



Grandstream Networks, Inc.

How To Manage Inbound Route/Outbound Route on UCM6510/UCM6100



Index

Table of Contents

OVERVIEW	3
MANAGING OUTBOUND ROUTE	4
USING SOURCE CALLER ID FILTER	4
USING PRIVILEGE LEVEL	6
<i>LOCAL EXTENSION PERMISSION</i>	7
<i>IVR PERMISSION</i>	8
<i>DISA PERMISSION</i>	9
<i>INBOUND ROUTE PERMISSION</i>	10
OUTBOUND CALLER ID/DOD CONFIGURATION.....	12
TRUNK CALLER ID	12
TRUNK DOD.....	13
EXTENSION CALLER ID.....	14
GLOBAL OUTBOUND CALLER ID	15
OUTBOUND CALLER ID PRIORITY.....	16
MANAGING INBOUND ROUTE	18
DID PATTERN CONFIGURATION	18
DID MODE	19
PERPEND TRUNK NAME TO CALLER ID FOR INBOUND CALL.....	20

Table of Figures

Figure 1: Create an Outbound Route.....	4
Figure 2: Enable Filter on Source Caller ID	5
Figure 3: Privilege Level for Outbound Rule	6
Figure 4: Extension Permission on UCM6510/UCM6100.....	8
Figure 5: IVR Permission Default Setting	9
Figure 6: DISA Permission	9
Figure 7: Create an Inbound Route	10
Figure 8: SIP Trunk Caller ID	12
Figure 9: DOD Extension Selection	14
Figure 10: Edit DOD.....	14
Figure 11: Extension Caller ID	15
Figure 12: Global Outbound CID	16

Figure 13: Edit Inbound Rule - DID Pattern	18
Figure 14: DID Pattern Example	19
Figure 15: Edit SIP Trunk – DID Mode.....	20
Figure 16: Edit Inbound Rule – Prepend Trunk Name.....	21

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OVERVIEW

This document presents instructions for uses to manage outbound routes and inbound routes on the UCM6510 and UCM6100.

Firstly we introduce how to use source caller ID filter and privilege level to control outbound calls. The UCM6510/UCM6100 support two ways to define source caller ID filter:

- Selecting allowed extensions
The permission and privilege settings are used to control the outbound calls generated from extension, IVR, DISA, and inbound route so that the UCM6510/UCM6100 can securely handle the calls as desired.
- Defining allowed extension/extension pattern
This specifies the extensions to be allowed to use the outbound rule.

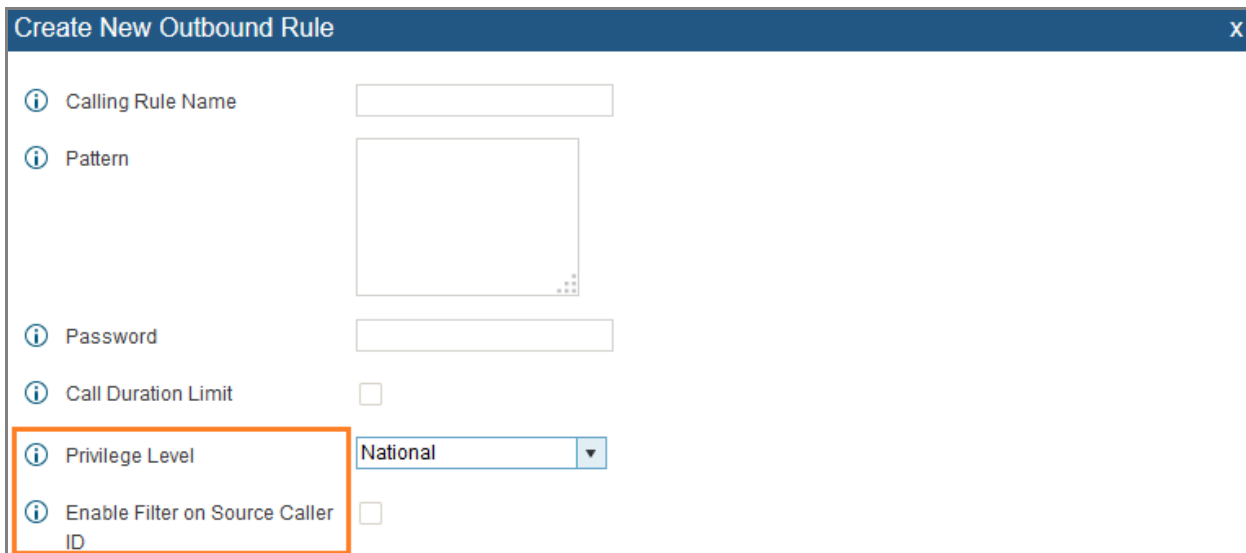
Then we introduce how to configure caller ID and DOD for outbound calls. Users could configure caller ID at 4 different places on UCM6510/UCM6100 web GUI. Caller ID configured at different places has different priority. Caller ID with higher priority will override the one with lower priority.

Next we introduce how to use DID pattern to control inbound calls. Only calls matching the DID pattern will be allowed to go through the inbound rule.

Finally we give a brief instruction of “Prepend Trunk Name” and “DID Mode” options.

MANAGING OUTBOUND ROUTE

There are two methods to manage the outbound route, **Privilege Level** and **Source Caller ID Filter**. When creating/editing an outbound rule under web UI->**PBX->Basic/Call Routes->Outbound Routes**, users shall see "Privilege Level" option and "Enable Filter on Source Caller" options as shown in the following figure.



The screenshot shows a web form titled "Create New Outbound Rule". The form contains the following fields and options:

- Calling Rule Name: Text input field.
- Pattern: Text area.
- Password: Text input field.
- Call Duration Limit: Checkbox (unchecked).
- Privilege Level: Dropdown menu with "National" selected.
- Enable Filter on Source Caller ID: Checkbox (unchecked).

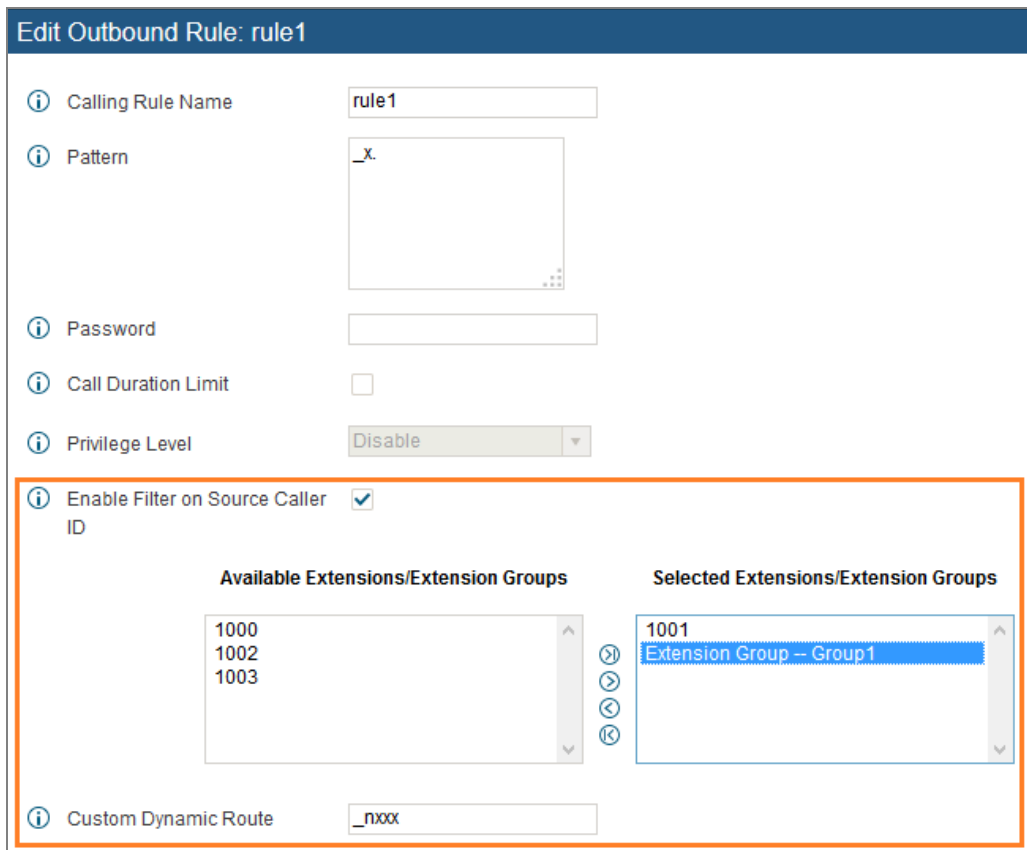
An orange rectangular box highlights the "Privilege Level" dropdown and the "Enable Filter on Source Caller ID" checkbox.

Figure 1: Create an Outbound Route

Basically, these two options are used as two ways to control outbound route permissions to decide which extensions are allowed to use the outbound rule to call external numbers. In the following two sections, we will separately introduce in details how to configure the two options to control extensions using trunk to make outbound calls.

USING SOURCE CALLER ID FILTER

When creating/editing an outbound rule under web UI->**PBX->Basic/Call Routes->Outbound Routes**, select "Enable Filter on Source Caller ID" checkbox to enable it.



Edit Outbound Rule: rule1

Calling Rule Name: rule1

Pattern: _x.

Password: [Empty]

Call Duration Limit:

Privilege Level: Disable

Enable Filter on Source Caller ID

Available Extensions/Extension Groups: 1000, 1002, 1003

Selected Extensions/Extension Groups: 1001, Extension Group -- Group1

Custom Dynamic Route: _nxxx

Figure 2: Enable Filter on Source Caller ID

After “Enable Filter on Source Caller ID” option is enabled, “Privilege Level” option is automatically disabled (turned into grey) and more options will show up for user to configure the filter. There are two ways to configure the source caller ID:

1. Select extensions/extension groups

Select extensions/extension groups from “Available Extensions/Extension Groups” to “Selected Extensions/Extension Groups”. Only selected extensions/extension groups are allowed to use this outbound rule to make outbound calls.

2. Custom Dynamic Route

User could define the pattern for the source caller ID by configuring “Custom Dynamic Route” option. This allows users to define extension range instead of selecting them one by one.

- All patterns are prefixed with the “_”.
- Special characters:
 - X: Any Digit from 0-9.
 - Z: Any Digit from 1-9.
 - N: Any Digit from 2-9.
 - “.”: Wildcard. Match one or more characters.

"!": Wildcard. Match zero or more characters immediately.

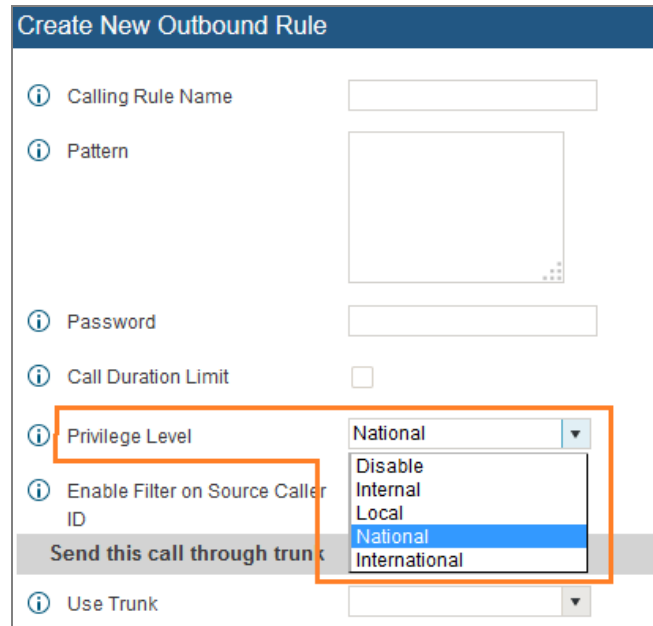
For example, if “Custom Dynamic Route” is configured as “_xxxx”, only extensions of 4 digits can use this outbound rule to make outbound calls.

If both of the above options are configured, they will take effect at the same time. Therefore the extension making the outbound call will either need to be an extension in the selected list or match the pattern defined in “Custom Dynamic Route” option.

For example, for the configurations shown in **[Figure 2: Enable Filter on Source Caller ID]**, assuming “Extension Group - Group1” contains extensions 1002 and 1003, then in this UCM6510/UCM6100 system, the extensions 1001, 1002, 1003 and other 4-digit extensions with first digit being 2-9 are allowed to use this outbound rule to call external numbers.

USING PRIVILEGE LEVEL

When creating/editing an outbound rule under web UI->**PBX->Basic/Call Routes->Outbound Routes**, users shall see "Privilege Level" with “Disable” and 4 levels in the drop down list.



The screenshot shows the 'Create New Outbound Rule' configuration page. The 'Privilege Level' dropdown menu is open, displaying the following options: National, Disable, Internal, Local, National (highlighted), and International. The 'Send this call through trunk' checkbox is checked. Other fields include Calling Rule Name, Pattern, Password, Call Duration Limit, Enable Filter on Source Caller ID, and Use Trunk.

Figure 3: Privilege Level for Outbound Rule

 **Note:**

- Setting “Privilege Level” to “Disable” will lead to the outbound route unavailable unless “Enable Filter on Source Caller ID” option is enabled to control outbound permission. Basically, selecting “Disable” means to disable the outbound rule and thus no outbound call can be placed through this outbound rule.
 - The permission level/privilege level option “Internal” “Local” “National” or “International” does not necessarily mean internal calls between extensions, local calls, national calls or international long distance calls in literal. They are basically 4 levels from lowest to highest for the users to identify and manage the routes. If users would like to make local, national or international calls via the UCM6510/UCM6100, the users need make sure the trunk using the outbound route has the capability to handle and route local, national or international calls by itself first.
-

The supported 4 privilege levels are “Internal”, “Local”, “National” and “International” from the lowest to the highest. When an outbound call is initiated to go through an outbound rule on UCM6510/UCM6100, the UCM6510/UCM6100 will compare the source caller’s permission level with the outbound rule’s privilege level. If the source caller’s permission level is higher than or equal to the outbound route’s privilege level, the call will be allowed to go through.

On the UCM6510/UCM6100, an outbound call can be initiated by the following sources (in other words, possible sources of outbound calls):

- a local extension on UCM6510/UCM6100
- an IVR
- a DISA
- Or an inbound route through which an external number is calling in.

In the following sections, we will introduce how to configure the permission levels for each of them.

LOCAL EXTENSION PERMISSION

Once the outbound route is created with a proper privilege level, the administrator could decide which extensions could use this outbound rule to dial external numbers by configuring “Permission” for each extension. On the UCM6510/UCM6100 web GUI, create/edit an extension under **PBX->Basic/Call Routes->Extensions**. Users shall see “Permission” option with four levels in the drop down list.

Edit Extension : 1000

General

Extension	1000	CallerID Number	
Permission	Internal	SIP/IAX Password	admin1
Enable Voicemail		Voicemail Password	619820
Call Forward Unconditional		CFU Time Condition	All Time

Figure 4: Extension Permission on UCM6510/UCM6100

The extension needs to be assigned with higher or equal level permission compared to the outbound route's privilege level in order to make outbound calls using that route.

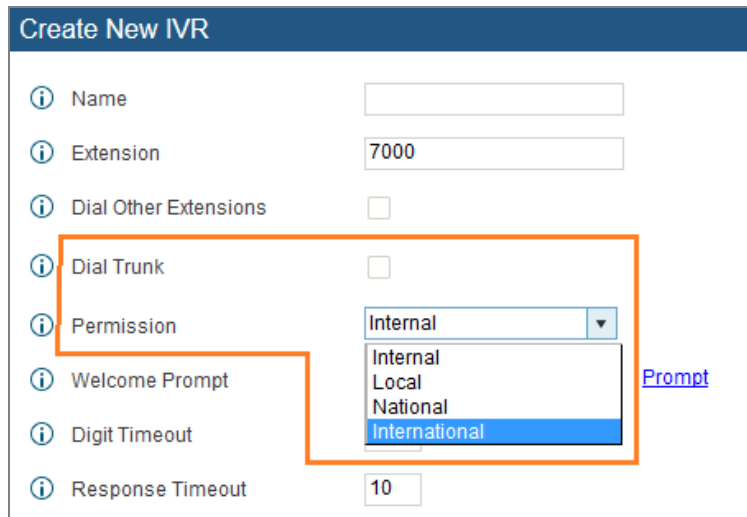
When making an outbound call via a route from an UCM6510/UCM6100 extension, the UCM6510/UCM6100 will compare the extension's permission level with the outbound route's privilege level. If the extension's permission level is higher than or equal to the outbound route's privilege level, the call will be allowed to go through.

Please see more descriptions for each permission level below:

- If an outbound rule is set to **"Internal"**: All extensions can use this rule.
- If an outbound rule is set to **"Local"**: Extensions with Local, National, or International level are allowed to use this rule.
- If an outbound rule is set to **"National"**: Extensions with National or International level are allowed to use this rule.
- If an outbound rule is set to **"International"**: Only extensions with international level can use this rule.

IVR PERMISSION

When creating/editing an IVR under **PBX->Call Features->IVR**, users shall see "Dial Trunk" and "Permission" options.



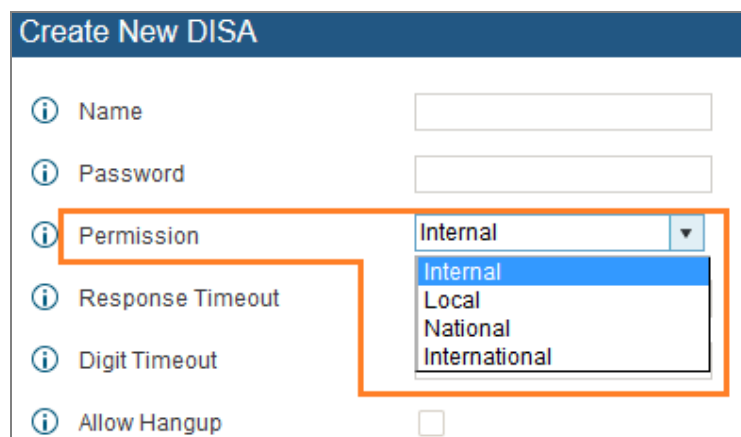
The screenshot shows the 'Create New IVR' configuration page. The 'Permission' dropdown menu is open, showing four options: Internal, Local, National, and International. The 'International' option is currently selected and highlighted in blue. An orange box highlights the 'Dial Trunk' checkbox (which is unchecked) and the 'Permission' dropdown menu. A blue link labeled 'Prompt' is visible to the right of the dropdown menu.

Figure 5: IVR Permission Default Setting

By default, the "Dial Trunk" option is disabled. To allow users calling into this IVR to use trunk to dial external numbers, the administrator should first enable "Dial Trunk" option and select a proper level for "Permission" option. The UCM6510/UCM6100 will then compare the IVR's permission level with the outbound route's privilege level. Only if the IVR's permission level is higher than or equal to the outbound route's privilege level, the call will be allowed to go through.

DISA PERMISSION

When creating/editing a DISA under web UI->**PBX->Call Features->DISA**, users shall see "Permission" options with 4 levels in the drop down list.



The screenshot shows the 'Create New DISA' configuration page. The 'Permission' dropdown menu is open, showing four options: Internal, Local, National, and International. The 'Internal' option is currently selected and highlighted in blue. An orange box highlights the 'Permission' dropdown menu and the 'Response Timeout' field.

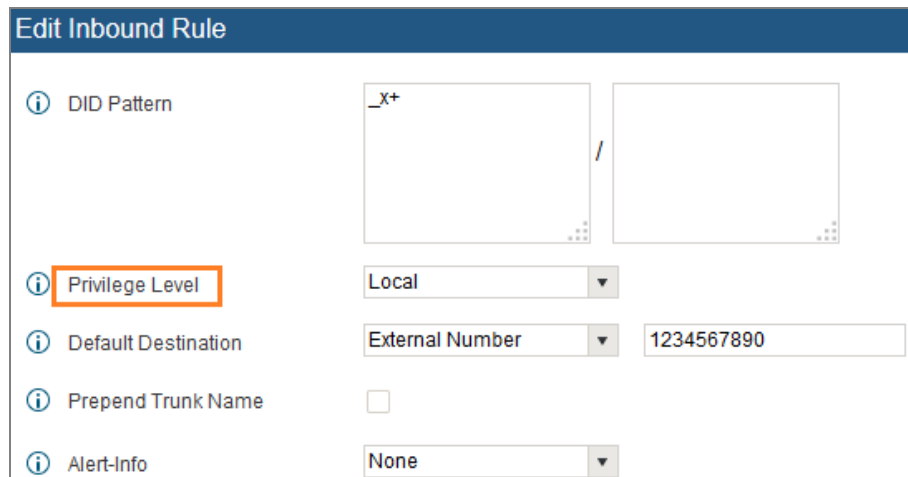
Figure 6: DISA Permission

To allow calls routed to this DISA to use trunk to dial external numbers, the administrator should select a proper level for "Permission" option. Once a DISA is created, users can configure the inbound route destination as "DISA" or IVR key event as "DISA". When a call is routed to DISA, the caller will be first asked to enter password, then a second dial tone will be played and the caller could enter the external numbers to dial outbound calls. At this time, the UCM6510/UCM6100 will compare the DISA's permission level with the outbound route's privilege level. Only if the DISA's permission level is higher than or equal to the outbound route's privilege level, the call will be allowed to go through.

INBOUND ROUTE PERMISSION

When an external number calls into UCM6510/UCM6100 through an inbound route, it will be directed to the default destination configured for that inbound route. If "Default Destination" of that inbound route is selected as "By DID" or "External Number", the call could be routed out to another external number through an outbound route on the UCM6510/UCM6100. In this case, the administrator need to configure the "Privilege Level" of that inbound route to control whether it is allowed to direct calls out to external numbers.

When creating/editing an inbound rule under web UI->**PBX->Basic/Call Routes->Inbound Routes**, users shall see "Privilege Level" option.



Edit Inbound Rule	
<p><i>i</i> DID Pattern</p>	<input type="text" value="_X+"/>
<p><i>i</i> Privilege Level</p>	Local ▼
<p><i>i</i> Default Destination</p>	External Number ▼ <input type="text" value="1234567890"/>
<p><i>i</i> Prepend Trunk Name</p>	<input type="checkbox"/>
<p><i>i</i> Alert-Info</p>	None ▼

Figure 7: Create an Inbound Route

This "Privilege Level" option applies to the inbound rule only when "Default Destination" is set to "External Number" or "by DID". (IVR is handled in a different way; the other options in the "Default Destination" can be considered as internal extension on the UCM6510/UCM6100)

When there is an incoming call from the trunk to the UCM6510/UCM6100 via this inbound route, if DID pattern in this inbound route matches one of the outbound route on the UCM6510/UCM6100, the

UCM6510/UCM6100 will compare the inbound route's privilege level with the matching outbound route's privilege level. If the inbound route's privilege level is higher than or equal to the matching outbound route's privilege level, the call will be allowed to go through.

OUTBOUND CALLER ID/DOD CONFIGURATION

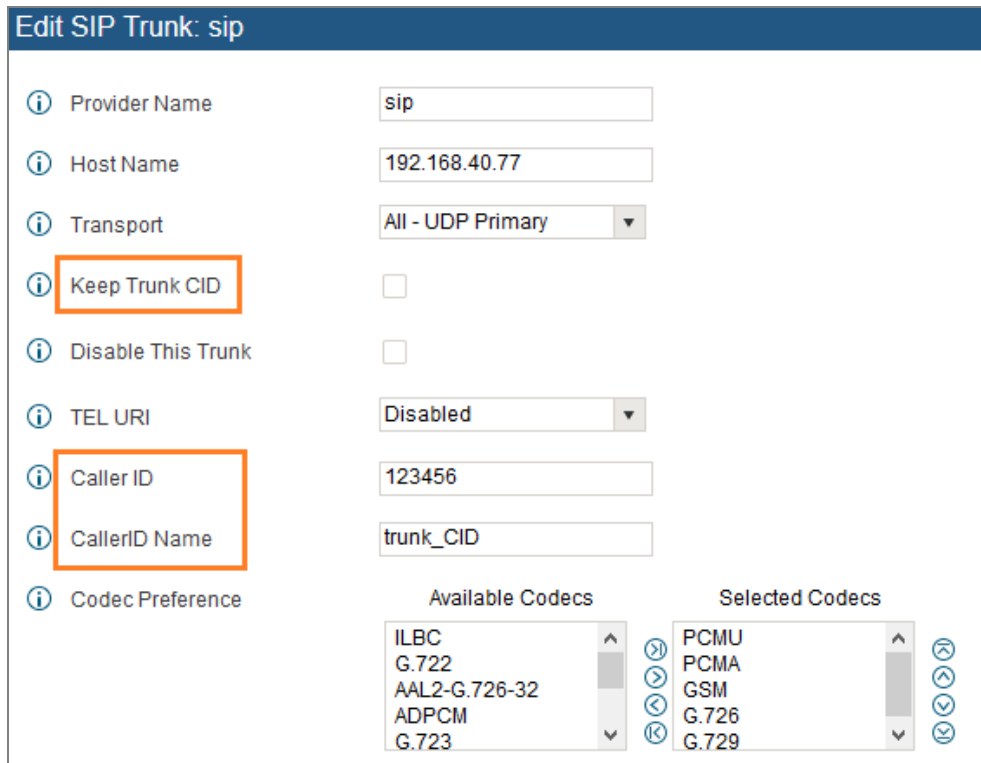
On UCM6510/UCM6100 web GUI, there are 4 places that allow users to configure the Caller ID to be displayed on the callee's LCD. We could name them as:

- Trunk Caller ID
- Trunk DOD
- Extension Caller ID
- Global Outbound Caller ID

In this section, we will introduce the configuration of each of them and their priority.

TRUNK CALLER ID

When editing a SIP peer trunk, users shall see “Keep Trunk CID”, “Caller ID” and “CallerID Name” options.



Edit SIP Trunk: sip

Provider Name: sip

Host Name: 192.168.40.77

Transport: All - UDP Primary

Keep Trunk CID:

Disable This Trunk:

TEL URI: Disabled

Caller ID: 123456

CallerID Name: trunk_CID

Codec Preference:

Available Codecs	Selected Codecs
ILBC	PCMU
G.722	PCMA
AAL2-G.726-32	GSM
ADPCM	G.726
G.723	G.729

Figure 8: SIP Trunk Caller ID

To have “Caller ID” and “CallerID Name” to take effect, users must enable “Keep Trunk CID” option. Only if

“Keep Trunk CID” is enabled, all outbound calls going through this trunk will use the “Caller ID” and “CallerID Name” configured for this trunk and have them displayed on the callee’s LCD.

If “Keep Trunk CID” is disabled, even if “Caller ID” and “CallerID Name” are configured with values, they will not be used as the caller ID of the outbound call.



TRUNK DOD

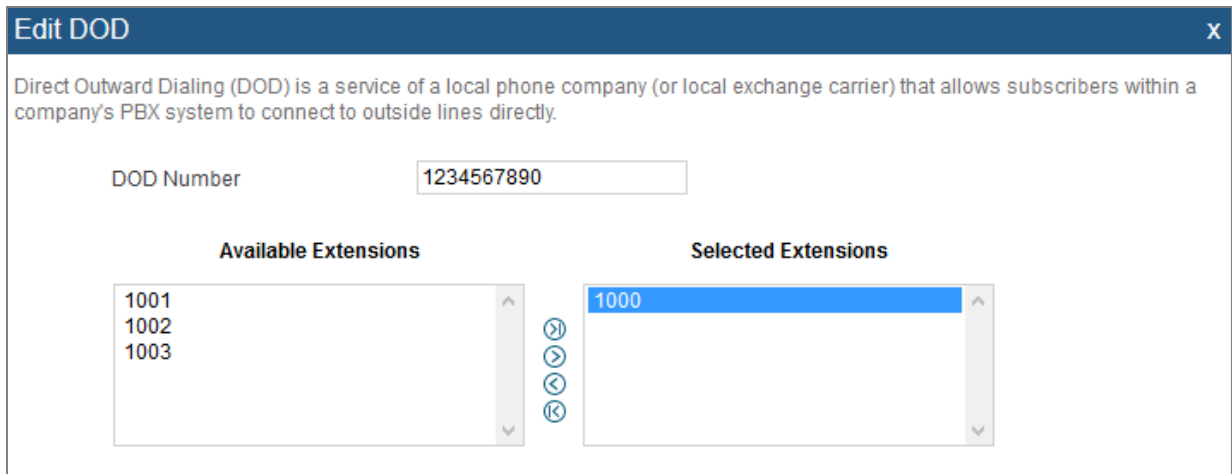
The UCM6510/UCM6100 provides Direct Outward Dialing (DOD) which is a service of a local phone company (or local exchange carrier) that allows subscribers within a company's PBX system to connect to outside lines directly.

Example of how DOD is used:

Company ABC has a SIP trunk. This SIP trunk has 4 DIDs associated to it. The main number of the office is routed to an auto attendant. The other three numbers are direct lines to specific users of the company. At the moment when a user makes an outbound call their caller ID shows up as the main office number. This poses a problem as the CEO would like their calls to come from their direct line. This can be accomplished by configuring DOD for the CEO’s extension.

Steps on how to configure DOD on the UCM:

1. To setup DOD go to UCM6510/UCM6100 web GUI->**PBX->Basic/Call Routes->VoIP Trunks** page.
2. Click  to access the DOD options for the selected SIP Trunk.
3. Click "Create a new DOD" to begin your DOD setup.
4. For "DOD Number", enter one of the numbers (DIDs) from your SIP trunk provider. In the example above, Company ABC received 4 DIDs from their provider. ABC will enter in the number for the CEO's direct line.
5. Select an extension from the "Available Extensions" list. Users have the option of selecting more than one extension. In this case, Company ABC would select the CEO's extension. After making the selection, click on the  button to move the extension(s) to the "Selected Extensions" list.



Edit DOD [X]

Direct Outward Dialing (DOD) is a service of a local phone company (or local exchange carrier) that allows subscribers within a company's PBX system to connect to outside lines directly.

DOD Number:

Available Extensions

- 1001
- 1002
- 1003

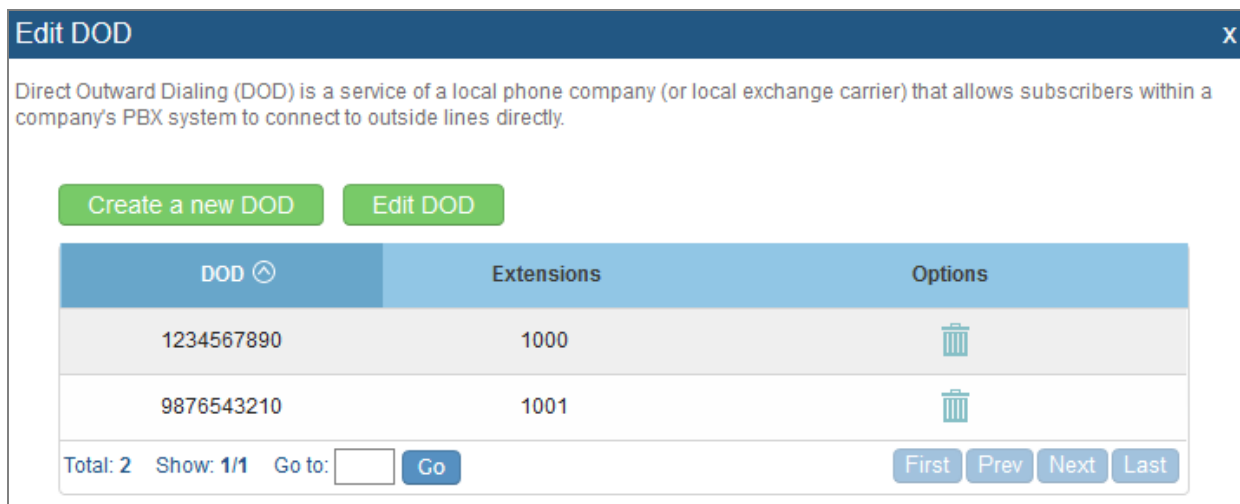
Selected Extensions

- 1000

Figure 9: DOD Extension Selection

6. Click "Save" at the bottom and "Apply Changes" on the top.

Once completed, the user will return to the "Edit DOD" page that shows all the extensions that are associated to a particular DOD.



Edit DOD [X]

Direct Outward Dialing (DOD) is a service of a local phone company (or local exchange carrier) that allows subscribers within a company's PBX system to connect to outside lines directly.

[Create a new DOD](#) [Edit DOD](#)

DOD	Extensions	Options
1234567890	1000	
9876543210	1001	

Total: 2 Show: 1/1 Go to: [Go](#) [First](#) [Prev](#) [Next](#) [Last](#)

Figure 10: Edit DOD

EXTENSION CALLER ID

When creating/editing an extension, users shall see options "CallerID Number", "First Name" and "Last Name".

Edit Extension : 1000

General			
Extension	1000	CallerID Number	
Permission	Internal	SIP/IAX Password	admin1
Enable Voicemail	<input checked="" type="checkbox"/>	Voicemail Password	619820
Call Forward Unconditional		CFU Time Condition	All Time
Call Forward No Answer		CFN Time Condition	All Time
Call Forward Busy		CFB Time Condition	All Time
Ring Timeout		Auto Record	<input type="checkbox"/>
Skip Voicemail Password Verification	<input type="checkbox"/>	Support Hot-Desking Mode	<input type="checkbox"/>
Disable This Extension	<input type="checkbox"/>	Music On Hold	default
User Settings			
First Name		Last Name	
Email Address		Language	Default

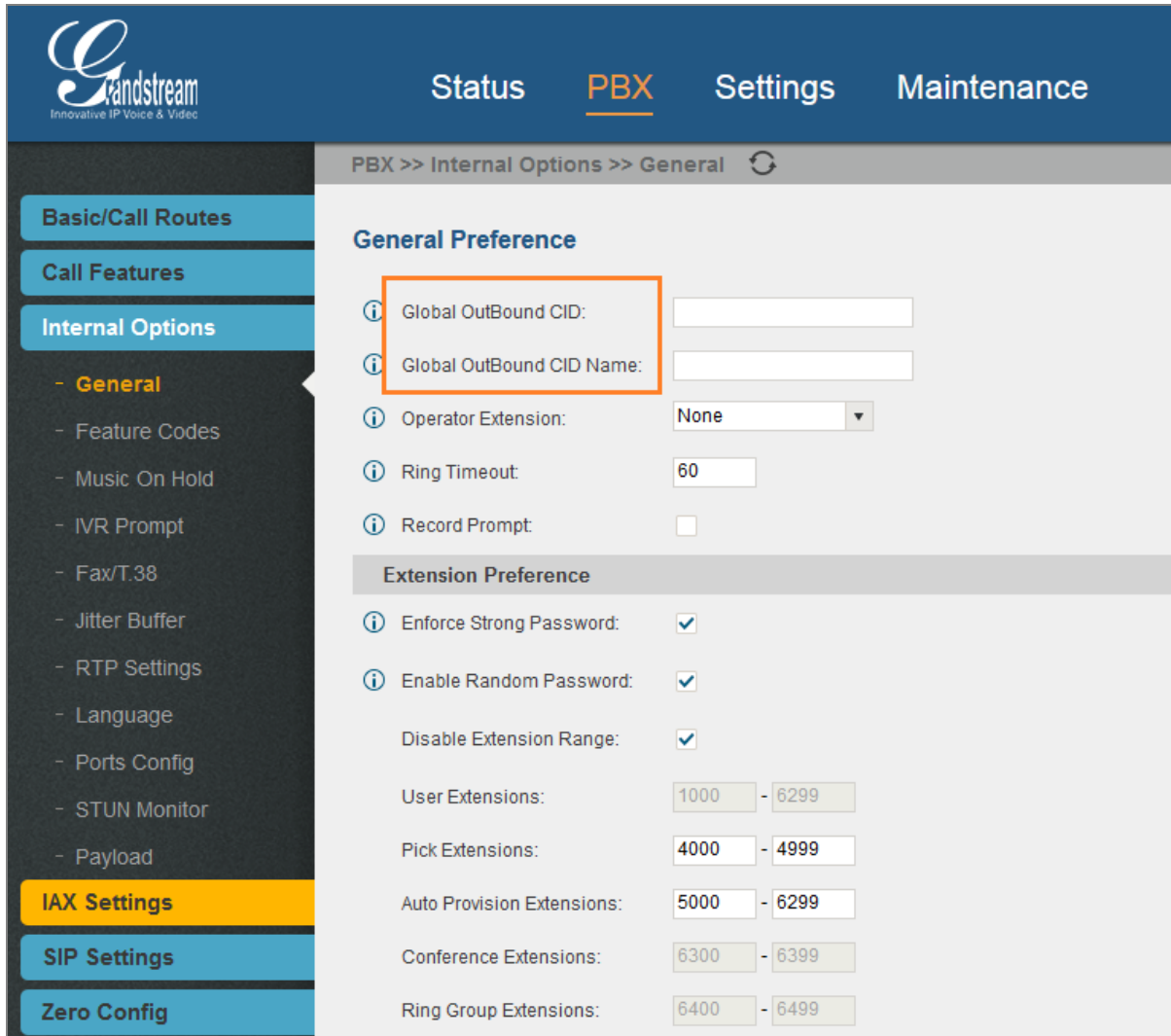
Figure 11: Extension Caller ID

“First Name” and “Last Name” together define caller ID name. When the extension makes an outbound call, its “CallerID Number”, “First Name” and “Last Name” will be used as the caller ID and caller ID name of the outbound call if the following conditions are satisfied:

- “Keep Trunk CID” of the trunk is disabled
- DOD of the trunk not configured

GLOBAL OUTBOUND CALLER ID

On UCM6510/UCM6100 web GUI->**PBX->Internal Options->General** page, users shall see “Global OutBound CID” and “Global Outbound CID Name” options:



The screenshot shows the Grandstream PBX settings interface. The top navigation bar includes 'Status', 'PBX', 'Settings', and 'Maintenance'. The 'PBX' tab is selected, and the breadcrumb path is 'PBX >> Internal Options >> General'. The left sidebar contains a menu with 'Internal Options' expanded to 'General'. The main content area is titled 'General Preference' and contains the following fields:

- Global OutBound CID: (text input field, highlighted with an orange box)
- Global OutBound CID Name: (text input field)
- Operator Extension: (dropdown menu, currently set to 'None')
- Ring Timeout: (text input field, value '60')
- Record Prompt: (checkbox, currently unchecked)

Below the 'General Preference' section is the 'Extension Preference' section, which includes:

- Enforce Strong Password: (checkbox, checked)
- Enable Random Password: (checkbox, checked)
- Disable Extension Range: (checkbox, checked)
- User Extensions: (range input, 1000 - 6299)
- Pick Extensions: (range input, 4000 - 4999)
- Auto Provision Extensions: (range input, 5000 - 6299)
- Conference Extensions: (range input, 6300 - 6399)
- Ring Group Extensions: (range input, 6400 - 6499)

Figure 12: Global Outbound CID

“Global Outbound CID” and “Global Outbound CID Name” will be used as call ID and call ID name of an outbound call if following conditions are satisfied:

- “Keep Trunk CID” of the trunk is disabled
- DOD of the trunk is not configured
- The extension initiating the outbound call doesn’t have caller ID number and caller ID Name configured

OUTBOUND CALLER ID PRIORITY

If trunk caller ID is configured and “Keep Trunk CID” is enabled, then trunk CID is of the highest priority. “Caller ID” and “CallerID Name” of the trunk will override caller ID configured in DOD, extension and global

settings.

If “Keep Trunk CID” is disabled, the priority of the other three caller id configuration is as following:

- DOD has the highest priority
- Extension CID has the second priority
- Global outbound caller ID has the lowest priority

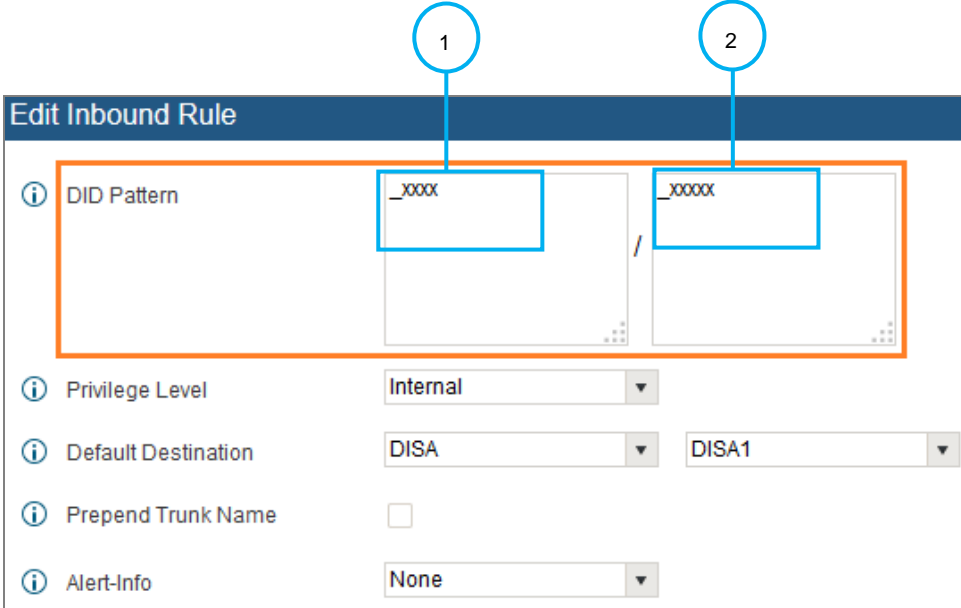
MANAGING INBOUND ROUTE

DID PATTERN CONFIGURATION

When creating/editing an inbound rule under **PBX->Basic/Call Routes->Inbound Routes**, users shall see "DID Pattern" option. User could use the following characters to define the DID pattern:

- X: Any Digit from 0-9.
- Z: Any Digit from 1-9.
- N: Any Digit from 2-9.
- ".": Wildcard. Match one or more characters.
- "!": Wildcard. Match zero or more characters immediately.

All patterns will be prefixed with “_”.



The screenshot shows the 'Edit Inbound Rule' configuration interface. The 'DID Pattern' field is highlighted with an orange border and contains two input boxes separated by a slash. The first box contains '_XXXX' and is labeled with a circled '1'. The second box contains '_XXXXX' and is labeled with a circled '2'. Below the DID Pattern field are other configuration options: Privilege Level (Internal), Default Destination (DISA), Prepend Trunk Name (checkbox), and Alert-Info (None).

Figure 13: Edit Inbound Rule - DID Pattern

1. The field BEFORE slash “/” defines the allowed pattern of the dialed number
2. The field AFTER the slash “/” defines the allowed pattern of the caller number

Only if both patterns are matched, the inbound call can successfully go through.

To illustrate it more clearly, here is an example. Assuming a peer trunk is configured between two UCM6100s.

1. An extension 10000 on UCM6100-A wants to call an extension 5000 on UCM6100-B.
2. This call must go through an inbound route configured on UCM6100-B to reach extension 5000. UCM6100-B will examine if the caller number and the dialed number match the DID pattern of the inbound rule.

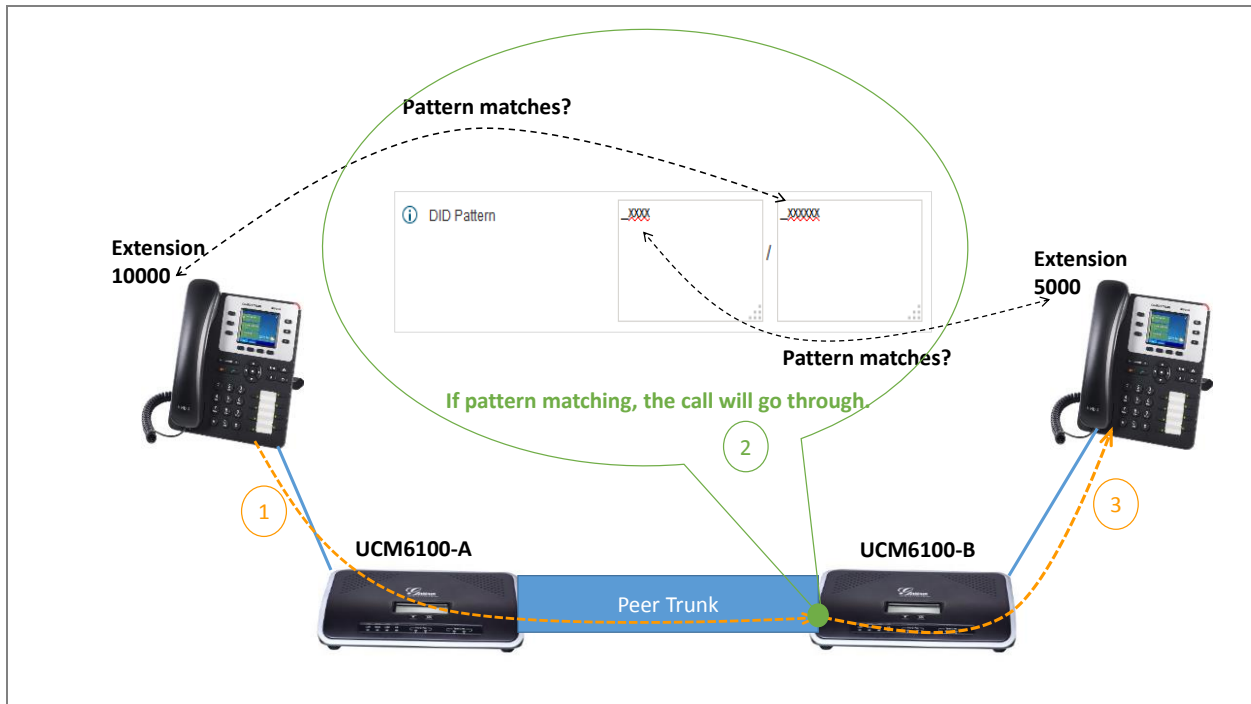


Figure 14: DID Pattern Example

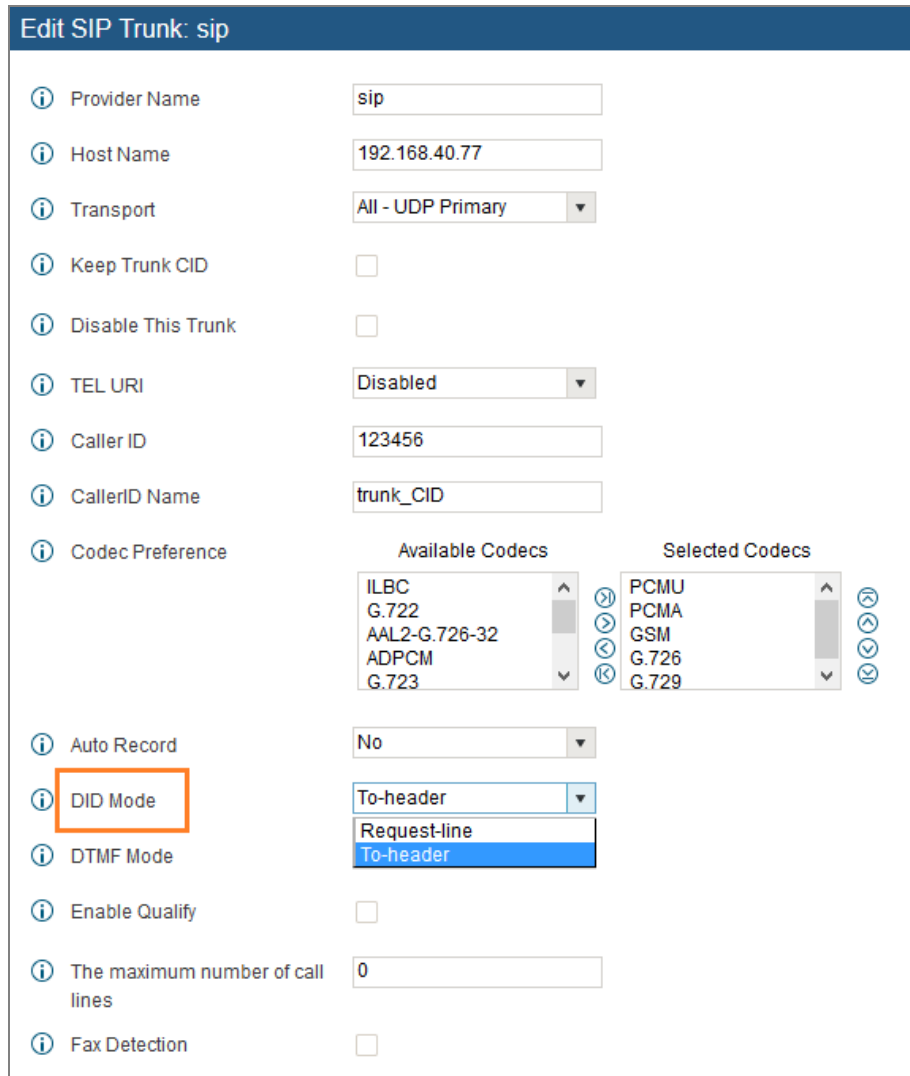
In this case, 10000 is the caller number and it will be restricted by the pattern defined in the second field and 5000 is the dialed number and it will be restricted by the pattern defined in the first field.

3. If the caller number and the destination number match the DID pattern, the call will successfully go through. In this example, assuming the inbound rule is configured with DID pattern shown in **[Figure 13: Edit Inbound Rule - DID Pattern]**, the call is allowed to go through.

DID MODE

When editing SIP peer trunk, users shall see “DID Mode” option. This options is for user to configure how to obtain the destination ID of an incoming SIP call. There are two modes available for uses to select:

To-header and Request-line. Select “To-header” to use To header in SIP message as the destination ID; select “Request-line” to use Request-line header in SIP message as the destination ID.



Edit SIP Trunk: sip

- Provider Name: sip
- Host Name: 192.168.40.77
- Transport: All - UDP Primary
- Keep Trunk CID:
- Disable This Trunk:
- TEL URI: Disabled
- Caller ID: 123456
- CallerID Name: trunk_CID
- Codec Preference:

Available Codecs	Selected Codecs
ILBC	PCMU
G.722	PCMA
AAL2-G.726-32	GSM
ADPCM	G.726
G.723	G.729
- Auto Record: No
- DID Mode**: To-header (dropdown menu open showing Request-line and To-header)
- DTMF Mode: To-header
- Enable Qualify:
- The maximum number of call lines: 0
- Fax Detection:

Figure 15: Edit SIP Trunk – DID Mode

PERPEND TRUNK NAME TO CALLER ID FOR INBOUND CALL

When creating/editing an inbound rule, user shall see “Prepend Trunk Name” option. If this option is enabled, UCM6510/UCM6100 will prepend the trunk name to the caller ID name for all incoming calls through this inbound rule. Therefore the caller ID name displayed on the called extension will be the trunk name plus the caller ID. Thus users would be able to tell from extension’s LCD which trunk the inbound call goes through.

Edit Inbound Rule X

DID Pattern /

Privilege Level

Default Destination

Prepend Trunk Name

Alert-Info

Time Condition

Time Condition

Figure 16: Edit Inbound Rule – Prepend Trunk Name

* Asterisk is a Registered Trademark of Digium, Inc.