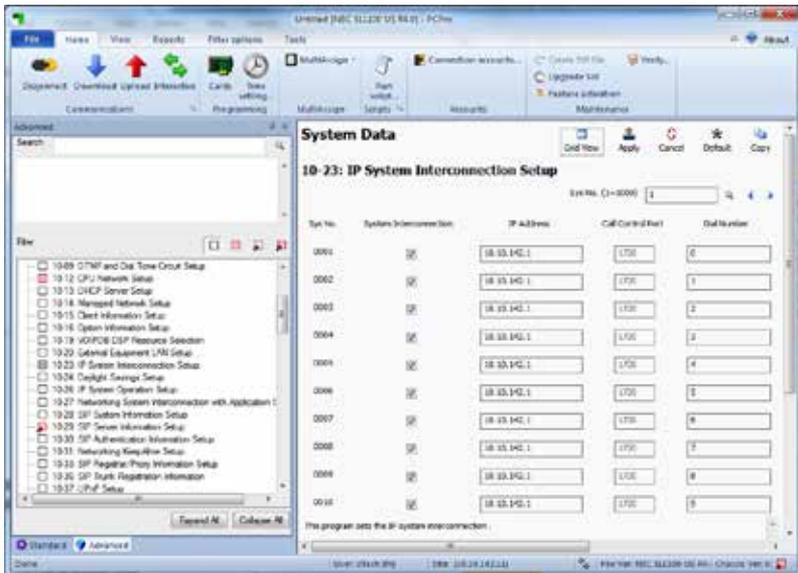
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Go to the **"10-23: IP System Interconnection Setup"** screen and set up the PBX to send the dialed digits of 0-9 to the SIP server address after trunk access code is dialed. For each of the 10 entries:

Check the **"System Interconnection"** field.

Enter Optimum Business SIP Trunk Adaptor's IP address in **"IP Address"** field.

Enter a different digit in the **"Dial Number"** field.

Hit the **Apply** icon.
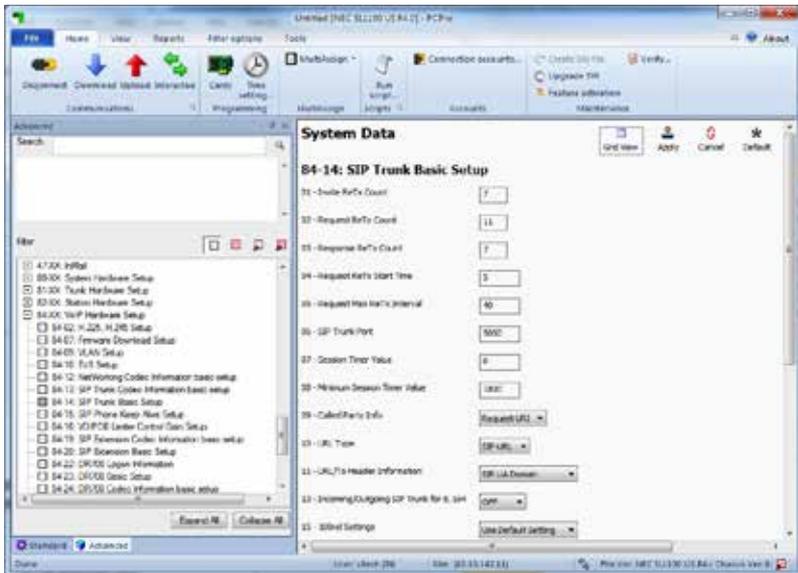
Go to the **"84-14: SIP Trunk Basic Setup"** screen and configure the basic SIP trunk parameters.

Select **"Request URI"** for the **"09 - Called Party Info"** field.

Select "SIP UA Domain" for the **"11 - URL/TO Header Information"** field.

Hit the **Apply** icon.

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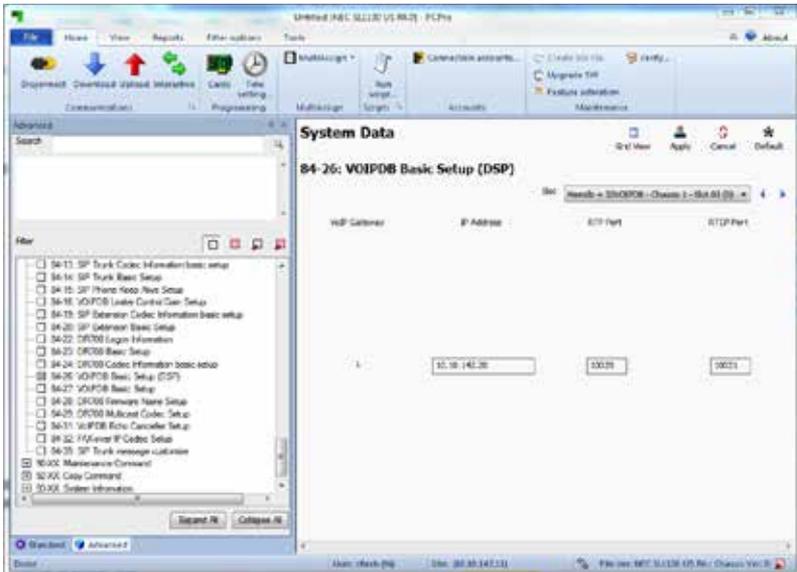
Go to the **"84-26: VOIPDB Basic Setup (DSP)"** screen and configure the IP address and RTP ports for the media.

Enter IP address for the VoIP Gateway.

Note: The IP address should be in the same subnet as the VoIP port. Also note that the number of VoIP Gateway/IP address to configure depends on how many concurrent calls the PBX will need to support. There are 16 DSPs per IP address so the first 16 calls will use the first IP address and the 17th call will use the second IP address.

Hit the **Apply** icon.

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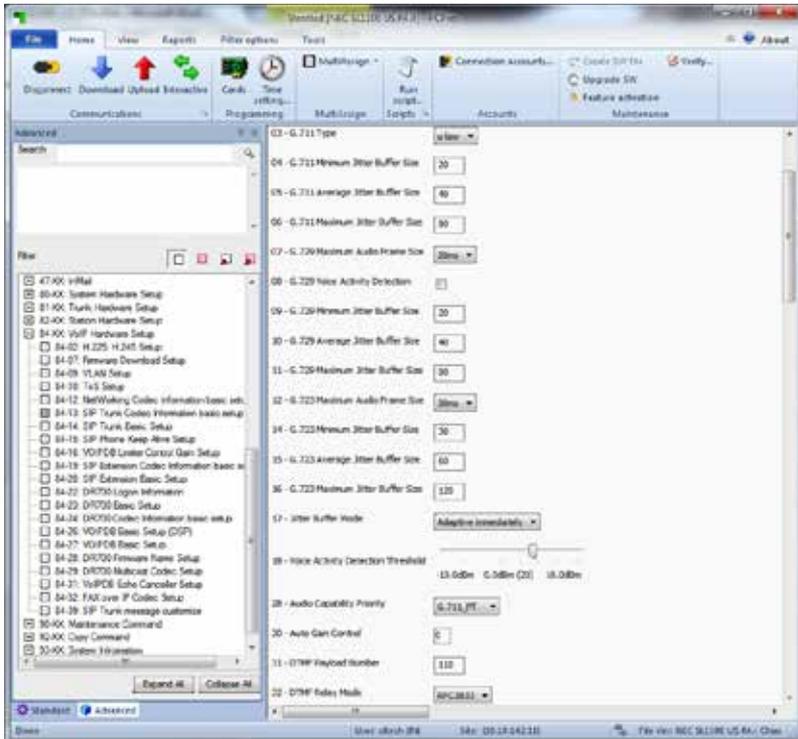
Go to the **"84-13: SIP Trunk Codec Setup"** screen and configure the codec and DTMF parameters.

Select **"u-law"** for the **"03 - G.711 Type"** field.

Select **"RFC2833"** for the **"32 - DTMF Relay Mode"** field. This will allow the auto-attendant (if installed) to support both in-band and out-of-band DTMF tones.

Hit the **Apply** icon.

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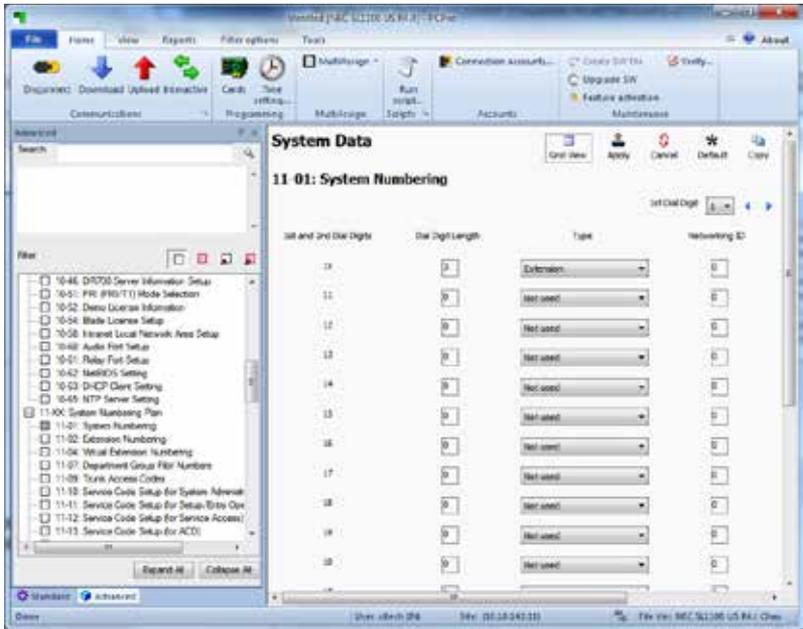
Setting up the PBX to dial **"9"** first for making outbound calls to the SIP trunk.

Go to the **"11-01: System Numbering"** screen.

Make sure the **"1x"** entry is configured for **"Extension"** type and is set for Dial Digit Length of **"3"**.

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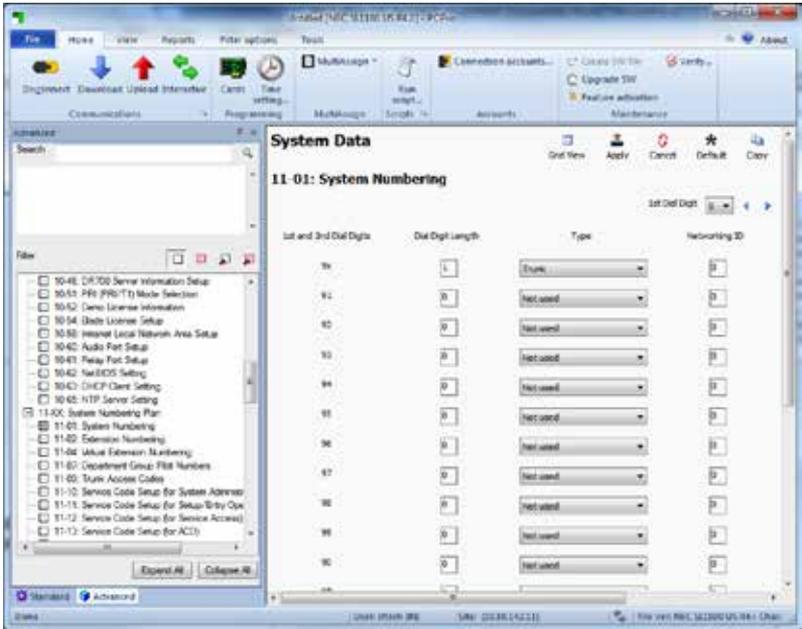
Make sure the **"9x"** entry is configured for **"Trunk"** type and is set for Dial Digit Length of **"1"**.

Hit the **Apply** icon.

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Go to the **"11-09: Trunk Access Codes"** screen.

Make sure the **"01 - Trunk Access Code"** field is set to **"9".**

Hit the **Apply** icon.

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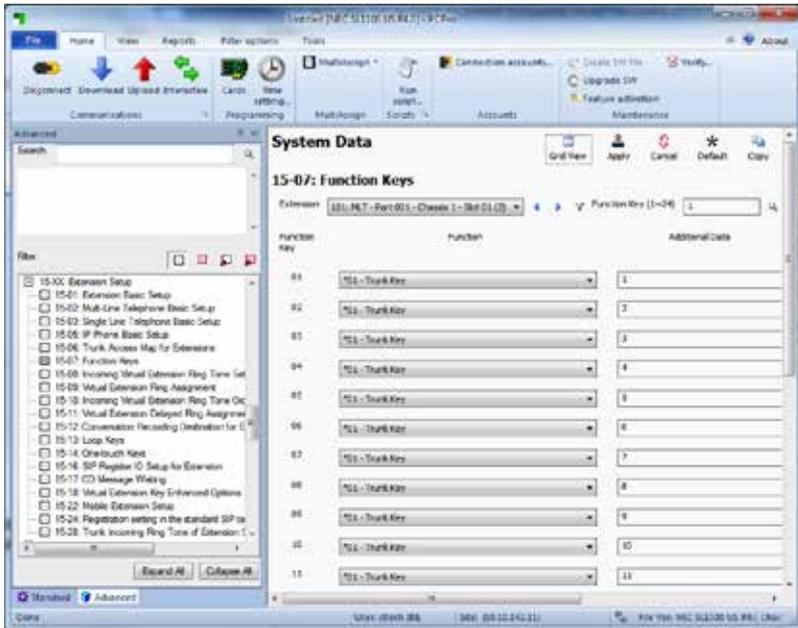
Go to the **"15-07: Function Keys"** screen.

Assign a couple of Function keys as "CAP key" for each phone. CAP keys are used for access to a trunk when the trunk is not on the phone. The phone can have access to as many of the trunks as the CAP keys it has.

Hit the **Apply** icon.

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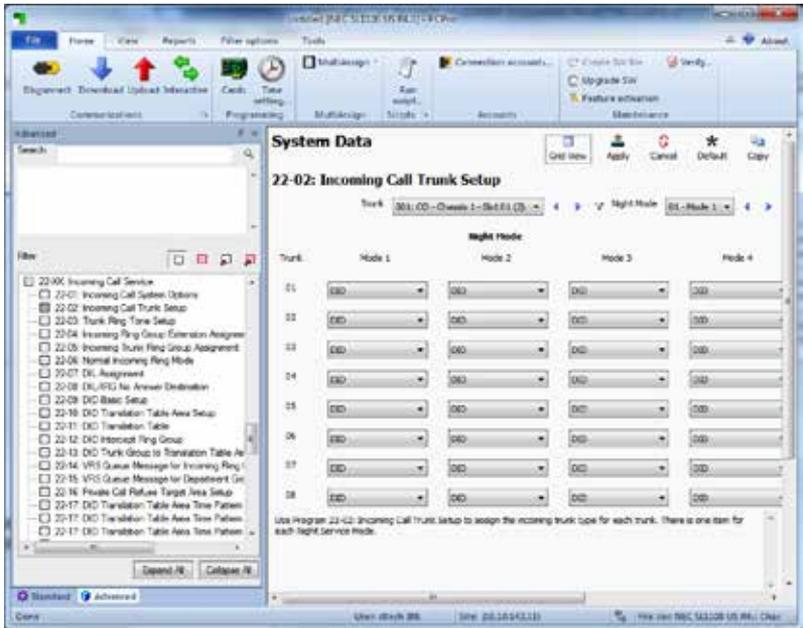
Setting up PBX to route incoming calls from SIP trunk to extensions.

Go to the **"22-02: Incoming Call Trunk Setup"** screen.

Select "DID" for all the service modes for each SIP trunk identified by its Trunk Logical Port number.

Hit the **Apply** icon.

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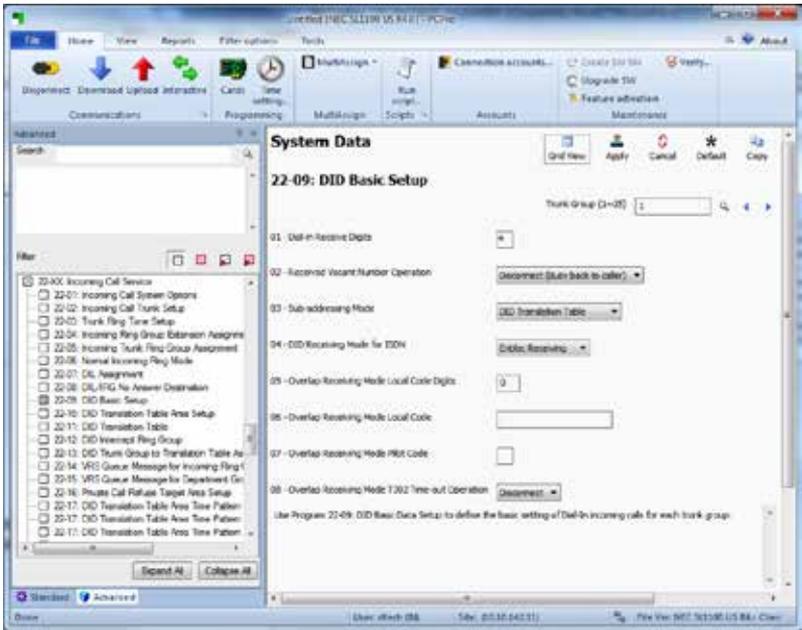
Go to the **"22-09: DID Basic Setup"** screen.

Enter "4" in the **"01 - Dial-in Receive Digits"** field.

Select "DID Translation Table" for the **"03 - Sub-addressing Mode"** field.

Hit the **Apply** icon.

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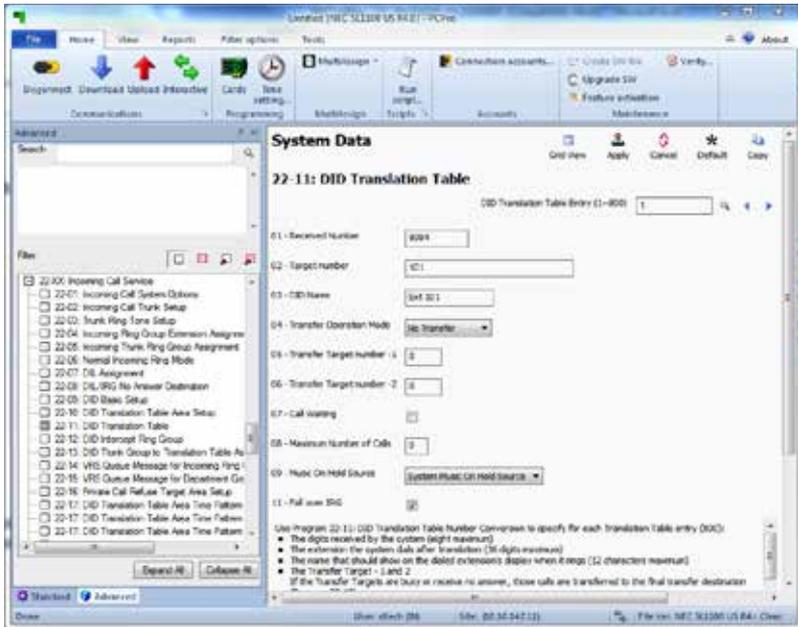
Go to the **"22-11: DID Translation Table"** screen and map the last 4 digits of the called number with each extension.

Enter the last 4 digits of the DID in the **"01 - Received Number"** field.

Enter the extension in the **"02 - Target Number"** field.

Hit the **Apply** icon.

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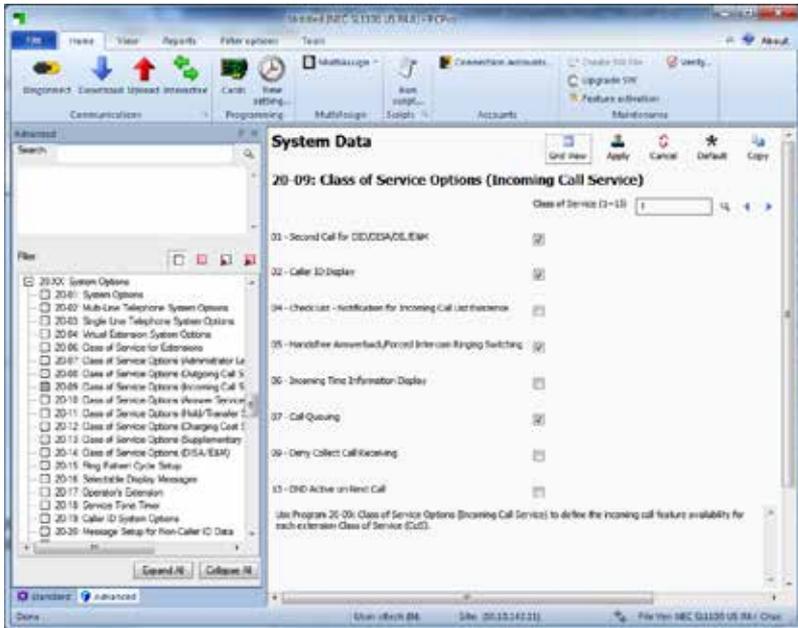
Go to the **"20-09: Class of Service Options (Incoming Call Service)"** screen and enable display of Caller ID for Class of Service 1-15.

Check the **"02 - Caller ID Display"** checkbox. This will allow the phones to display caller ID of the received call.

Hit the **Apply** icon.

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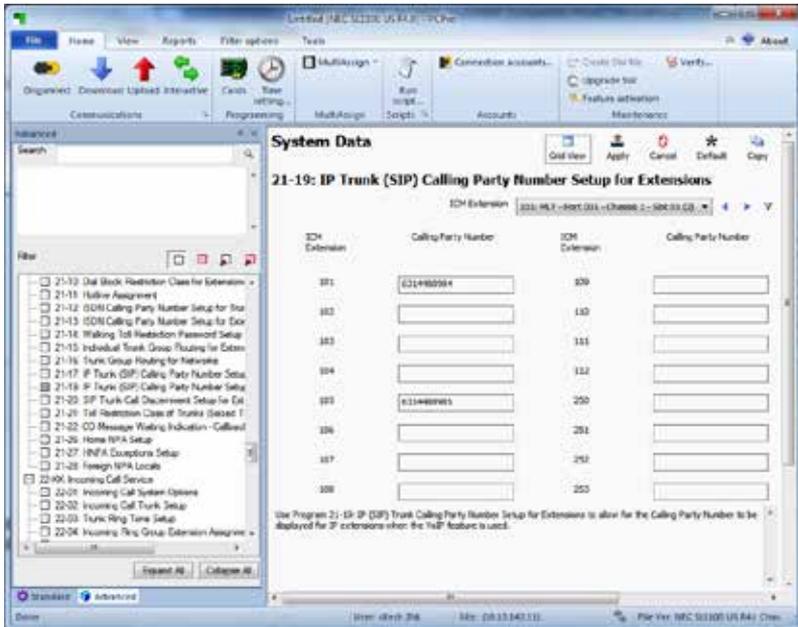
Go to the **"21-19: IP Trunk (SIP) Calling Party Number Setup for Extensions"** screen and configure the caller ID info for the SIP display field of the To header for each extension.

Enter the caller ID info in the Calling Party Number field for each assigned extension. Note that this field may be used as the User ID in the To header, depending on the setting of 10-29-14 (SIP Carrier Choice).

Hit the **Apply** icon.

Note: When using registration mode, all extensions' Calling Party Numbers must be set to the Pilot DID. Outbound calls will not work for extensions where the Calling Party Number does not match the Pilot DID.

For non-registration mode the Calling Party Number can be set to any valid DID.

Note: When making configuration changes to the PBX it will not take effect until you click on the Upload button and upload the changes to the PBX, some may require a reset. When in doubt, just save all the changes and restart the PBX.