



# Grandstream Networks, Inc.

---

UCM6XXX Series – Fax Server Guide



## Table of Contents

<b>INTRODUCTION.....</b>	<b>4</b>
<b>SETUP UCM6XXX WITH PHYSICAL FAX MACHINE .....</b>	<b>5</b>
FXS Extension Configuration .....	5
Connecting FAX Machine to UCM.....	7
<b>ROUTING FAX CALLS.....</b>	<b>7</b>
<i>Create Analog Trunk .....</i>	<i>8</i>
<i>Create VOIP Trunk.....</i>	<i>8</i>
<i>Sending/Receiving Fax Files using Fax Machine.....</i>	<i>9</i>
<b>UCM6XXX FAX VALUE ADDED FEATURES.....</b>	<b>12</b>
WEB GUI FAX SENDIND .....	12
USING FAX-TO-MAIL.....	13
<i>UCM Email Settings.....</i>	<i>13</i>
<i>Create/Edit Virtual Fax Extensions .....</i>	<i>15</i>
<i>Receiving FAX files using virtual Faxing.....</i>	<i>17</i>
Fax Detection and Intelligent Routing .....	18



## Table of figures

Figure 1: Create FXS Extension for Fax Machine (Basic Settings) .....	6
Figure 2: Create FXS Extension for Fax Machine (Media) .....	6
Figure 3: FXS Ports of UCM6510 (Example).....	7
Figure 4: Analog trunk for Fax.....	8
Figure 5: VOIP Trunk with Fax Detection.....	9
Figure 6: Inbound Route with FXS Extension as default destination .....	10
Figure 7: Outbound Route.....	11
Figure 8: Fax sending settings.....	12
Figure 9: Format Error Message .....	13
Figure 10: File Send Progress .....	13
Figure 11: Email Template for FAX.....	14
Figure 12: Create new Fax extension .....	15
Figure 13: Fax Settings .....	15
Figure 14: Inbound Route with Fax Extension as default destination.....	17
Figure 15: List of Fax Files.....	18
Figure 16: Fax intelligent Routing after a Fax signaling detection .....	18

## Table of tables

Table 1: FAX/T.38 Parameters .....	16
------------------------------------	----



## INTRODUCTION

Fax Server is one of the most useful and important UCM6xxx features that allows the user to send and receive Fax files. The UCM6xxx IP-PBX series support T.30 for legacy analog Fax transmissions along with T.38 and Pass-through for Fax Over IP. The UCM6xxx series provide a lot of options and methods to perform sending/receiving Fax files depending on user's resources and the way he/she wants to proceed.



UCM Fax Server supports T.38 which is a protocol that dictates how to send a fax over a computer data network and requires a T.38-capable VoIP service or gateway (please check with your service provider for this protocol support), otherwise the transmission of Fax will proceed via pass through using RTP for sending facsimile signals.

This guide describes the steps to follow in order to perform sending and receiving fax files when the user has an Analog Fax machine connected to UCM6xxx's FXS Port or when he only wants to use a virtual fax machine and benefit from the value-added features of the UCM6xxx related to fax.



## SETUP UCM6XXX WITH PHYSICAL FAX MACHINE

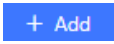


### FXS Extension Configuration

FXS (**F**oreign **x**change **s**tation) is any telephone interface that is used for end-user analog telephony equipment, (i.e. analog fax machine and analog phones) to provide battery power, dial tone and generate the ringing voltage and therefore the user needs to create a “FXS Extension” for the Fax machine to be used.

All the UCM IP-PBX models have two FXS ports to connect analog phone and Fax machine for typical SMB installations.

Please, refer to the following steps in order to create the FXS extension:

1. Go to UCM6xxx Web GUI → **Extension/Trunk** → **Extension**
2. Click on 
3. Under “Basic Settings”, configure the extension’s parameters.



Create New Extension Save

**Basic Settings**   Media   Features   Specific Time   Follow Me

\* Select Extension Type: FXS Extension

Select Add Method: Single

---

**General**

* Extension:	<input type="text" value="4000"/>	Analog Station:	<span style="border: 1px solid red; padding: 2px;">FXS 1</span>
CallerID Number:	<input type="text"/>	* Permission:	<span style="border: 1px solid gray; padding: 2px;">Internal</span>
Enable Voicemail:	<input checked="" type="checkbox"/>	* Voicemail Password:	<input type="text" value="81816310"/>
Skip Voicemail Password:	<input type="checkbox"/>	Send Voicemail to Email:	<span style="border: 1px solid gray; padding: 2px;">Default</span>
Verification:		Disable This Extension:	<input type="checkbox"/>

**Figure 1: Create FXS Extension for Fax Machine (Basic Settings)**

- Select the extension type to be “FXS Extension” and select which FXS port where the FAX machine will be connected.

Create New Extension Save

Basic Settings   **Media**   Features   Specific Time   Follow Me

**Analog Settings**

Call Waiting:	<input type="checkbox"/>	Use “#” as SEND:	<input checked="" type="checkbox"/>
* RX Gain:	<input type="text" value="0"/>	* TX Gain:	<input type="text" value="0"/>
* MIN RX Flash:	<input type="text" value="200"/>	* MAX RX Flash:	<input type="text" value="1250"/>
Enable Polarity Reversal:	<input checked="" type="checkbox"/>	* Echo Cancellation:	<span style="border: 1px solid gray; padding: 2px;">ON</span>
3-way Calling:	<input checked="" type="checkbox"/>	* Send CallerID After:	<span style="border: 1px solid gray; padding: 2px;">1</span>
* Fax Mode:	<span style="border: 1px solid red; padding: 2px;">Fax Gateway</span>		

**Figure 2: Create FXS Extension for Fax Machine (Media)**

- Under “Media”, set the “Fax Mode” to “Fax Gateway” so that the UCM6xxx can support conversation and processing of Fax data from T.30 to T.38 and T.38 to T.30.



6. Click on **Save** and **Apply** changes.

## Connecting FAX Machine to UCM

After creating the FXS extension, the user needs to make sure of connecting his Fax Machine to the chosen and configured FXS Port. The following figure shows the example of UCM6510's FXS Ports.

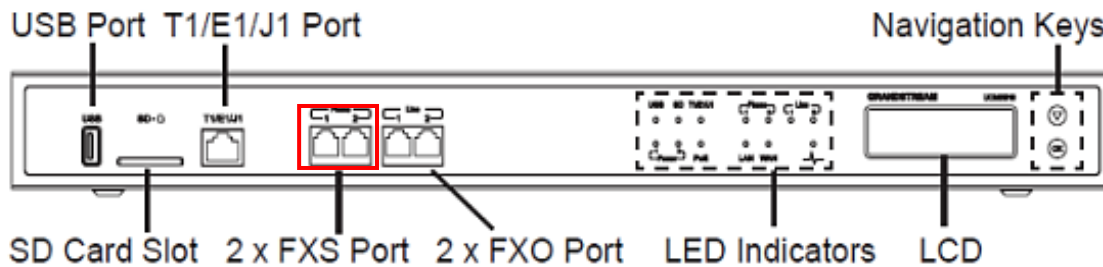
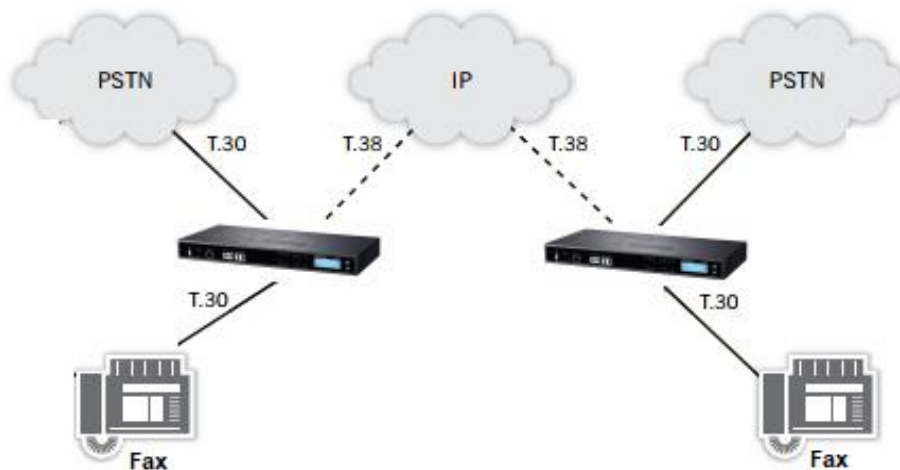


Figure 3: FXS Ports of UCM6510 (Example)

## ROUTING FAX CALLS

As shown on below diagram, the fax transmission originates from the physical Fax machine as a T.30 fax. Then the built-in T.38 gateway module in UCM6xxx translates the fax transmission to T.38 format and sends it over the IP network to the other UCM6xxx.

The second Server translates back the transmission to T.30 and sends it the attached Fax Machine or over the PSTN line for external numbers.




User needs to setup Trunks and call routing rules in order to route incoming and outgoing fax through the desired trunk, we will show the steps to use analog and VOIP trunk to perform sending and receiving Fax files.



## Create Analog Trunk

Please, refer to the following steps in order to create an analog trunk:

1. Go to UCM6xxx Web UI → **Extension/Trunk** → **Analog trunks**.
2. Click on **+ Create New Analog Trunk** to create a new Analog Trunk, or on  to edit an existing one.

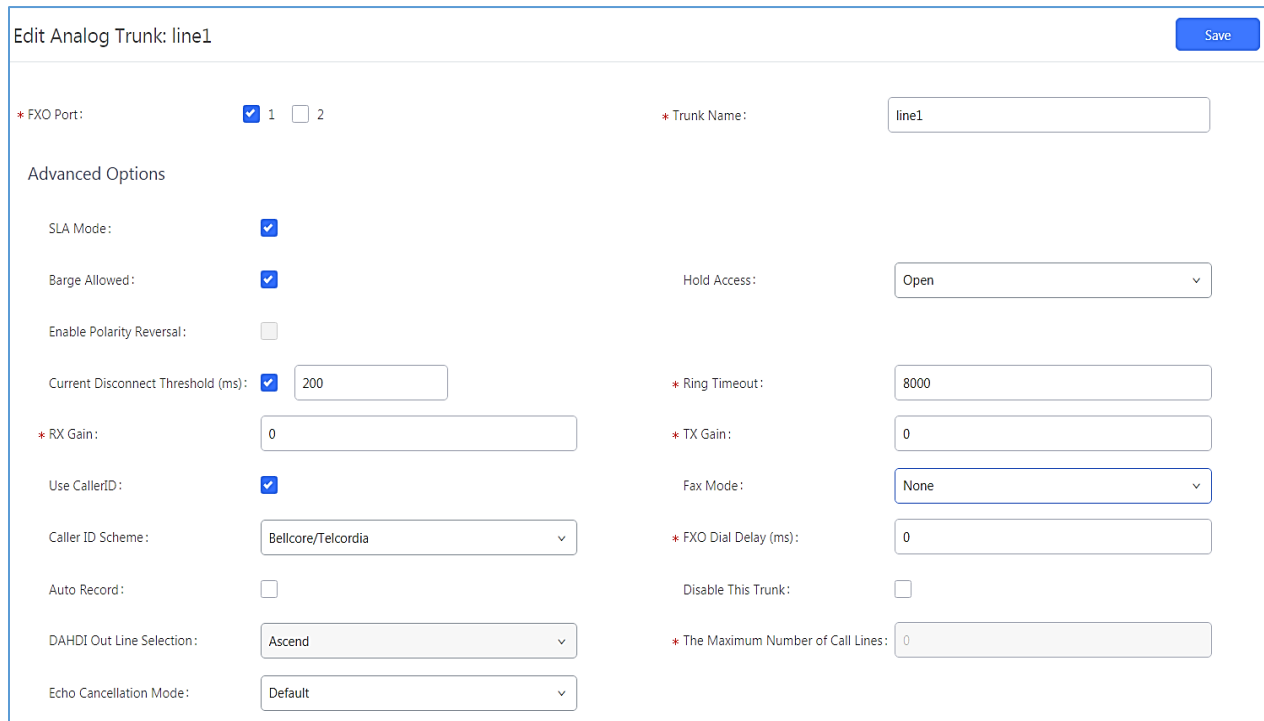


Figure 4 shows the configuration page for an analog trunk named 'line1'. The settings are as follows:

- \* FXO Port:**  1  2
- \* Trunk Name:** line1
- Advanced Options:**
  - SLA Mode:
  - Barge Allowed:
  - Enable Polarity Reversal:
  - Current Disconnect Threshold (ms):  200
  - Hold Access: Open
  - \* Ring Timeout: 8000
  - \* RX Gain: 0
  - \* TX Gain: 0
  - Use CallerID:
  - Fax Mode: None
  - Caller ID Scheme: Bellcore/Telcordia
  - \* FXO Dial Delay (ms): 0
  - Auto Record:
  - Disable This Trunk:
  - DAHDI Out Line Selection: Ascend
  - \* The Maximum Number of Call Lines: 0
  - Echo Cancellation Mode: Default

**Figure 4: Analog trunk for Fax**

**Note:** Make sure to choose the right FXO port where PSTN Line is connected and to set Fax Mode on “none”.

3. Click on “SAVE” and “Apply Changes”

## Create VOIP Trunk

Please, refer to the following steps in order to create a VOIP Trunk:

1. Go to UCM6xxx Web UI → **Extension/Trunk** → **VOIP trunks**.
2. Click on **+ Create New SIP Trunk** to create a new VOIP Trunk.
3. Set the SIP credentials given by the service provider (server IP or domain, username and password...etc).
4. Click on “SAVE” and “Apply Changes”.





Basic Settings
Advanced Settings

Codec Preference :

<input type="checkbox"/> 9 items Available	<input type="checkbox"/> 6 items Selected
<input type="checkbox"/> G.722 <input type="checkbox"/> AAL2-G.726-32 <input type="checkbox"/> ADPCM <input type="checkbox"/> G.723 <input type="checkbox"/> H.263	<input type="checkbox"/> PCMU <input type="checkbox"/> PCMA <input type="checkbox"/> GSM <input type="checkbox"/> G.726 <input type="checkbox"/> G.729

Send PPI Header:

Send PAI Header:

DID Mode:

DTMF Mode:

Enable Heartbeat Detection:

\* The Maximum Number of Call:

Lines:

Fax Mode:

Enable Fax Intelligent:

Routing:

Fax Intelligent Routing:

Destination:

**Figure 5: VOIP Trunk with Fax Detection**

**Note:** As shown above, under advanced Settings, user can set Fax Mode on “Fax Detection” and enable “Fax Intelligent Routing” and set the destination in order to automatically forward the Fax to the right destination set by the user.

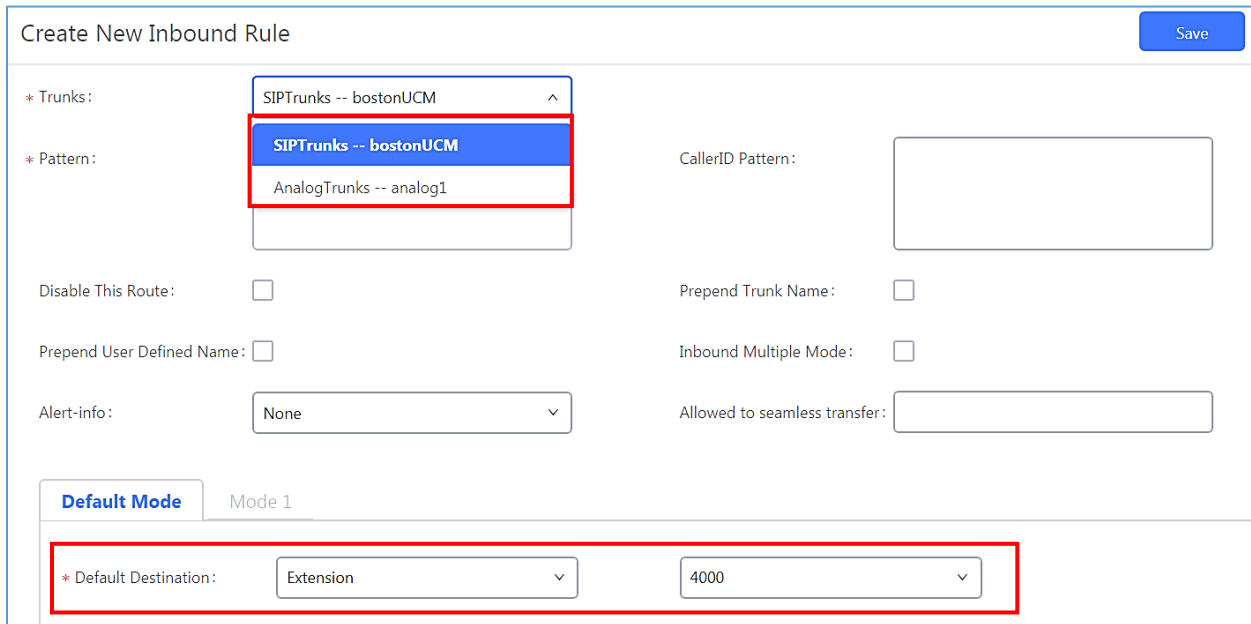
### **Sending/Receiving Fax Files using Fax Machine**

Please, refer to the following steps in order to manage sending/receiving faxes using a fax machine.

1. Connect Fax machine to the UCM6xxx FXS port.
2. Connect PSTN line to the UCM6200 FXO port (in the case of using Analog Trunk).
3. Go to Web GUI → **Extension/Trunk** page.



4. Create or edit a Trunk:
  - Analog trunk: *Please, refer to the chapter [Create Analog Trunk]*
  - VOIP trunk: *Please, refer to the chapter [Create VOIP Trunk]*
5. Go to UCM6xxx Web GUI → **Extension/Trunk** → **Extensions** page.
6. Create or edit the extension for FXS port. *Please, refer to the chapter [FXS Extension Configuration].*
7. Under Web GUI → **Extension/Trunk** → **Inbound Routes** page, click on **+ Add** in order to create an inbound route to use the Fax trunk to receive fax files.
8. Select the trunk you created (Analog Trunk or SIP Trunk).
9. Select the created FXS extension for Fax machine as the default destination.



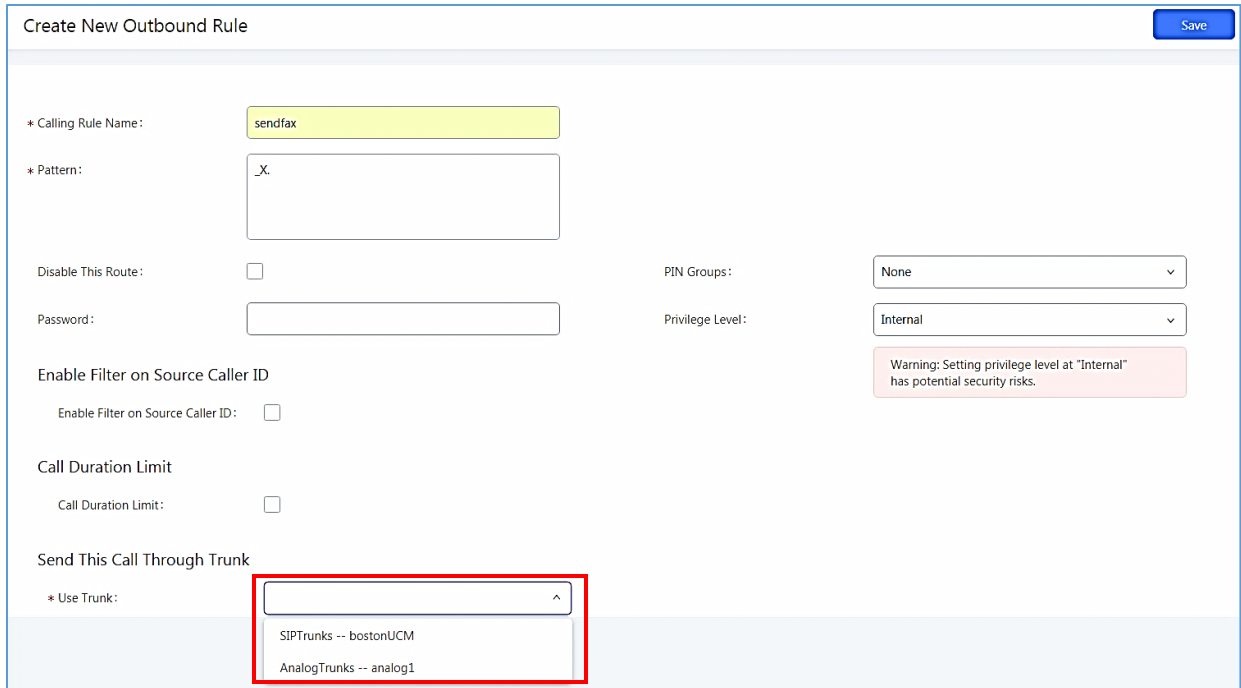
**Figure 6: Inbound Route with FXS Extension as default destination**

10. Click on “Save” and “Apply changes”.

In order to send outbound fax, users should follow below steps:

1. Under Web GUI → **Extension/Trunk** → **Outbound Routes** page, click on **+ Add** in order to create an outbound route to use the fax trunk to send files.
2. Select the trunk you created (Analog Trunk or SIP Trunk).





**Create New Outbound Rule** Save

\* Calling Rule Name:

\* Pattern:

Disable This Route:

Password:

PIN Groups:

Privilege Level:

Enable Filter on Source Caller ID

Enable Filter on Source Caller ID:

Call Duration Limit

Call Duration Limit:

Send This Call Through Trunk

\* Use Trunk:

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

**Figure 7: Outbound Route**

3. Click on "Save" and "Apply changes".

After this configuration is done, Fax files can be received and sent with the Fax Machine connected to UCM6xxx on the FXS Port.



## UCM6XXX FAX VALUE ADDED FEATURES

The UCM IP-PBX series have many value added features related to fax and which can help users who don't have PSTN lines and FAX machine to send and receive fax files in PDF format.

Among these features we have the fax sending from web GUI, fax to email and fax detection.



### WEB GUI FAX SENDIND

In order to use the FAX sending feature of the UCM, users need to follow below steps:

1. Under Web GUI → **Extension/Trunk** → **Outbound Routes** page, click on **+ Add** in order to create an outbound route to use the fax trunk to send files. *refer to the previous steps [Outbound Routes ]*
2. Select the trunk already created (Analog Trunk or SIP Trunk).
3. Access to UCM web GUI either using admin account or user portal (more on user portal [here](#)).
4. Go to UCM6xxx Web GUI → **Value-added Features** → **Fax Sending**.
5. Enter the fax number and upload the file to be faxed.

Fax Sending

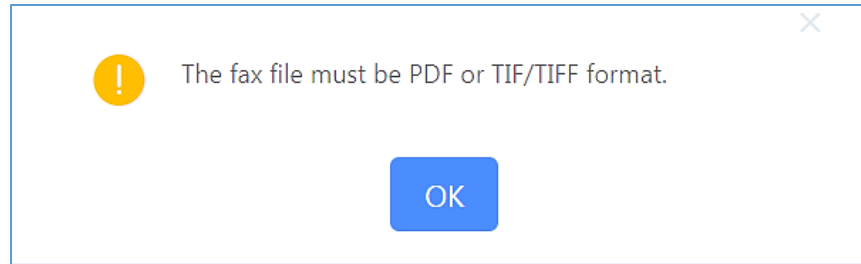
\* External Fax Number:

Fax File:

Figure 8: Fax sending settings

**Note:** The File needs to be a PDF or TIF/TIFF File.





**Figure 9: Format Error Message**

Once the right File is selected, the Fax File will be successfully placed in the send queue and the user can view the File Send progress that shows the status and progress percentage of files.

File Send Progress							
				<input type="text" value="External Fax Number"/>			
<input type="checkbox"/>	Name	Date	Sender	External Fax Number	Send Status	Current Progress	Options
<input type="checkbox"/>	pdf_test.pdf	2017-09-12 15:38:08 UTC-04:00	admin	4000	Sending	<div style="width: 20%;"><div style="width: 20%;"></div></div> 20%	
<input type="checkbox"/>	pdf_test.pdf	2017-09-12 15:28:59 UTC-04:00	admin	4000	Success	<div style="width: 100%;"><div style="width: 100%;"></div></div> ✓	
<input type="checkbox"/>	training_program.pdf	2017-08-25 04:24:47 UTC-04:00	5000	61531648502	Sending	<div style="width: 0%;"><div style="width: 0%;"></div></div> ✗	

**Figure 10: File Send Progress**

## USING FAX-TO-MAIL

### UCM Email Settings



First step in setting up fax-to-mail feature is to configure UCM Email settings; this can be done by following below steps:

1. Log into the web GUI as an admin under **System Settings**→**Email Settings**→Email Settings
2. Enter the required information for SMTP.
3. Click on “Save” then “Apply Changes”.
4. Click on “Test” Button and test if the email settings are correct and that a test mail has been received.

This way we confirmed that UCM can send emails via Its built-in SMTP client. Moreover, users can customize the emails that will be sent along with the FAX, this can be done under Email template page as shown below.



Edit Email Template: Fax Save

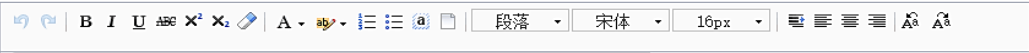
\* Subject:

\* Message in Text Format: 

Hi \${RECEIVEEXTEN},  
You have received a new fax \${FILENAME} (\${FAXPAGES} pages) at \${FAXDATE} from \${CALLERIDNUM} \${CALLERIDNAME}.

[Restore Default Template](#)

Message in HTML Format: 

  
Hi \${RECEIVEEXTEN},  
You have received a new fax \${FILENAME} (\${FAXPAGES} pages) at \${FAXDATE} from \${CALLERIDNUM} \${CALLERIDNAME}.

[Preview](#) [Restore Default Template](#) [Upload](#)

Figure 11: Email Template for FAX

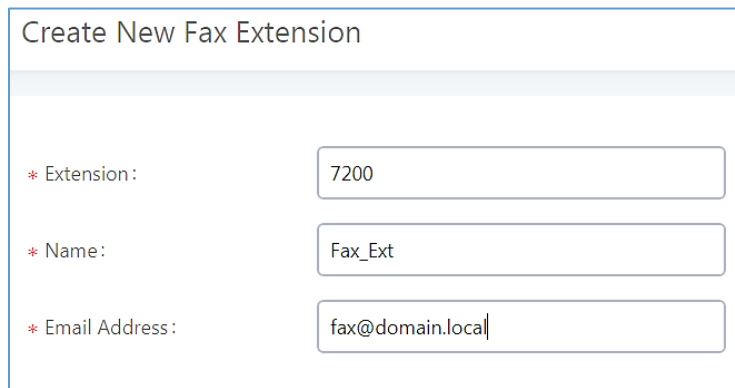


## Create/Edit Virtual Fax Extensions

The second step is to create a new Fax extension which will be mapped with a certain email address.

Please, follow the next steps bellow:

1. Go to UCM6xxx Web GUI → **Call features** → **FAX/T.38**
2. Click on **+ Create New Fax Extension**
3. Enter the number and name of the extension.
4. Enter the Email Address where to send the received Faxes.





Create New Fax Extension

\* Extension: 7200

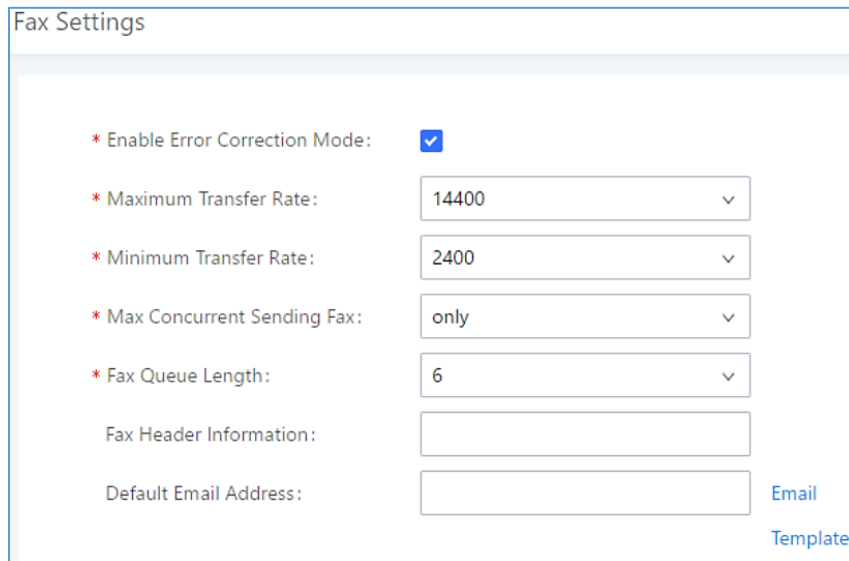
\* Name: Fax\_Ext

\* Email Address: fax@domain.local

Figure 12: Create new Fax extension

Once the user created the extension, it will be displayed in the FAX/T.38 menu with the possibility of editing the extension's information by clicking on  button, or deleting them with  button.

User can click on "Fax settings" in order to configure the Fax/T.38 parameters as the following figure.



Fax Settings

\* Enable Error Correction Mode:

\* Maximum Transfer Rate: 14400

\* Minimum Transfer Rate: 2400

\* Max Concurrent Sending Fax: only

\* Fax Queue Length: 6

Fax Header Information:

Default Email Address:

[Email Template](#)

Figure 13: Fax Settings



**Table 1: FAX/T.38 Parameters**

<b>Enable Error Correction Mode</b>	Configure to enable Error Correction Mode (ECM) for the Fax. The default setting is "Yes".
<b>Maximum Transfer Rate</b>	Configure the maximum transfer rate during the Fax rate negotiation. The possible values are 2400, 4800, 7200, 9600, 12000 and 14400. The default setting is 14400.
<b>Minimum Transfer Rate</b>	Configure the minimum transfer rate during the Fax rate negotiation. The possible values are 2400, 4800, 7200, 9600, 12000 and 14000. The default setting is 2400.
<b>Max Concurrent Sending Fax</b>	Configure the concurrent fax that can be sent by UCM6200. Two mode "Only" and "More" are supported. <ul style="list-style-type: none"> <li>• <b>Only</b> Under this mode, the UCM6200 allows only single user to send fax at a time.</li> <li>• <b>More</b> Under this mode, the UCM6200 supports multiple concurrent fax sending by the users.</li> </ul> <p>By default, this option is set to "only".</p>
<b>Fax Queue Length</b>	Configure the maximum length of Fax Queue from 6 to 10. The default setting is 6.
<b>Fax Header Information</b>	Adds fax header into the fax file.
<b>Default Email Address</b>	Configure the Email address to send the received Fax to if user's Email address cannot be found. <b>Note:</b> The extension's Email address or the Fax's default Email address needs to be configured in order to receive Fax from Email. If neither of them is configured, Fax will not be received from Email.
<b>Template Variables</b>	Fill in the "Subject:" and "Message:" content, to be used in the Email when sending the Fax to the users. The template variables are: <ul style="list-style-type: none"> <li>• <code>{CALLERIDNUM}</code> : Caller ID Number</li> <li>• <code>{CALLERIDNAME}</code> : Caller ID Name</li> <li>• <code>{RECEIVEEXTEN}</code> : The extension to receive the Fax</li> <li>• <code>{FAXPAGES}</code> : Number of pages in the Fax</li> <li>• <code>{VM_DATE}</code> : The date and time when the Fax is received</li> </ul>

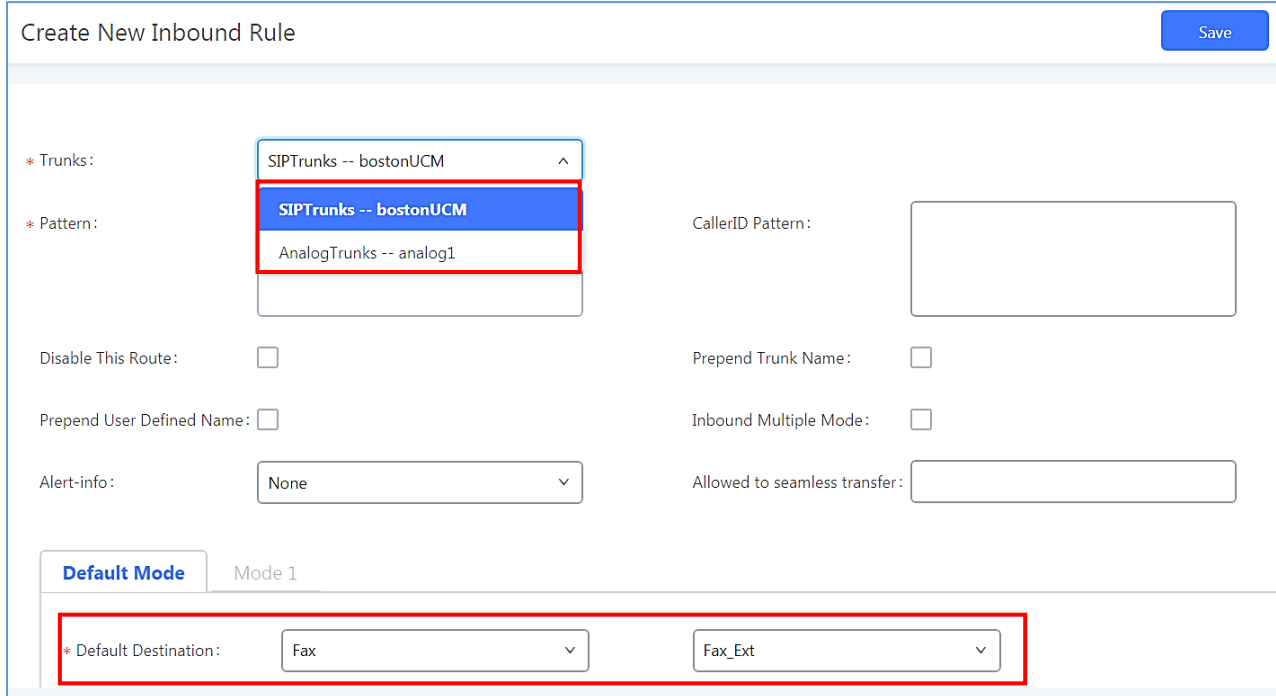




## Receiving FAX files using virtual Faxing

Now, that email settings and virtual fax extension have been set up and in order to receive Fax files using virtual faxing, please refer to the following steps:

1. Under UCM6xxx Web UI → **Call Features** → **Fax/T.38**, create a new Fax extension. *Please refer to the chapter [Create/Edit Virtual Fax Extensions].*
2. Create or edit a Trunk:
  - Analog trunk: *Please, refer to the chapter [Create Analog Trunk]*
  - VOIP trunk: *Please, refer to the chapter [Create VOIP Trunk]*
3. Under Web GUI→**Extension/Trunk**→**Inbound Routes** page, click on **+ Add** in order to create an inbound route to use the Fax trunk to receive fax files.
4. Select the trunk you created (Analog Trunk or SIP Trunk).
5. Select the created FAX extension as the default destination.



The screenshot shows the 'Create New Inbound Rule' configuration page. The 'Trunks' field is set to 'SIPTrunks -- bostonUCM'. The 'Pattern' field is set to 'SIPTrunks -- bostonUCM'. The 'Default Destination' field is set to 'Fax'. The 'Default Mode' is set to 'Mode 1'. The 'Default Destination' field is highlighted with a red box.

**Figure 14: Inbound Route with Fax Extension as default destination**

6. Click on “Save” and “Apply Changes”.

Once successfully configured, the incoming Fax from external Fax machine to the PSTN line number will be converted to PDF file and sent to the Email address [fax@domain.local](mailto:fax@domain.local) set when Fax Extension was created. The list of received Fax files is displayed under UCM6xxx Web UI → **Call Features** → **Fax/T.38**.



List of Fax Files				
<input type="checkbox"/> Delete Selected Fax Files		<input type="checkbox"/> Delete All		<input type="text" value="Callee Number"/> <input type="button" value="Search"/>
<input type="checkbox"/>	Name ↕	Date ↕	Size ↕	Options
<input type="checkbox"/>	VFAX-5000-20170828-110103-1503932444.50.pdf	2017-08-28 11:01:25 UTC-04:00	1573	<input type="button" value="Download"/> <input type="button" value="Delete"/>
<input type="checkbox"/>	VFAX-5000-20170828-110103-1503932444.50.tiff	2017-08-28 11:01:20 UTC-04:00	5871	<input type="button" value="Download"/> <input type="button" value="Delete"/>

Figure 15: List of Fax Files

## Fax Detection and Intelligent Routing

Users can configure the Fax detection and intelligent routing under UCM6xxx Web GUI → Extension/Trunk → VOIP Trunk → Edit SIP Trunk → Advanced Settings. Setting “Fax mode” to “Fax detection” will enable detecting the Fax Signal during a call, and the received Fax file will be sent to the configured Email address otherwise it will be sent to the default Email address configured in Fax Page in the case.

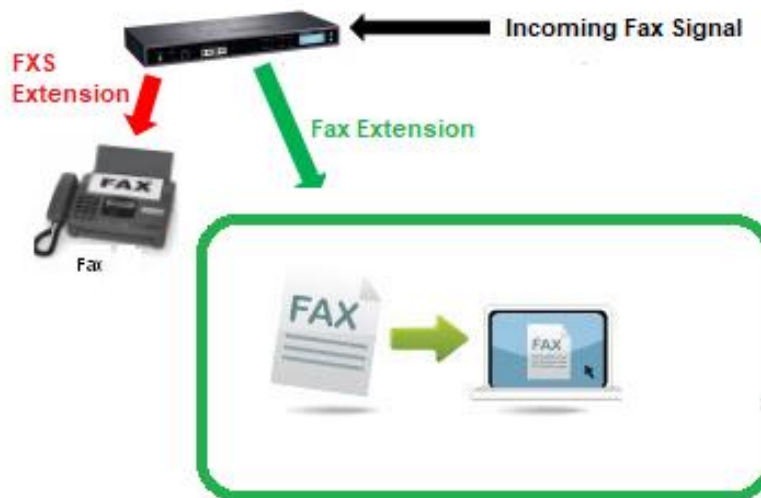


Figure 16: Fax intelligent Routing after a Fax signaling detection

The user can also Enable Fax intelligent Routing in order to route directly the Fax signal to the appropriate FXS Extension connected to the Physical Fax Machine or the Virtual Faxing Extension. The user needs to choose this extension number from the available extensions in “Fax Intelligent Routing Destination”. See *figure 5 for more information about Fax detection and Intelligent Routing Configuration*.

