



## Configuration Guide

# Configuring the Voice Trunk Access Code in AOS R10.8.0 or Later

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This configuration guide will aid in modifying your existing outbound trunk access code (TAC) configuration for ADTRAN products using ADTRAN Operating System (AOS) release R10.8.0 or later. (TAC is also known as steering digit or outside line selection code.) An overview of outbound TACs is provided along with a step-by-step explanation for planning a successful conversion. This guide is intended for a NetVanta 7000 Series unit that has already been installed and deployed using the default outbound TAC (9). The troubleshooting section outlines the use of **debug** commands to verify that the outbound TAC has been configured properly and instructions for correcting affected features from the graphical user interface (GUI).

This guide consists of the following sections:

- *Outbound TAC Overview on page 2*
- *Hardware and Software Requirements and Limitations on page 2*
- *Preparing for Voice Configuration Changes on page 3*
- *Modifying the TAC Configuration on page 5*
- *Replacing the TAC Digit on page 6*
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- *Appendix A: Dial Strings and Dial Plan Templates on page 19*

## Outbound TAC Overview

The outbound TAC is a single digit entered before a dial string to signify an external number is being dialed. On NetVanta 7000 Series products, the default digit used for this purpose is **9**. In certain situations, it is preferable to access an outside line by dialing either a different digit or no extra digit. If this is the case, the TAC can be changed or removed.

ADTRAN recommends configuring and installing the NetVanta 7000 Series unit with the preferred TAC behavior from the beginning using the Installation Wizard. If the TAC configuration must be changed, there are many other configuration settings to take into consideration. These considerations are listed in *Hardware and Software Requirements and Limitations*. NetVanta 7000 Series units installed prior to AOS release R10.8.0 will have **9** set as the default TAC.

## Hardware and Software Requirements and Limitations

TACs are only supported on NetVanta 7000 Series voice products.

The TAC configuration method changed significantly in AOS firmware release R10.8.0. If you are using a firmware version released prior to AOS R10.8.0, refer to the configuration guide *Configuring Trunk Access Codes in AOS Releases Prior to R10.8.0* for configuration information. This guide is available online in the ADTRAN support community at <https://supportforums.adtran.com>.

There are a number of configuration settings that must be adjusted if the TAC is changed or omitted on an installed system. The following items should be reviewed to confirm that the correct TAC is configured in each of these areas of AOS:

- System dial plan templates
- User account call forwarding, call coverage, and FindMe-FollowMe external refer actions
- Ring groups call coverage
- Shared line account (SLA) external call coverage
- Shared call appearance (SCA) external call coverage
- Auto attendant transfers to external numbers
- Dial-by-name external directory entries
- Class of service (CoS) advanced permit/deny templates
- System speed dial entries
- Call coverage lists to ring external numbers
- Global system ANI substitution
- Trunk accounts SIP outbound match ANI add/replace diversion/p-asserted-identity

For additional instructions for the system administrator to check each of the above items from the AOS GUI, refer to *Troubleshooting on page 14*. Any of the settings listed above that do not use an external number for transferring or forwarding calls, will not be affected by changing the TAC and will not require additional consideration.

## Preparing for Voice Configuration Changes

Before modifying your voice configuration, it is important to plan accordingly. The following steps are provided in preparation for a successful conversion. Perform these steps before you attempt to change the TAC as instructed in *Modifying the TAC Configuration on page 5*.

1. *Save a Copy of Your Current Configuration on page 3*
2. *Identify the Range of Numbers Currently in Use on page 4*

### Save a Copy of Your Current Configuration

Before you begin modifying your system's voice configuration, ADTRAN suggests making a backup copy of your current configuration. The most comprehensive method of making a backup copy of the current configuration, including all your voice settings, is to use the backup feature in AOS. This method entails generating a Python script to back up the unit. Instructions are provided on the GUI menu explaining how to install Python and download the backup file.

1. To download a copy of your configuration in the GUI, navigate to **Utilities > System > Backup**.
2. Select the **System Configuration, Phone Configuration, and AA/CQ Configurations and Custom Prompts** check boxes to include the startup and dynamic voice configurations.
3. Select **Download** to begin the file transfer.

The screenshot shows the ADTRAN GUI's 'Backup' configuration page. On the left, a navigation sidebar lists categories like Wizard, System, Voice, Data, Monitoring, and Utilities. Under Utilities, 'System' is expanded, and 'Backup' is selected. The main panel, titled 'Backup', contains a text box with instructions: 'Click 'Download' to generate a Python script to backup the unit. For information on how to backup the unit using this script, please refer to the following documentation: [Text Instructions](#) [ADTRAN Support Documentation](#)'. Below this is a form with several fields: 'Archive Type' (set to 'zip'), 'IP Address', 'Username', and 'Password'. A list of configuration categories follows, each with a checkbox and a help icon: 'System Configuration' (checked), 'Phone Configurations' (checked), 'AA/CQ Configurations and Custom Prompts' (checked), 'Voicemail Greetings', 'Voicemail Messages', 'Firmware', 'French Canadian Prompts', 'Irish Prompts', 'Latin Spanish Prompts', and 'UK English Prompts'. At the bottom of the form is a 'Download' button. Two callout boxes with arrows provide instructions: one points to the checked checkboxes for System, Phone, and AA/CQ configurations, and the other points to the 'Download' button.

## Identify the Range of Numbers Currently in Use

To avoid conflicts with routing calls to users or internal applications running on the NetVanta 7000 Series product, it is important to make note of the numbers that are currently being used in the system. This includes internal extensions as well as applications (for example, auto attendant, paging groups, etc.).



*If you are omitting the TAC, this step is not required and should be skipped.*

Review the extensions currently in use and select a digit that does not lead an extension or application on the NetVanta 7000 Series product. Make a note of any that may cause a conflict with the new TAC you have chosen, otherwise reconfiguration of the conflicting numbers will be necessary to change the ranges.

Review each of these settings:

- Aliases
- Auto attendant extensions
- Call queue extensions
- Call queue de-queue extensions
- Paging group extensions
- Shared call appearance extensions
- Shared line accounts names
- Shared line account held call pick-up extensions
- Voice loopback extensions
- Ring group extensions
- Pick-up group extensions
- User account extensions
- Voicemail login extension
- Leave voicemail extension
- Overhead paging extension

Make any changes necessary to accommodate the new digit you have selected as your TAC.



*Changing the TAC to 0 will make the internal operator unreachable. Keep this in mind when selecting a new TAC.*

To review the internal extensions in use for these applications, navigate to **Voice > Reports > Extensions List** in the GUI.

Review the internal extensions in use. Make a note of any that may cause a conflict with the new TAC you have chosen.

**Extensions List**

This page displays all of the configured extensions in the system.

Account Type acronyms:  
 AA = Auto Attendant      CQ = Call Queue      DP = Desktop Paging  
 LA = Shared Line/Shared Call      LB = Loopback Account      OG = Operator Group  
 PG = Pickup Group/SLA Pickup      RG = Ring Group      SR = System Reserved  
 UA = User Account

Extension	Name	Account Type	Status	DND	Fwd	New VM
0	Operator Group	OG	--	--	--	No
1		UA	Not Present	Off	Off	No
1234	Doe, Jane	UA	Not Present	On	Off	No
2001	Port 0/1, Analog FXS	UA	Idle	Off	Off	No
2002	Port 0/2, Analog FXS	UA	Idle	Off	Off	No
2003	SIP User, Default	UA	Idle	Off	Off	No
2013	SIP User, Default	UA	Idle	Off	Off	No
2025	SIP User, Default	UA	Idle	Off	Off	No
3001		RG	--	--	--	No
3434		RG	--	--	--	No
3456	Sales	CQ	--	--	--	--
5555		UA	Not Present	Off	Off	No
5566	SIP User, Default	UA	Idle	Off	Off	No
5577		LA	--	--	--	--
6850		LA	--	--	--	--
7890	Smith, John	UA	Idle	Off	Off	No
8000	Overhead Paging Ext	SR	--	--	--	--
8200	DefaultAA	AA	--	--	--	--
8500	Voicemail Login Ext	SR	--	--	--	--
8504	Leave Voicemail Ext	SR	--	--	--	--
OVERHEAD...	Overhead Paging Ext	Alias (SR)	--	--	--	--
Sales	Operator Group	Alias (OG)	--	--	--	No
Support	Operator Group	Alias (OG)	--	--	--	No
VM_CHECK	Voicemail Login Ext	Alias (SR)	--	--	--	--
VM_LEAVE	Leave Voicemail Ext	Alias (SR)	--	--	--	--

## Modifying the TAC Configuration

Now that you have prepared for this major configuration change by backing up your current configuration and making note of the internal extensions currently in use, you are ready to modify the current TAC configuration. The following instructions describe how to configure a TAC digit other than the default or to remove the TAC completely.

1. To modify the current TAC digit, navigate to **Voice > System Setup > Dial Plan**.
2. Select **Local Dialing Type**, either **7 Digit Dialing** or **10 Digit Dialing**. The system will not allow you to change the TAC without specifying one of these options.
3. Select the new digit from the drop-down menu. Valid entries are **none**, or **0** through **9**. Selecting **none** indicates that no TAC is necessary to access an outbound trunk.

**Dial Plan Parameters**

Dial plan parameters not only tell the system how to route calls, but also work with Classes of Service to determine whether a user has permission to dial a given number.

Local Dialing Type: <No Dialing Type Selected>

Local Emergency Services:

Trunk Access Code: 7

none  
0  
1  
2  
3  
4  
5  
6  
7  
8  
9

Apply

Select a **Local Dialing Type**.

Select the new digit from the drop-down menu. Select **none** to specify no TAC is necessary.

Select **Apply** to accept the changes.



*Changing the TAC to 0 will make the internal operator unreachable. Keep this in mind when selecting a new TAC.*

4. Select **Apply** to accept the new TAC setting.



*If the TAC selected causes a conflict with an existing internal extension, a warning displays on the GUI. It provides instructions for addressing the conflict.*

Your configuration selection in this step determines which set of instructions to follow beyond this point. Proceed to [Replacing the TAC Digit on page 6](#) if you are changing to a TAC digit other than the default, or proceed to [Omitting the TAC on page 10](#) if you are removing the TAC digit completely.

## Replacing the TAC Digit

The following steps are required to change the TAC in AOS to a new digit:

*Step 1: Modify Voice Dial Plan Entries on page 6.*

*Step 2: Modify the Dial Strings for the IP Phone Configuration File on page 8.*

### Step 1: Modify Voice Dial Plan Entries

Dial plan entries are required for the AOS unit to recognize when a dial string is complete, as well as for applying CoS rules. When changing the TAC, it is important to remove dial plan entries that contain a leading 9. These entries should be modified to contain the new leading digit. Conflicts can result if left unchanged.

A typical dial plan for a default configuration is shown below. This example is for illustrative purposes only and does not imply that your dial plan entries must match the example.

1. To view and edit the current dial plan entries from the GUI, navigate to **Voice > System Setup > Dial Plan**.

**Dial Plan Templates (Advanced)**

Dial plan templates allow the system to recognize dialed numbers as a particular type of call. The type of call is matched against the user's class of service to determine whether that user has the permission to make the call.

**Add New Dial Plan Template**

Template:  ?

Number Type:  ?

**View/Delete Dial Plan Templates**

The following list details the currently configured dial plan templates. To delete a template, click on the Delete button next to that template. You can use an existing template as the basis for a new template by clicking on a template row. The form above will be initialized to that template's values.

Dial Plan Template	Number Type	
911	Local Emergency	
9-911	Local Emergency	
9-NXX-NXX-XXXX	Local	<input type="button" value="Delete"/>
0	Internal Operator	<input type="button" value="Delete"/>
MXXX	Extensions	<input type="button" value="Delete"/>
9-1-NXX-NXX-XXXX	Long Distance	<input type="button" value="Delete"/>
9-1-800-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-888-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-877-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-866-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-855-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-0-NXX-NXX-XXXX	Operator Assisted	<input type="button" value="Delete"/>
9-011-\$	International	<input type="button" value="Delete"/>
9-1-900-NXX-XXXX	900	<input type="button" value="Delete"/>
9-1-976-NXX-XXXX	900	<input type="button" value="Delete"/>
9-976-XXXX	900	<input type="button" value="Delete"/>

Review the current dial plan entries and make note of templates containing the default TAC 9.

2. Review the current dial plan entries and look for templates containing the default preceding **9**.
3. Select an entry from the list that must be modified. The selected template will populate the **Template** field at the top of the **Dial Plan Templates** menu, allowing you to edit it.
4. Modify the **Template** to contain the new preceding digit (for example, **7**). Select **Add** to accept the new template.
5. Remove the old template by selecting **Delete** from the same line as the listing.

**Dial Plan Templates (Advanced)**

Dial plan templates allow the system to recognize dialed numbers as a particular type of call. The type of call is matched against the user's class of service to determine whether that user has the permission to make the call.

**Add New Dial Plan Template**

Template:  ?

Number Type:  ?

**View/Delete Dial Plan Templates**

The following list details the currently configured dial plan templates. To delete a template, click on the Delete button next to that template. You can use an existing template as the basis for a new template by clicking on a template row. The form above will be initialized to that template's values.

Dial Plan Template	Number Type	
911	Local Emergency	
9-911	Local Emergency	
9-NXX-NXX-XXXX	Local	<input type="button" value="Delete"/>
0	Internal Operator	<input type="button" value="Delete"/>

Modify the template to contain the new TAC digit.

Select **Add** to accept the new template.

Select each entry from the list to display the template in the **Template** field above.

Remove the old template by selecting **Delete** from the same line as the template.

6. Continue steps 2 through 5 until you have modified all the dial plan entries that require a preceding digit to access an outside line.

7. Additionally, the extensions dial plan template **MXXX** should be removed by selecting **Delete** from the same line as the listing. A new template must be added that omits the TAC digit. For example, if the new TAC is **7**, add a new template of **[12345689]XXX** for extensions. Enter the new template in the **Template** field at the top of the **Dial Plan Templates** menu. Select **Extensions** for the **Number Type**.
8. Select **Add** to accept the new template.

**Dial Plan Templates (Advanced)**

Dial plan templates allow the system to recognize dialed numbers as a particular type of call. The type of call is matched against the user's class of service to determine whether that user has the permission to make the call.

**Add New Dial Plan Template**

Template:

Number Type:

**View/Delete Dial Plan Templates**

The following list details the currently configured dial plan templates. To delete a template, click on the Delete button next to that template. You can use an existing template as the basis for a new template by clicking on a template row. The form above will be initialized to that template's values.

Dial Plan Template	Number Type	
911	Local Emergency	
7-911	Local Emergency	
7-1-800-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
7-1-888-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
0	Internal Operator	<input type="button" value="Delete"/>
MXXX	Extensions	<input type="button" value="Delete"/>
7-1-877-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>

9. An example of a dial plan using **7** as the TAC for external numbers is shown below.

**View/Delete Dial Plan Templates**

The following list details the currently configured dial plan templates. To delete a template, click on the Delete button next to that template. You can use an existing template as the basis for a new template by clicking on a template row. The form above will be initialized to that template's values.

Dial Plan Template	Number Type	
911	Local Emergency	
7-911	Local Emergency	
7-NXX-NXX-XXXX	Local	<input type="button" value="Delete"/>
0	Internal Operator	<input type="button" value="Delete"/>
[12345689]XXX	Extensions	<input type="button" value="Delete"/>
7-1-NXX-NXX-XXXX	Long Distance	<input type="button" value="Delete"/>
7-1-800-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
7-1-888-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
7-1-877-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
7-1-866-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
7-1-855-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
7-0-NXX-NXX-XXXX	Operator Assisted	<input type="button" value="Delete"/>
7-011-\$	International	<input type="button" value="Delete"/>
7-1-900-NXX-XXXX	900	<input type="button" value="Delete"/>
7-1-976-NXX-XXXX	900	<input type="button" value="Delete"/>
7-976-XXXX	900	<input type="button" value="Delete"/>

## Step 2: Modify the Dial Strings for the IP Phone Configuration File

In order for SIP phones to be aware of the TAC change, dial strings in the IP phone configuration files must be modified. You must replace the **9** for dialed extensions with the new TAC digit. Also, depending on which digit is used for the TAC, the dial string of **[1-8]xxx** (for four-digit extensions) must be modified to omit the digit from the brackets. For example, if the desired TAC is **7**, you will replace **[1-8]xxx** with **[12345689]xxx**.





*The dial strings cannot be modified from the command line interface (CLI), only from the GUI.*

In this example, the configuration was changed to use the TAC **7** instead of the default **9**. All of the external number dial strings where a **9** is currently used, should be modified to replace the preceding **9** with a **7** (or other digit if you are using a different trunk access code). Also, you must apply this to any new or existing configurations, by selecting the **New and Existing Configurations** radio button before selecting **Apply**.

1. Navigate to **Voice > Stations > IP Phone Globals**. Select the **Default Settings** tab.
2. Select **[1-8]xxx** from the **Extension Dial Strings** field.
3. Edit the entry **[1-8]xxx** to read **[12345689]xxx**. Select **Change** to accept the changes.
4. Select each external dial string and replace the **9** at the beginning of the string with the new TAC. Some of the system default dial strings that must be altered include (but are not limited to) the following:
  - 9,[2-9]xxxxxxT
  - 9,[2-9]xx[2-9]xxxxxx
  - 9,[0-1][2-9]xx[2-9]xxxxxx
  - 9,011xxx.T



*Additional information is provided in [Appendix A: Dial Strings and Dial Plan Templates](#) on page 19 to assist with using wildcards and symbols when entering dial strings.*

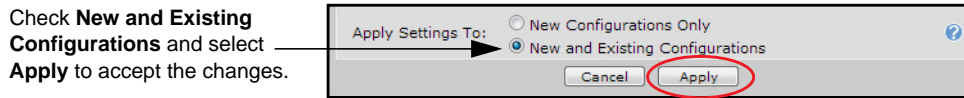
Select the dial string to modify from the **Extension Dial Strings** field.

Make the necessary changes to the dial string in the field provided.

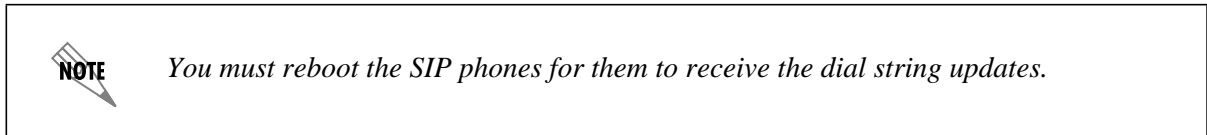
Select the **Change Entry** radio button and select **Change** to accept the new dial string.

The screenshot shows the 'IP Phone Globals' configuration page. The 'Default Settings' tab is active. Under 'SIP Server', 'VLAN Address: 10.10.20.1' is selected. The 'Extension Dial Strings' field is expanded, showing a list of dial strings. The entry '[1-8]xxx' is selected. Below the list, the 'Change Entry' radio button is selected, and the 'Change' button is highlighted. The text 'Please modify the dial plan to include any local emergency numbers.' is displayed in red above the list.

- From the bottom of the **IP Phone Globals** menu, select the **New and Existing Configurations** as the **Apply Settings To** option. This option applies the phone configurations to all new and all existing IP phone configurations, overwriting any customizations.



- Select **Apply** to accept all the changes.



## Omitting the TAC

In certain installations, it is preferable to omit the TAC altogether and not require dialing a preceding digit for placing external calls. The following steps are required to omit the TAC in AOS:

*Step 1: Modify Voice Dial Plan Entries on page 10.*

*Step 2: Add an Interdigit Timeout to the Extensions Dial Plan Template on page 12.*

*Step 3: Modify the Dial Strings for the IP Phone Configuration File on page 13.*

### Step 1: Modify Voice Dial Plan Entries

Dial plan entries are required for the AOS unit to recognize when a dial string is complete, as well as for applying CoS rules. When changing the TAC, it is important to remove dial plan entries that contain a leading **9**. These entries should be modified to contain the new leading digit. Conflicts can result if left unchanged.

A typical dial plan for a default configuration is shown below. This example is for illustrative purposes only and does not imply that your dial plan entries must match the example.

1. To view and edit the current dial plan entries from the GUI, navigate to **Voice > System Setup > Dial Plan**.

**Dial Plan Templates (Advanced)**

Dial plan templates allow the system to recognize dialed numbers as a particular type of call. The type of call is matched against the user's class of service to determine whether that user has the permission to make the call.

**Add New Dial Plan Template**

Template:  ?

Number Type:  ?

**View/Delete Dial Plan Templates**

The following list details the currently configured dial plan templates. To delete a template, click on the Delete button next to that template. You can use an existing template as the basis for a new template by clicking on a template row. The form above will be initialized to that template's values.

Dial Plan Template	Number Type	
911	Local Emergency	
9-911	Local Emergency	
9-NXX-NXX-XXXX	Local	<input type="button" value="Delete"/>
0	Internal Operator	<input type="button" value="Delete"/>
MXXX	Extensions	<input type="button" value="Delete"/>
9-1-NXX-NXX-XXXX	Long Distance	<input type="button" value="Delete"/>
9-1-800-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-888-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-877-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-866-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-1-855-NXX-XXXX	Toll Free	<input type="button" value="Delete"/>
9-0-NXX-NXX-XXXX	Operator Assisted	<input type="button" value="Delete"/>
9-011-\$	International	<input type="button" value="Delete"/>
9-1-900-NXX-XXXX	900	<input type="button" value="Delete"/>
9-1-976-NXX-XXXX	900	<input type="button" value="Delete"/>
9-976-XXXX	900	<input type="button" value="Delete"/>

Review the current dial plan entries and make note of templates containing the default TAC 9.

2. Review the current dial plan entries and look for templates containing the default preceding **9**.
3. Select an entry from the list that must be changed. The existing template populates the **Template** field at the top of the **Dial Plan Templates** menu, allowing you to edit it.
4. Change the **Template** by removing the preceding **9**. Select **Add** to accept the new template.
5. Remove the old template by selecting **Delete** from the same line as the listing.

**Dial Plan Templates (Advanced)**

Dial plan templates allow the system to recognize dialed numbers as a particular type of call. The type of call is matched against the user's class of service to determine whether that user has the permission to make the call.

**Add New Dial Plan Template**

Template:  ?

Number Type:  ?

**View/Delete Dial Plan Templates**

The following list details the currently configured dial plan templates. To delete a template, click on the Delete button next to that template. You can use an existing template as the basis for a new template by clicking on a template row. The form above will be initialized to that template's values.

Dial Plan Template	Number Type	
911	Local Emergency	
9-911	Local Emergency	
9-NXX-NXX-XXXX	Local	<input type="button" value="Delete"/>
0	Internal Operator	<input type="button" value="Delete"/>

Modify the template to contain the new TAC digit.

Select **Add** to accept the new template.

Remove the old template by selecting **Delete** from the same line as the template.

Select each entry from the list to display the template in the **Template** field above.

- Continue steps 2 through 5 until you have modified all the dial plan entries that require a preceding digit to access an outside line. An example dial plan with no assigned TAC for external numbers is shown below.

**View/Delete Dial Plan Templates**

The following list details the currently configured dial plan templates. To delete a template, click on the Delete button next to that template. You can use an existing template as the basis for a new template by clicking on a template row. The form above will be initialized to that template's values.

Dial Plan Template	Number Type	
911	Local Emergency	
911	Local Emergency	
NXX-NXX-XXXX	Local	Delete
0	Internal Operator	Delete
MXXX	Extensions	Delete
1-NXX-NXX-XXXX	Long Distance	Delete
1-800-NXX-XXXX	Toll Free	Delete
1-888-NXX-XXXX	Toll Free	Delete
1-877-NXX-XXXX	Toll Free	Delete
1-866-NXX-XXXX	Toll Free	Delete
1-855-NXX-XXXX	Toll Free	Delete
0-NXX-NXX-XXXX	Operator Assisted	Delete
011-\$	International	Delete
1-900-NXX-XXXX	900	Delete
1-976-NXX-XXXX	900	Delete
976-XXXX	900	Delete

## Step 2: Add an Interdigit Timeout to the Extensions Dial Plan Template

To allow analog phones to dial external numbers after the above dial plan changes are made, an interdigit timeout must be added to the extensions template. This step can only be completed from the CLI. (If you are unfamiliar with accessing or using the CLI, refer to the *AOS Command Reference Guide* available online in the ADTRAN support community at <https://supportforums.adtran.com>.)

- Access the CLI.
- Enter the **voice dial-plan** *<pattern id>* **extensions** *<pattern>* **default** command from the Global Configuration mode. The *<pattern id>* specifies the dial pattern ID. Valid range is **1** to **255**. The *<pattern>* parameter specifies the dialing pattern using wildcards. The **default** setting specifies using the default named-digit-timeout value. In the following example, the pattern **MXXX** specifies a four-digit extension beginning with any digit 1 through 8, using the default timeout:

```
(config)#voice dial-plan 3 extensions MXXX default
```



The **default** named-digit-timeout is set using the **voice timeouts interdigit** *<value>* command.



Additional information is provided in *Appendix A: Dial Strings and Dial Plan Templates* on page 19 to assist with using wildcards and symbols when entering dial strings.

### Step 3: Modify the Dial Strings for the IP Phone Configuration File

In order for SIP phones to be aware of the omission of the TAC, the dial strings in the IP phone configuration files must be modified. The dial string of **[1-8]xxx** (for dialing four-digit extensions) must be changed to **[1-9]xxx.T**. Since **9** is no longer the TAC, changing the **[1-8]** to **[1-9]** allows additional extension numbers to be used. In case the user is dialing a local number and not an extension, adding the **.T** instructs the phone to wait for an interdigit timeout to occur before sending the call. Also, the preceding **9** must be removed from each of the external dial strings. Use the following steps to modify the dial strings:

1. Navigate to **Voice > Stations > IP Phone Globals**. Select the **Default Settings** tab.
2. Select **[1-8]xxx** from the **Extension Dial Strings** field.
3. Edit the entry to read **[1-9]xxx** and include **.T** at the end of the dial string. Select **Change** to accept the changes.
4. From each of the external dial strings, remove the preceding **9** and comma (,). Select **Change** to accept the changes. Some of the system default dial strings that must be altered include (but are not limited to) the following:
  - 9,[2-9]xxxxxxT
  - 9,[2-9]xx[2-9]xxxxxx
  - 9,[0-1][2-9]xx[2-9]xxxxxx
  - 9,011xxx.T



*Additional information is provided in Appendix A: Dial Strings and Dial Plan Templates on page 19 to assist with using wildcards and symbols when entering dial strings.*

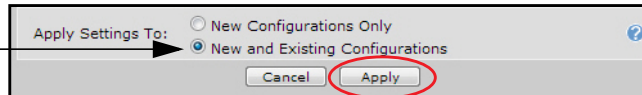
Select the dial string to modify from the **Extension Dial Strings** field.

Make the necessary changes to the dial string in the field provided.

Select the **Change Entry** radio button and select **Change** to accept the new dial string.

- From the bottom of the **IP Phone Globals** menu, select the **New and Existing Configurations** as the **Apply Settings To** option. This option applies the phone configurations to all new and all existing IP phone configurations, overwriting any customizations.
- Select **Apply** to accept all the changes.

Check **New and Existing Configurations** and select **Apply** to accept the changes.



## Troubleshooting

After modifying the TAC, there are multiple features that could have external number forwarding or transfers configured that will be affected. These features are explained in *Feature Considerations*. Additionally, several **debug** commands can be issued from the Enable mode in the CLI to assist in troubleshooting. These commands are explained in *Debug Commands on page 18*.

## Feature Considerations

Some features that can experience conflicts when changing the TAC or omitting it, were listed in *Hardware and Software Requirements and Limitations on page 2*. These features can be reviewed through multiple areas in the GUI. This section identifies each of those features and where their configurations can be reviewed by the system administrator. These settings are specific to your configuration, and it may not be necessary for all settings to be altered or changed. Refer to the support community at <https://supportforums.adtran.com> for additional documentation on each feature, as well as those listed in *Additional Resources on page 18*.



*It is important for the system administrator to communicate with system users to change any current configurations they may have set individually using external number forwarding or transfers, as well as the new behavior for accessing an outside line to make external calls.*

## User Accounts

Any external call coverage that forwards calls to an outside number should be modified with the new or the absence of a TAC digit. Review the user accounts for each of these sections in the GUI:

- Navigate to **Voice > Stations > User Accounts**
- Select the user from the list.
- Select **Edit**.
- Select each of the following tabs and review for the specified setting.
  - On the **Current Settings** tab, review for **Call Forwarding** options set to an external number.
  - On the **Call Coverage** tab, review for **Ring External Number** in the Action list.
  - On the **FMFM** tab, review for any external numbers used in **Refer the Call to** actions.
- Refer to *Configuring User Accounts on the NetVanta 7000 Series* for more information.

## IP Phone Configurations

Each IP phone on the system can have individual settings that could cause a conflict with the new TAC configuration. Review the **IP Phone Configs** menu for any IP phones on the system that may have buttons assigned to external numbers (such as speed dials).

1. Navigate to **Voice > Stations > IP Phone Configs**.
2. Select the MAC address for an IP phone. Select **Edit**.
3. Select the **Button Map** tab. Correct external number assignments as necessary.
4. Select the **Other Directory Entries** tab. Correct any external number assignments as necessary.
5. This must be performed for each IP phone that has an external number configured for buttons on the phone.

## Ring Groups

1. Navigate to **Voice > Stations > Ring Groups**.
2. Select the ring group.
3. Select **Call Coverage** tab.
4. Review for **Ring External Number** actions. Make changes as necessary.
5. Refer to *Configuring NetVanta 7000 Series Ring Groups* for more information.

## Shared Line Accounts (SLA) and Shared Call Appearances (SCA)

1. Navigate to **Voice > Trunks > Shared Line Accounts**.
2. Select the SLA. (SCAs are also listed as SLA.)
3. Select **Call Coverage** tab.
4. Review for **Ring External Number** actions. Make changes as necessary.
5. Refer to *Configuring Shared Line Appearances for Analog Trunks on the NetVanta 7000 Series* or *Configuring Shared Call Appearances* for more information.

## Auto Attendants

1. Navigate to **Voice > Applications > Auto Attendants**
2. Select the auto attendant from the list.
3. From the **Digit Actions** tab, review the actions for a **Transfer to a Phone Number**. The **Details** menu will display any external numbers.
4. Change settings to reflect a new **External Number**.
5. Refer to *Configuring the Auto Attendant for the NetVanta 7000 Series* for more information.

The screenshot displays the configuration page for an Auto Attendant named "DefaultAA". The left sidebar shows the navigation menu with categories like System, Voice, Trunks, Applications, System Setup, Reports, Data, Monitoring, and Utilities. The main content area is divided into several sections:

- General Info:** Name (DefaultAA), Extension (8200), Description, Operator Extension (0).
- Menu Prompt Info:** Menu Prompt (defaultAAPrompt.wav), Timeout (5 seconds), Enter Digits During Prompts (checked).
- Digit Actions:** A table of actions where action 2 is "Transfer to a Phone Number".
- Transfer To a Phone Number Details:** A sub-section for configuring the transfer action, including Pre-Transfer Prompt, Transfer Target (Extension, External Number, Voice Mailbox, Operator), Play Prompt, and If Transfer Fails.

Annotations in the image include a red circle around the "Transfer to a Phone Number" action in the Digit Actions table and a red arrow pointing from it to a callout box. The callout box shows the "Transfer Target" options, with the "External Number" field selected and containing the value "7-2569638000".

Review the **Digit Actions** for any transfers to a phone number.

Select the transfer action to review the **Details** menu.

Change the external number that was previously configured using the old TAC, to a new number, preceded by the new TAC (shown in the figure box).

### Dial-by-Name Directory Entries

1. Navigate to **Voice > Applications > Dial-By-Name Dirs**.
2. Select the directory from the list.
3. Review the directory members for actions that may cause a conflict. For example, an external number listed in the directory that begins with the TAC. Modify these entries to comply with the new TAC settings.



### Class of Service, Advanced Permit/Deny Templates

1. Navigate to **Voice > System Setup > Classes of Service**.
2. Select the class of service from the list.
3. Expand **Advanced Permit/Deny Call Templates**. Review the templates listed. Modify the entries to comply with the new TAC settings as necessary.

### System Speed Dial Entry

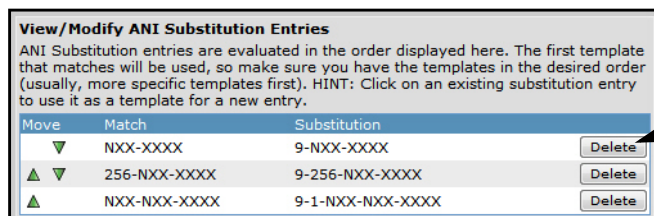
1. Navigate to **Voice > System Setup > System Speed Dial**.
2. Review the speed dial entries for external numbers. Correct external numbers as necessary.

### Call Coverage Lists Ring External Number

1. Navigate to **Voice > System Setup > Call Coverage Lists**.
2. Select the call coverage from the list.
3. Review for **Ring External Number** actions. Modify as necessary.

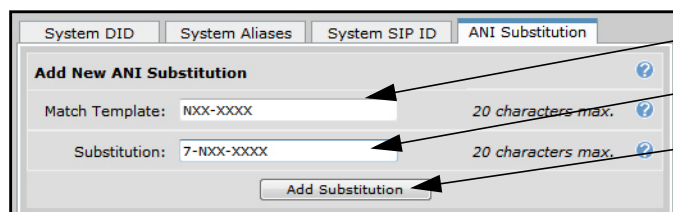
### System Parameters ANI Substitution

1. Navigate to **Voice > System Setup > System Parameters**.
2. Select the **ANI Substitution** tab.
3. Review entries for ANI substitutions that use the old TAC. Delete the old entry first because the system will not allow duplicate entries.



Remove the old ANI substitution entry by selecting **Delete** from the same line as the entry.

4. Enter the template to match incoming calls, in the **Match Template** field.
5. Next, enter the substitution template using the new TAC in the **Substitution** field. For example, if the new TAC is 7, enter a match **NXX-XXXX** substitution **7-NXX-XXXX**.



Enter a match template.  
 Enter a new substitution string.  
 Select **Add Substitution** to accept the new entry.

6. Select **Add Substitution**.
7. Select **Apply** to accept all changes.

## Trunk Accounts SIP Outbound Match ANI Add/Replace Diversion/P-Asserted-Identity

This feature can only be reviewed and altered using the CLI.

1. Access the CLI.
2. From the Enable mode, enter the command **show running-config voice trunk** <Txx> where <Txx> is the trunk two-digit identifier.
3. Review the output for any existing diversion or p-asserted-identity entries that may conflict with the new TAC configuration. Make changes as necessary.
4. Refer to *Modifying SIP Headers on SIP Trunks in AOS Voice Products* for more information.

## Debug Commands

There are several debug messages that can be enabled to assist in troubleshooting your TAC configuration. Debug messages are displayed in real time. You can activate multiple debug messages simultaneously.

Use the **debug voice summary** command to activate debug messages associated with voice functionality. Use the **no** form of this command to disable the debug messages. To enable voice debug messages, enter the command as follows:

```
>enable
```

```
#debug voice summary
```

Use the **debug sip stack messages** command to activate debug messages associated with SIP messaging. Use the **no** form of this command to disable the debug messages. To enable sip stack message debug messages, enter the command as follows:

```
>enable
```

```
#debug sip stack message
```

## Additional Resources

There are additional resources available to aid in configuring your AOS unit. Many of the topics discussed in this guide are complex and require additional understanding. The documents listed below are available online at ADTRAN's Support Forum at <https://supportforums.adtran.com>.

- *AOS Command Reference Guide*
- *AOS Voice International Configuration Guide*
- *Configuring the Auto Attendant for the NetVanta 7000 Series*
- *Configuring User Accounts on the NetVanta 7000 Series*
- *NetVanta 7100 Administrator's Guide*
- *Upgrading Firmware in AOS*

## Appendix A: Dial Strings and Dial Plan Templates

### IP Phone Extension Dial Strings

The extension dial strings set the order-independent list of dial string templates that, when matched against the user's dial input, enable the phone to recognize a completed dial string. For example, the default list allows both 7-digit (**9,[2-9]xxxxxx.T**) and 10-digit (**9,[2-9]xx[2-9]xxxxxx**) local dialing. If users always dial seven digits for local calls, remove the **T** from the 7-digit string, and remove the 10-digit string entirely. If users always dial 10 digits, remove the 7-digit string entirely.

Valid input values:

- Digit **0** through **9**: Matches the exact digit.
- Wildcard (**X**): Matches any single digit
- Brackets (**[]**): Matches a range of digits. To match a single digit, simply enter that digit. To match a range of digits, enter the first and last digit separated by a hyphen.
- Timeout (**T**): Matches the default timeout value of 3 seconds. This allows an arbitrary-length string to be completed once the timeout expires.
- Comma (**,**): When encountered on a partial match of a dial string, the phone will turn dial tone back on. Useful for returning tone after dialing the trunk access code (9) to access an outside line.
- Period (**.**): Matches zero or more occurrences of the previous dial string value. Useful for matching against arbitrary-length strings like international numbers.

### Dial Plan Pattern Templates

The dial plan templates consists of number patterns using wildcards to represent the variety of possible number sequences dialed on the system. The system recognizes the dialed number as a particular call type and matches it against the user's CoS to determine if permission exists to make the call. The dial plan templates use numbers, characters, and wildcards to define them as explained below.

Valid characters for templates are as follows:

- 0 - 9** Match the exact digit(s) only
- X** Match any single digit 0 through 9
- N** Match any single digit 2 through 9
- M** Match any single digit 1 through 8
- \$** Match any number string dialed
- []** Match any digit in the list within the brackets (for example, [1,4,6])
- ,()** Formatting characters that are ignored but allowed
- Use within brackets to specify a range, otherwise ignored

The following are example template entries using wildcards:

- 1) **NXX-XXXX** Matches any 7-digit number beginning with 2 through 9.
- 2) **1-NXX-NXX-XXXX** Matches any number with a leading 1, then 2 through 9, then any 2 digits, then 2 through 9, then any 6 digits.
- 3) **555-XXXX** Matches any 7-digit number beginning with 555.

- 4) XXXX\$ Matches any number with at least 5 digits.
- 5) [7,8]\$ Matches any number beginning with 7 or 8.
- 6) 1234 Matches exactly 1234.

Some template number rules:

- 1) All brackets must be closed with no nesting of brackets and no wildcards within the brackets.
- 2) All brackets can hold digits and commas, for example: [1239]; [1,2,3,9]. Commas are implied between numbers within brackets and are ignored.
- 3) Brackets can contain a range of numbers using a hyphen, for example: [1-39]; [1-3,9].
- 4) The \$ wildcard is only allowed at the end of the template, for example: 91256\$; XXXX\$.