



**Grandstream Networks, Inc.**

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Using UCM6510 as E1/T1/J1 Gateway



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## INTRODUCTION

The UCM6510 supports E1/T1/J1 which are physical connection technology used in digital network. T1 is the North American standard, J1 is used in Japan, whereas E1 is the European standard. This offers the possibility of deploying the UCM6510 as Digital Trunk with a Traditional PBX with E1, T1 or J1 interface allowing the possibility for clients behind the legacy PBX to benefit from VoIP capabilities.

This document will guide users how to configure the UCM6510 to act as Digital Gateway including inbound and outbound rules to allow routing calls from and to VoIP through the Digital Trunk.



Figure 1: Typical Architecture



## DIGITAL TRUNK CONFIGURATION

This chapter will introduce how to connect and configure a Digital trunk between a legacy PBX with a digital card (E1, T1 or J1) and UCM6510.

We consider that UCM6510 is already peered with the VoIP Provider via SIP Trunk, for more information on how to setup a VoIP trunk please refer to the [SIP Trunk Guide](#).

### Connecting Digital Port

To connect the UCM6510 with a legacy PBX having a digital card interface, users will need first to connect each others via a crossover cable depending on the digital trunk used, users could check with their Service Provider to get the correct cable.

The following figure shows the UCM6510's front view to locate the T1/E1/J1 port.

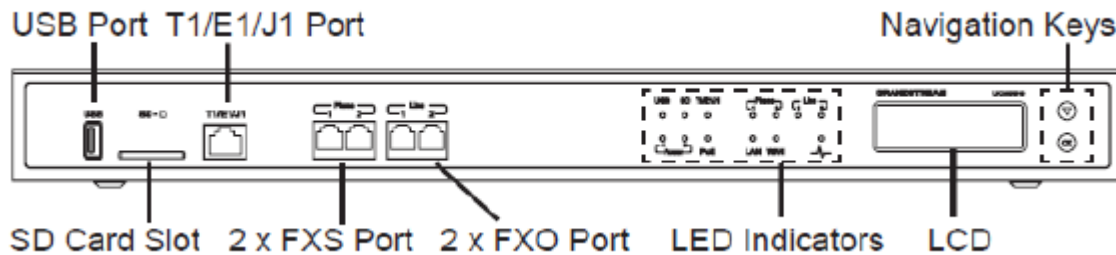


Figure 2: UCM6510 Front View


### Configuring Digital Trunk

After connecting digital ports of the UCM6510 and PBX, users will need to configure the port type and channels, in order to create a digital trunk.

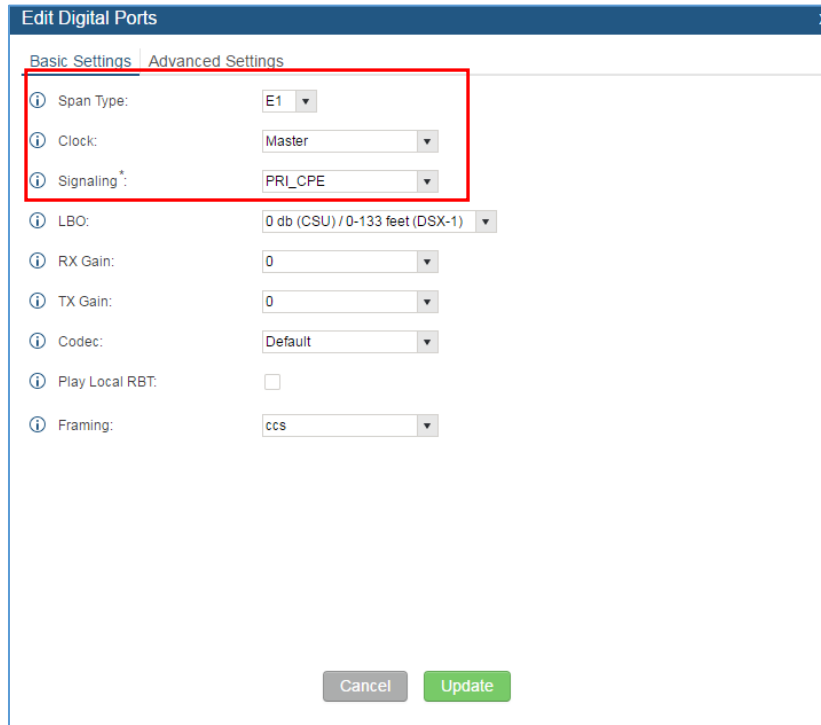
E1 Digital Trunk will be used as example to configure ports, channels and creating the Digital Trunk, and make the UCM6510 as Master while the legacy PBX will act as Slave.

### Configuring Digital Channels and Ports

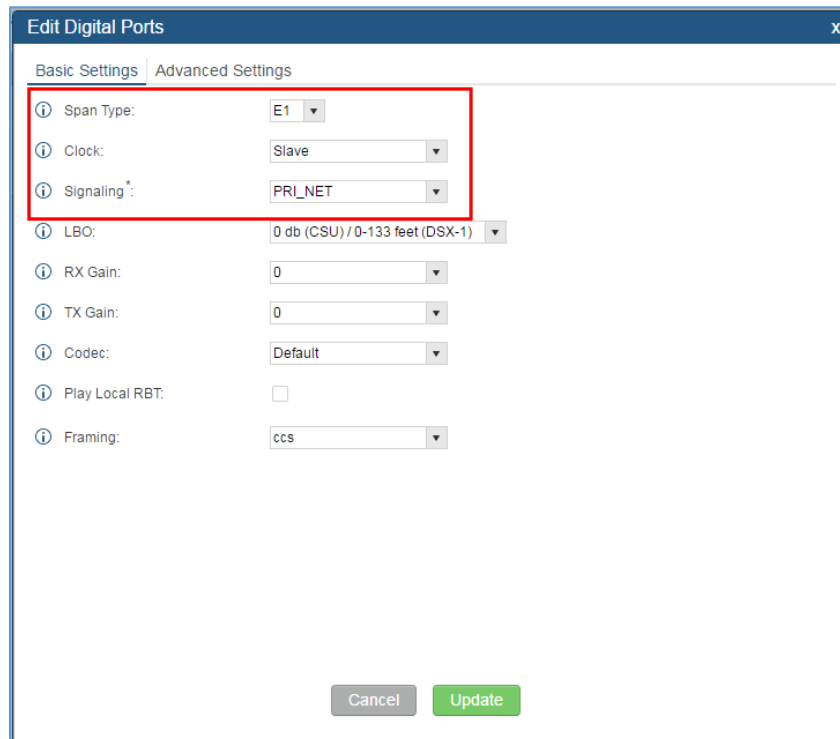
To configure digital channels and ports on UCM6510 please follow below steps:

1. Go to UCM6510 **WebUI->PBX->Ports Config-> Digital Hardware**.
2. Click on  under option to define the digital hardware type.
3. Set **Span Type** to digital trunk's type ("E1" in this example).
4. Set **Clock** to "Master" and **Signaling** to "PRI\_CPE" (assuming that the legacy PBX's digital card will act as Slave). Or set **Clock** to "Slave" and **Signaling** to "PRI\_NET" if legacy PBX is acting as Master.






**Figure 3: Editing Digital Ports on UCM6510 Acting as Master**

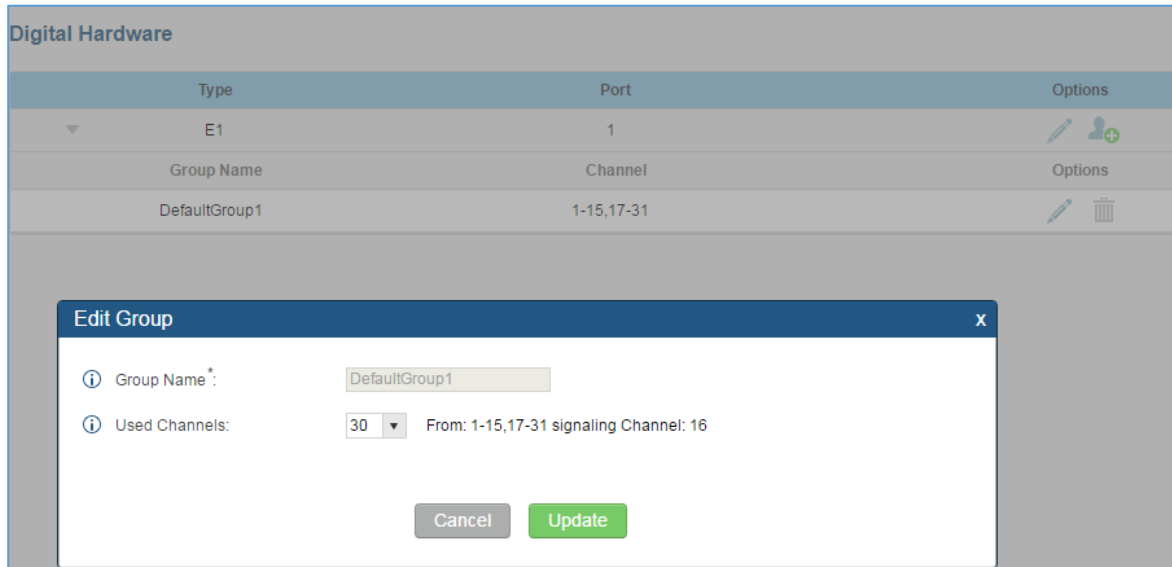


**Figure 4: Editing Digital Ports on UCM6510 Acting as Slave**

5. Click on **Update** button to save changes.




6. Access to **PBX->Ports Config->Digital Hardware** and click on  next to “DefaultGroup1” to set number of “Used Channels” on this trunk. By default, the group will be using all available channels. This step is optional.
7. Click on **Update**, then click on **Apply Changes** to save the settings.



**Figure 5: Selecting Channels**

#### Notes:

- The default setting in default group has all the channels included. Users will need to modify default group to make sure the number of used channels is within the max number of channels allowed for T1, E1 or J1. For example, channel 16 is always used in E1 for signaling (channel 24 in T1/J1).
- If all the channels are used in default group, users cannot create another group since all channels are already taken by default group.
- Users can create a new group using other available channels, by clicking on .

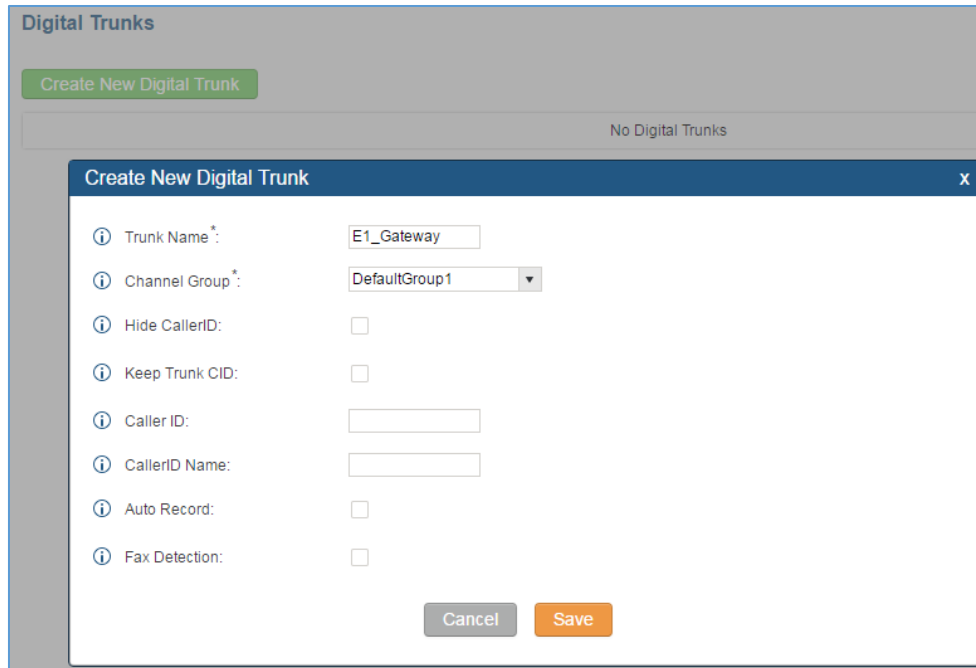
### Creating a Digital Trunk

After Configuring Ports and Channels, users can create a Digital Trunk to peer both traditional PBX and UCM6510.

To create a Digital Trunk, follow the below steps:

1. Go to UCM6510 **WebUI->PBX->Basic/Call Routes->Digital Trunks**.
2. Click on “Create New Digital Trunk”.
3. Set the Trunk’s Name, and select the Channel Group to be used (“DefaultGroup1” in this example).





**Figure 6: Create a Digital Trunk**

4. Click on **Save** button then **Apply Changes**.
5. Users can check the Trunk's status as well as its channels from **Status->PBX Status->PBX Status**.

Trunks <span>↻</span> <span>[ - ]</span>				
Status <span>⌵</span>	Trunks	Type	Username	Port/Hostname/IP
Available	E1_Gateway	E1 (CPE)	-	Ports 1 (1-15,17-31)

**Figure 7: Trunk's Status**

Digital Channels Status <span>↻</span> <span>[ - ]</span>							
Port 1	1	2	3	4	5	6	7
	8						
	9	10	11	12	13	14	15
	16						
	17	18	19	20	21	22	23
	24						
	25	26	27	28	29	30	31

**Figure 8: Channels Status**



## OUTBOUND/INBOUND ROUTES

Once the Digital Trunk is up and available, now we can configure the calling rules to allow users behind the legacy PBX without VoIP capability to receive/make calls through the UCM6510 acting as Digital Gateway, considering that a SIP Trunk is already set between the VoIP provider and UCM6510.

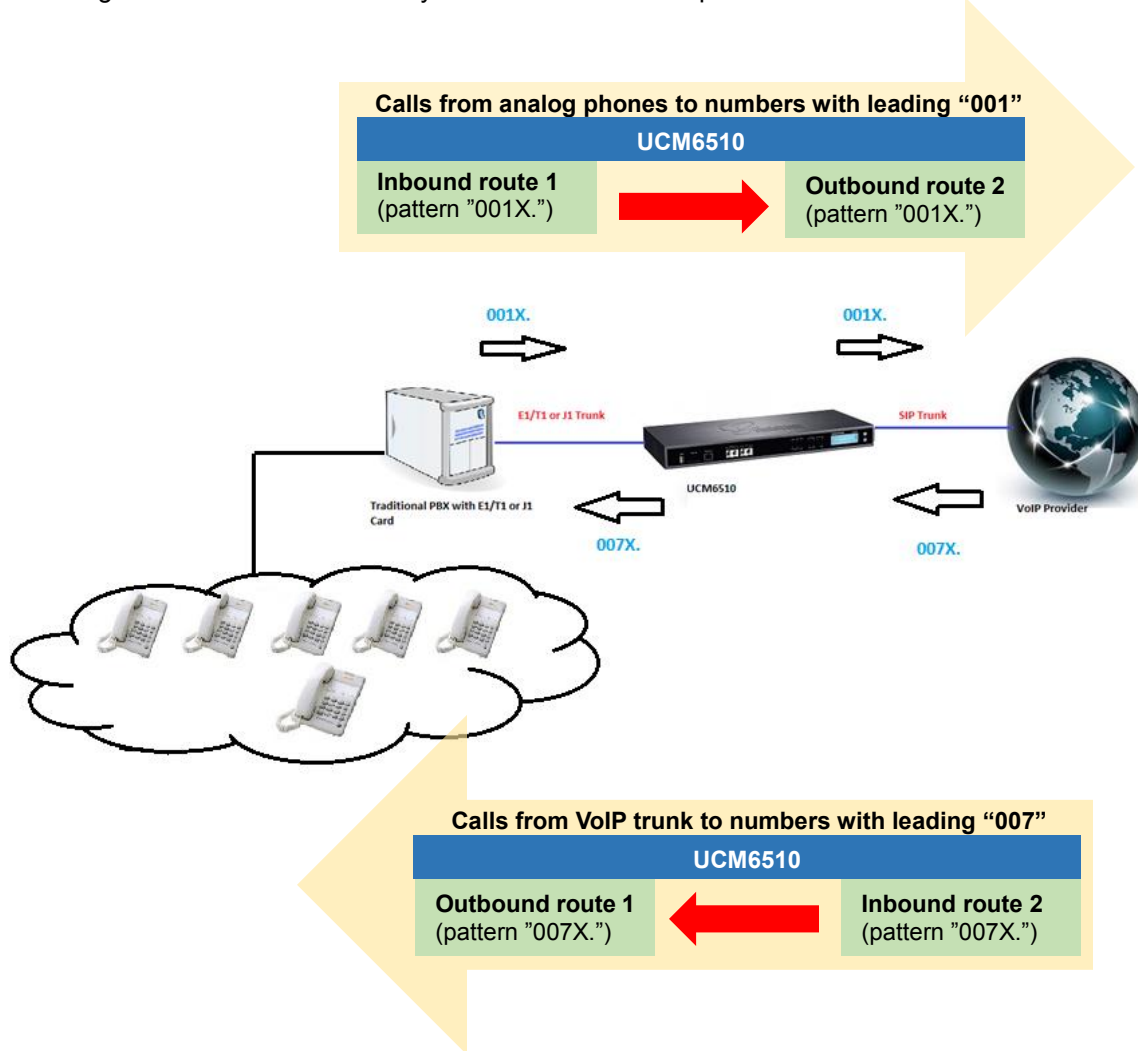


Figure 9: Inbound/Outbound Routes Example Scenario

In the above figure, we will use an example where phones behind the legacy PBX will dial numbers that begins 001 which will go through the UCM6510 acting as Digital Gateway, and receive calls that begins with 007.

Users can use this example, and change patterns to match their actual numbering plan.

For more details about configuring Inbound/Outbound routes, please refer to "[How to Manage Inbound / Outbound Routes on UCM6XXX](#)" guide.





## Creating Outbound Route

For this scenario, we need to create 2 outbound routes on UCM6510:

- **Outbound Route 1:** This route will allow outbound calls to numbers with leading 007 to go through Digital trunk (E1 trunk).
- **Outbound Route 2:** This route will allow outbound calls to numbers with leading 001 to go through VoIP trunk (VoIP provider).

Follow below steps to create outbound routes:

1. Go to UCM6510 **WebUI->PBX->Basic/Call Routes->Outbound Routes**.
2. Click on **“Create New Outbound Rule”**.
3. Set the following:
  - a. **Calling Rule Name:** Name to identify this rule (example: “E1\_Gateway\_OUT”).
  - b. **Pattern:** Matching rule to route outbound calls via the trunk (example: “\_007X.”).
  - c. **Privilege level:** Set privilege to allow callers with same level or higher to use this route.
4. Choose the Digital Trunk set earlier, in **Use Trunk** field.
5. Click on **Save** button, then **Apply Changes** to save the configuration.



Create New Outbound Rule
X

Calling Rule Name\*:

Pattern\*:

Disable This Route:

Call Duration Limit:

PIN Groups:

Password:

Privilege Level:  Warning: Setting privilege level at "Internal" has potential security risks.

Enable Filter on Source Caller

ID:

**Send This Call Through Trunk**

Use Trunk\*:

Strip:

Prepend:

**Use Failover Trunk:**

Trunks	Strip	Prepend	Options
Click to add failover trunk			

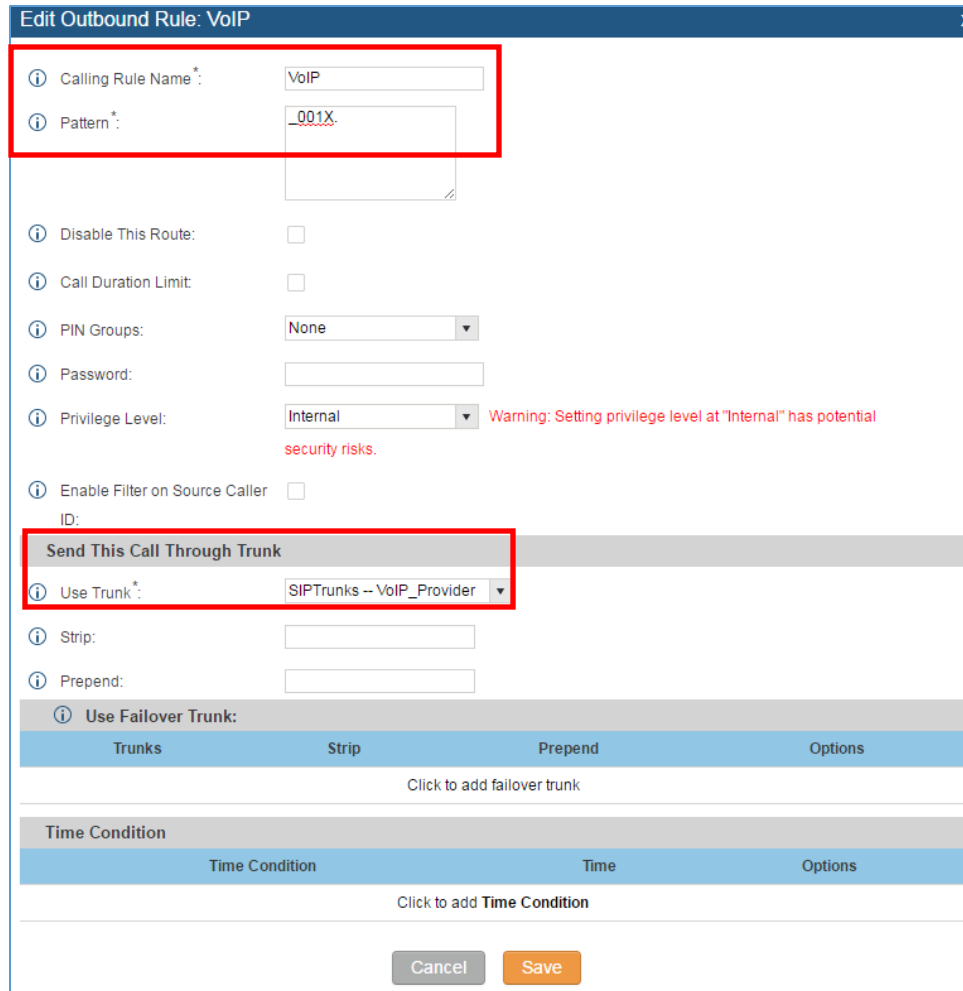
**Time Condition**

Time Condition	Time	Options
Click to add Time Condition		

**Figure 10: Outbound Rule through Digital Trunk**

Now that the first outbound route is created (for outbound calls through digital trunk), repeat above steps to create a new outbound route through VoIP trunk using 001X. as pattern. Refer to figure below.





**Edit Outbound Rule: VoIP**

Calling Rule Name\*: VoIP

Pattern\*: 001X

Disable This Route:

Call Duration Limit:

PIN Groups: None

Password:

Privilege Level: Internal Warning: Setting privilege level at "Internal" has potential security risks.

Enable Filter on Source Caller ID:

**Send This Call Through Trunk**

Use Trunk\*: SIPTrunks -- VoIP\_Provider

Strip:

Prepend:

**Use Failover Trunk:**

Trunks	Strip	Prepend	Options
Click to add failover trunk			

**Time Condition**

Time Condition	Time	Options
Click to add Time Condition		

Cancel Save

Figure 11: Outbound Rule through VoIP Provider

## Creating Inbound Route

For this scenario, we need to create 2 inbound routes on UCM6510 and should have option “Dial Trunk” enabled:

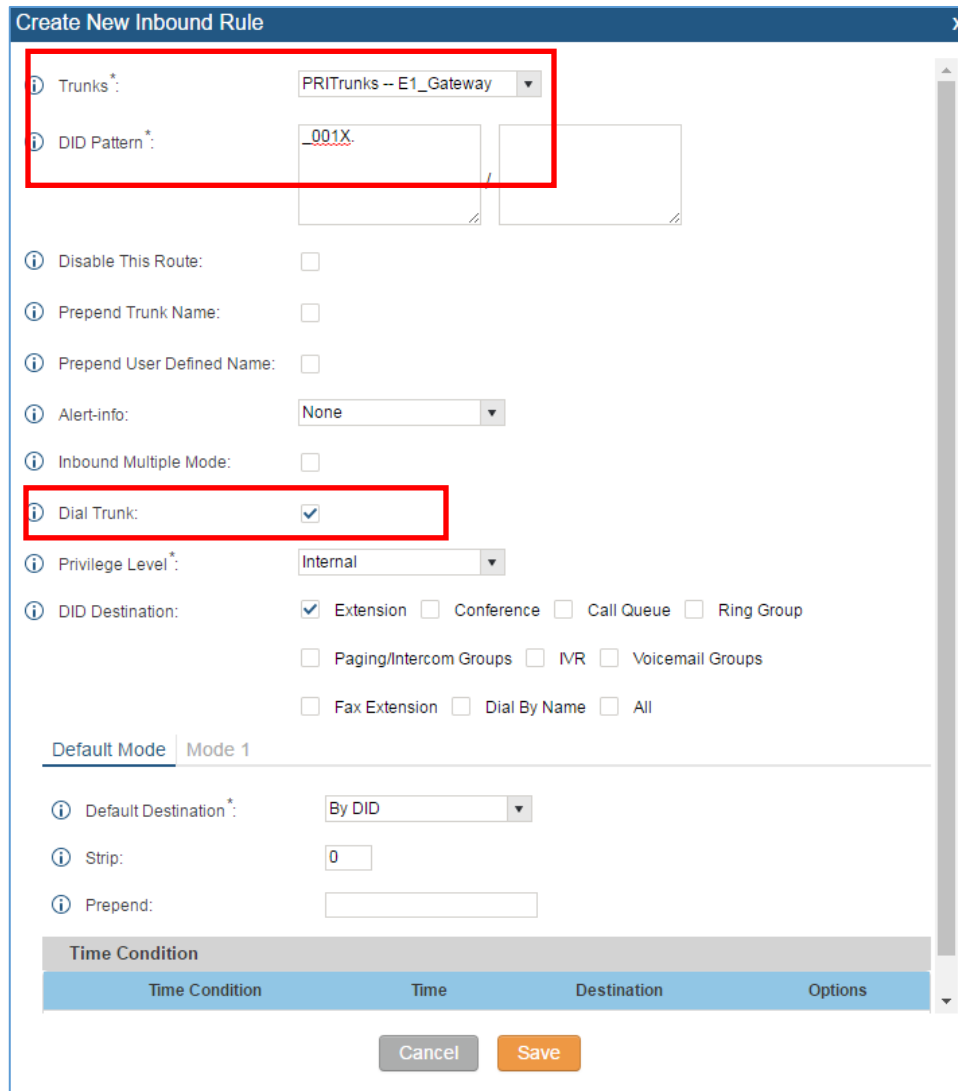
- **Inbound Route 1:** This route will allow incoming calls to numbers with leading 001 through Digital trunk (E1 trunk) to reach UCM6510 and be processed.
- **Inbound Route 2:** This route will allow incoming calls to numbers with leading 007 through VoIP trunk (VoIP provider) to reach UCM6510 and be processed.

Follow below steps to create inbound routes:

1. Go to UCM6510 **WebUI->PBX->Basic/Call Routes->Inbound Routes**.
2. Click on “**Create New Inbound Rule**”.
3. Select the Digital Trunk from **Trunks**.



4. Set the **DID pattern** (“\_001X.” used in our calling scenario example).
5. Set **Destination** as “ByDID”.
6. Make sure to check **Dial Trunk** to allow users to use the VoIP trunk with provider.
7. Click on **Save**, then **Apply Changes**.



**Create New Inbound Rule**

Trunks\*: PRITrunks -- E1\_Gateway

DID Pattern\*: \_001X.

Disable This Route:

Prepend Trunk Name:

Prepend User Defined Name:

Alert-info: None

Inbound Multiple Mode:

**Dial Trunk:**

Privilege Level\*: Internal

DID Destination:  Extension  Conference  Call Queue  Ring Group  
 Paging/Intercom Groups  IVR  Voicemail Groups  
 Fax Extension  Dial By Name  All

Default Mode | Mode 1

Default Destination\*: By DID

Strip: 0

Prepend:

**Time Condition**

Time Condition	Time	Destination	Options

Cancel Save

**Figure 12: Inbound Rule through Digital Trunk**

Now that the first inbound route is created (incoming calls through digital trunk), repeat above steps to create a new inbound route through VoIP trunk using “007X.” as pattern. Refer to figure below.



Create New Inbound Rule
x

**Trunks \***: SIPTrunks -- VoIP\_Provider ▼

**DID Pattern \***: 007X

**Disable This Route:**

**Prepend Trunk Name:**

**Prepend User Defined Name:**

**Alert-info:** None ▼

**Inbound Multiple Mode:**

**Dial Trunk:**

**Privilege Level \*:** Internal ▼

**DID Destination:**  Extension  Conference  Call Queue  Ring Group

Paging/Intercom Groups  IVR  Voicemail Groups

Fax Extension  Dial By Name  All

---

**Default Mode** | Mode 1

**Default Destination \*:** By DID ▼

**Strip:** 0

**Prepend:**

**Time Condition**

Time Condition	Time	Destination	Options
Click to add Time Condition			

Cancel
Save

**Figure 13: Inbound Rules through VoIP Trunk**

