



## **Avaya Solution & Interoperability Test Lab**

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# **Application Notes for Revolabs FLX with Avaya IP Office – Issue 1.0**

### **Abstract**

These Application Notes describe the configuration steps required for Revolabs FLX to interoperate with Avaya IP Office. The Revolabs FLX is a SIP conference phone that can register with Avaya IP Office as a SIP endpoint in support of voice communications and conferencing requirements.

Readers should pay attention to Section 2, in particular the scope of testing as outlined in Section 2.1 as well as any observations noted in Section 2.2, to ensure that their own use cases are adequately covered by this scope and results.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

# 1. Introduction

These Application Notes describe the configuration steps required for Revolabs FLX to interoperate with Avaya IP Office. The Revolabs FLX is a SIP conference phone that can register with Avaya IP Office as a SIP endpoint combining the functionality of an IP phone and a conferencing station in support of voice communications and conferencing requirements.

## 2. Interoperability Testing

The focus of this interoperability compliance testing was to verify that the Revolabs FLX can register as a SIP endpoint to IP Office, and is able to originate and receive audio calls to and from telephones on the IP Office system.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly-defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute for full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

### 2.1. Test Description and Coverage

Compliance testing verified that the Revolabs FLX was able to interoperate with the telephones residing on the IP Office system. The following interoperability areas were covered:

- Revolabs FLX can register to the IP Office system as a SIP endpoint.
- Revolabs FLX can make a call to a telephone on the IP Office system and establish a clear speech path.
- A telephone on the IP Office system can call the extension assigned to the Revolabs FLX and establish a speech path(s).
- Revolabs FLX can support calling features such as Hold and Resume, Conferencing, Blind Transfer, Attended Transfer, and Call Forwarding.
- Successful codec negotiation using G.711MU, G.722 and G.711A codecs
- Revolabs FLX can send required DTMF tones.
- Revolabs FLX can leave and retrieve voicemails as well as successful MWI.
- Revolabs FLX can successfully re-register if the network connection drops and returns.

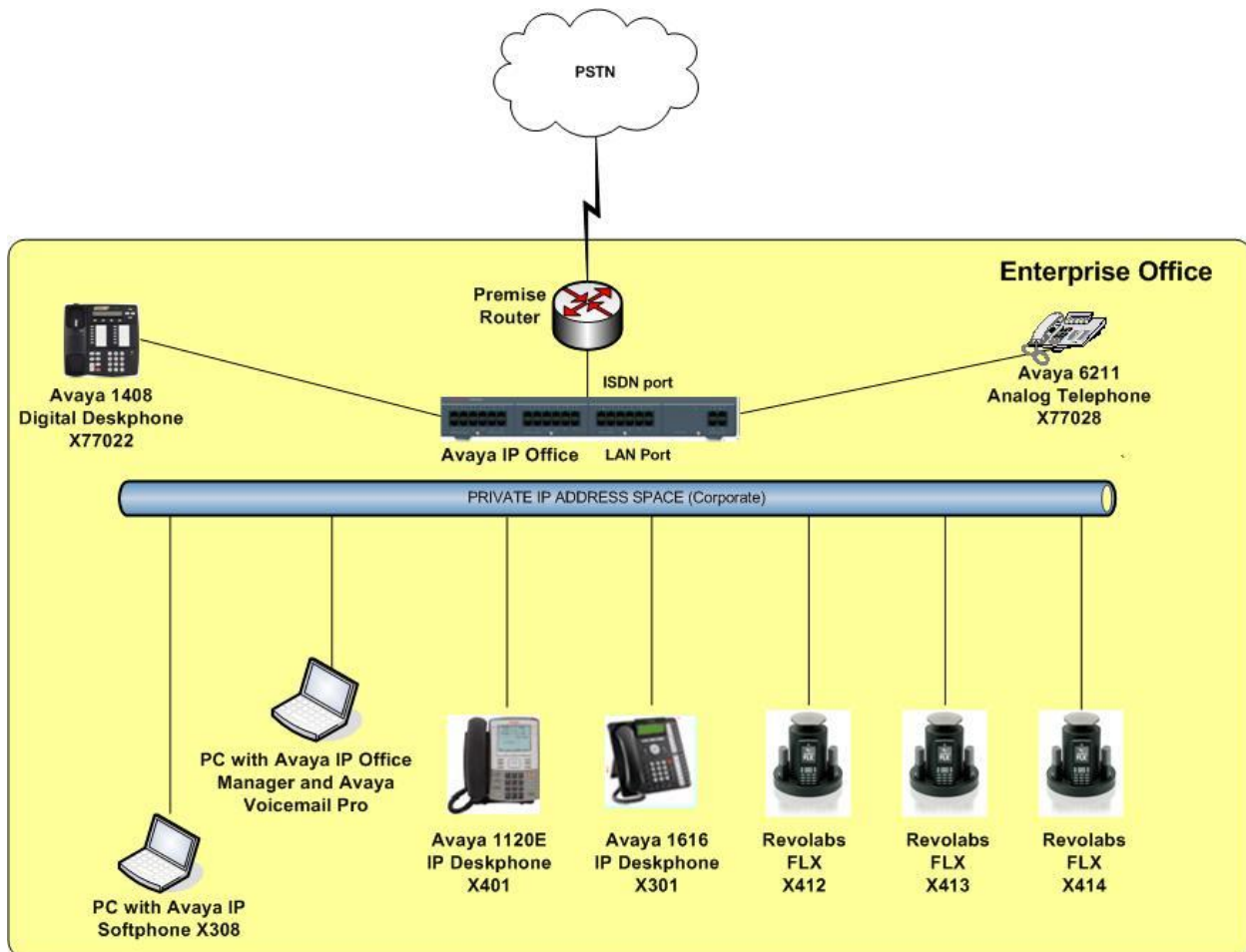
### 2.2. Test Results and Observations

The feature test cases were performed manually. The objectives outlined in **Section 2.1** were executed and passed.

The serviceability test cases were performed manually by disconnecting and reconnecting the LAN cable to the Revolabs FLX.

### 3. Reference Configuration

Once Revolabs FLX registers as a SIP endpoint with IP Office, these endpoints can place and receive voice calls with various supported features as listed above in **Section 2**. The reference configuration used for the compliance test is shown in **Figure 1** below.



**Figure 1: Revolabs FLX with IP Office**

## 4. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment/Software	Release/Software
Avaya IP Office IP500 V2	9.0.0.829
Avaya 1120E IP Deskphone (SIP)	SIP1120e.04.01.13.00
Avaya 1616i IP Deskphone (H.323)	hb1616ua1_330D.bin
Avaya 1608 Digital Deskphone	N/A
Avaya 6211 Analog Telephone	N/A
Avaya IP Office Softphone	3.2.3.48
Revolabs FLX	2.1.15

*Testing was performed with IP Office 500 V2 R9.0, but it also applies to IP Office Server Edition R9.0. Note that IP Office Server Edition requires an Expansion IP Office 500 V2 R9.0 to support analog or digital endpoints or trunks. IP Office Server Edition does not support TAPI Wave or Group Voicemail.*

## 5. Configure Avaya IP Office

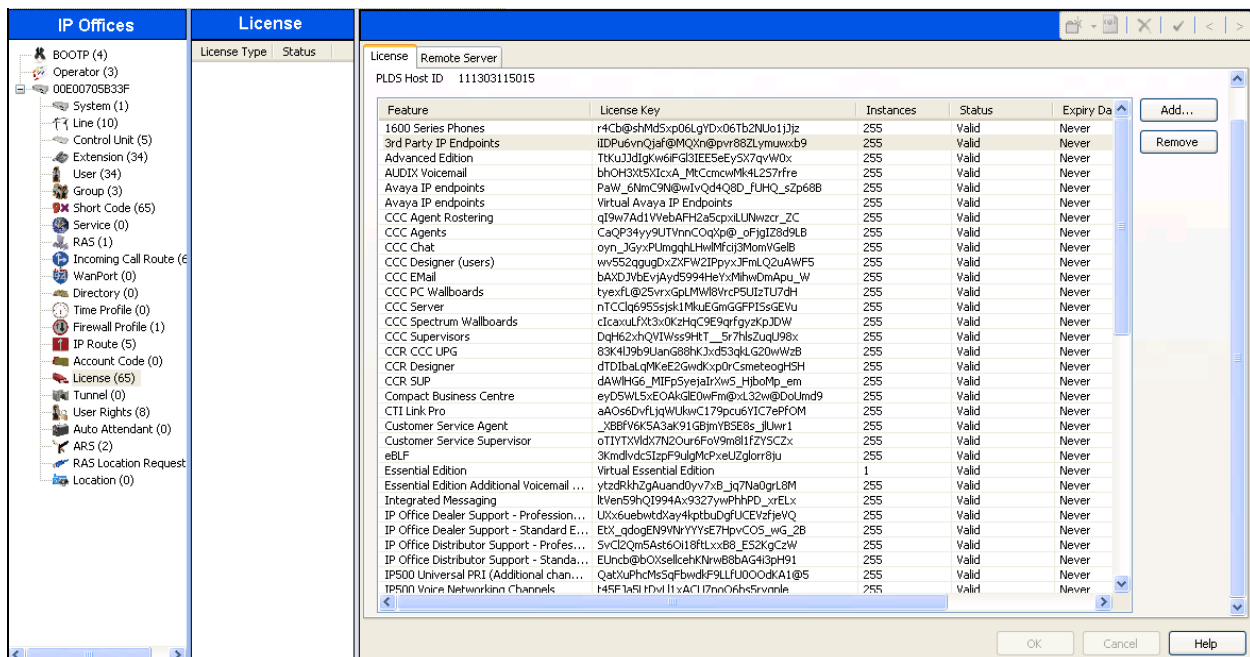
This section provides the procedures for configuring IP Office. The procedures include the following areas:

- Verify IP Office license
- Obtain LAN IP address
- Administer SIP registrar
- Administer SIP extensions
- Administer SIP users
- Administer codecs

### 5.1. Verify IP Office License

From a PC running the Avaya IP Office Manager application, select **Start → Programs → IP Office → Manager** to launch the Manager application. Select the proper IP Office system, and log in using the appropriate credentials.

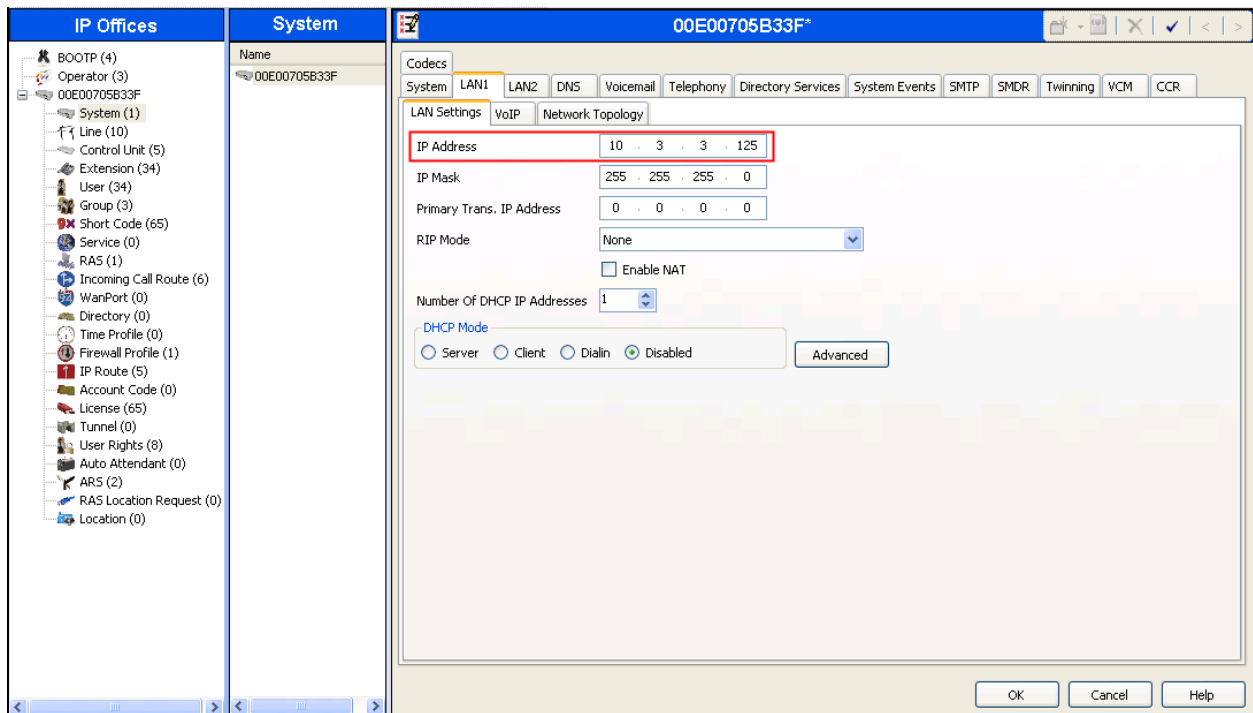
The **Avaya IP Office R9 Manager** screen is displayed. From the configuration menu in the left pane, select **License → 3<sup>rd</sup> Party IP Endpoints**. Verify that the **Status** is “Valid” and that there are enough **Instances** to support all required endpoints.



### 5.2. Obtain LAN IP Address

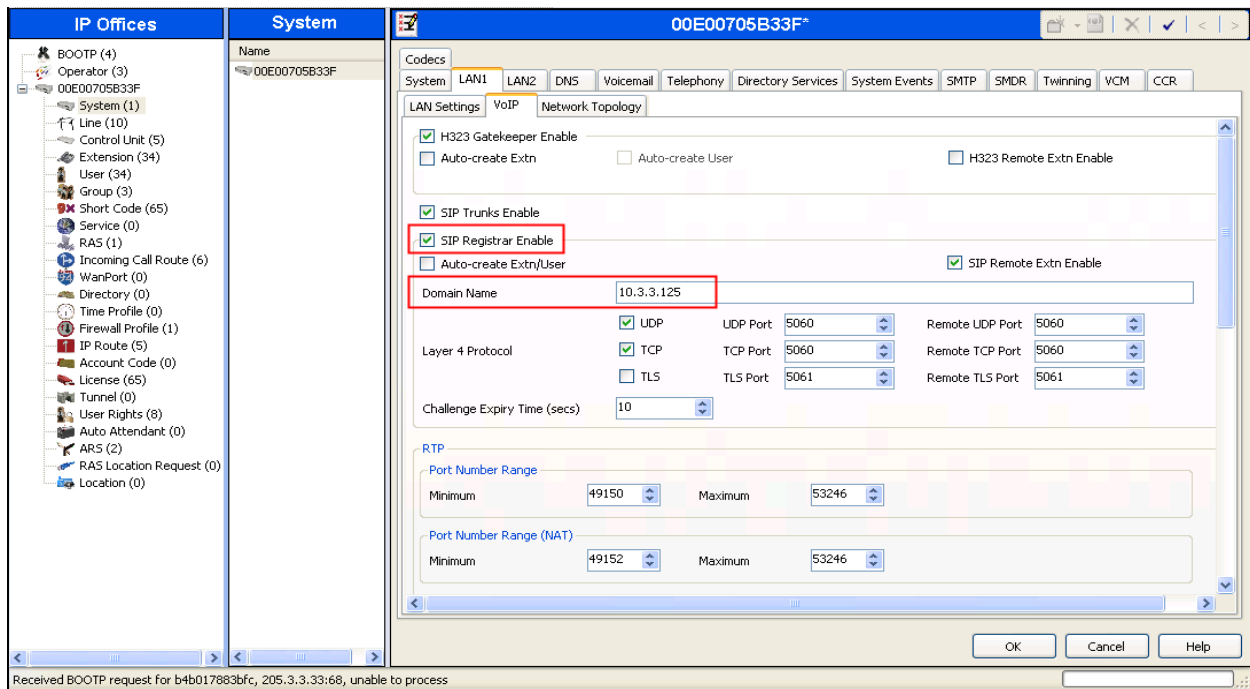
From the configuration menu in the left pane, select **System**. Click the **LAN1** tab followed by the **LAN Settings** sub-tab in the right pane. Make a note of the **IP Address**, which will be used later to configure Revolabs FLX.

Note that IP Office can support SIP extensions on the LAN1 and/or LAN2 interfaces. For the compliance testing, the LAN1 interface was used.



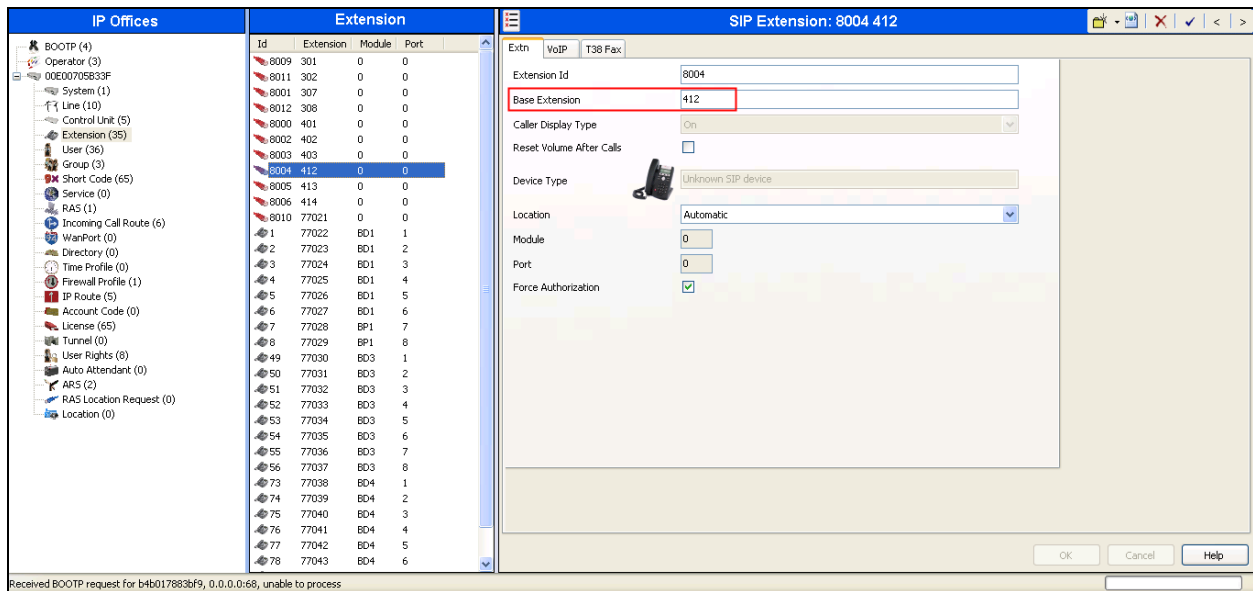
### 5.3. Administer SIP Registrar

Select the **VoIP** sub-tab from the right pane. Make certain that **SIP Registrar Enable** is checked and enter a valid **Domain Name** for SIP endpoints to use for registration with IP Office. In the compliance testing, the **Domain Name** was set to the IP address of the LAN1 interface, so the SIP endpoints used the LAN1 IP address for registration, as shown below.



## 5.4. Administer SIP Extensions

From the configuration menu in the left pane, right-click on **Extension** and select **New → SIP Extension** from the pop-up list to add a new SIP extension. For **Base Extension**, enter the Revolabs FLX extension which is shown in **Figure 1** in **Section 3**. Retain the default values in the remaining fields.



Repeat this section to add additional SIP extensions as desired. In the compliance testing, three SIP extensions “412”, “413” and “414” were created as IP Office users.



From the configuration menu in the left pane, right-click on **User** and select **New** from the pop-up list. Enter a descriptive **Name** for the User. For **Extension**, enter the Revolabs FLX extension from **Section 5.4**. Remember these values as they will be needed to register Revolabs FLX to IP Office.

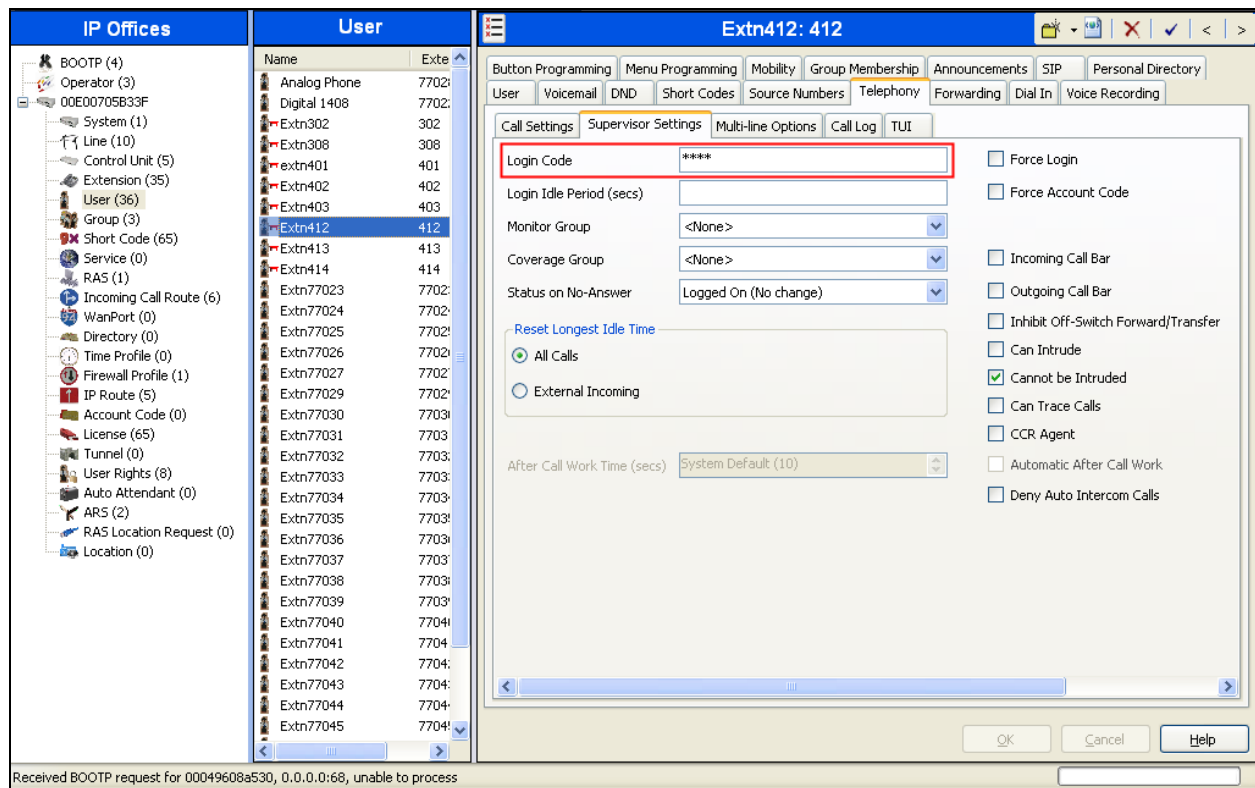
The screenshot displays the Cisco Unified Communications Manager (CUCM) Administration console. The left pane shows the 'IP Offices' and 'User' hierarchy. The right pane shows the configuration details for the selected user, 'Extn412: 412'.

**User Configuration Details:**

- Name:** Extn412
- Password:** (Empty field)
- Confirm Password:** (Empty field)
- Account Status:** Enabled
- Full Name:** Revo SIP3
- Extension:** 412
- Email Address:** (Empty field)
- Locale:** United States (US English)
- Priority:** 5
- System Phone Rights:** None
- Profile:** Basic User
  - ☐ Receptionist
  - ☐ Enable Softphone
  - ☐ Enable one-X Portal Services
  - ☐ Enable one-X TeleCommuter
  - ☐ Enable Remote Worker
  - ☐ Enable Flare
  - ☐ Enable Mobile VoIP Client
  - ☐ Send Mobility Email

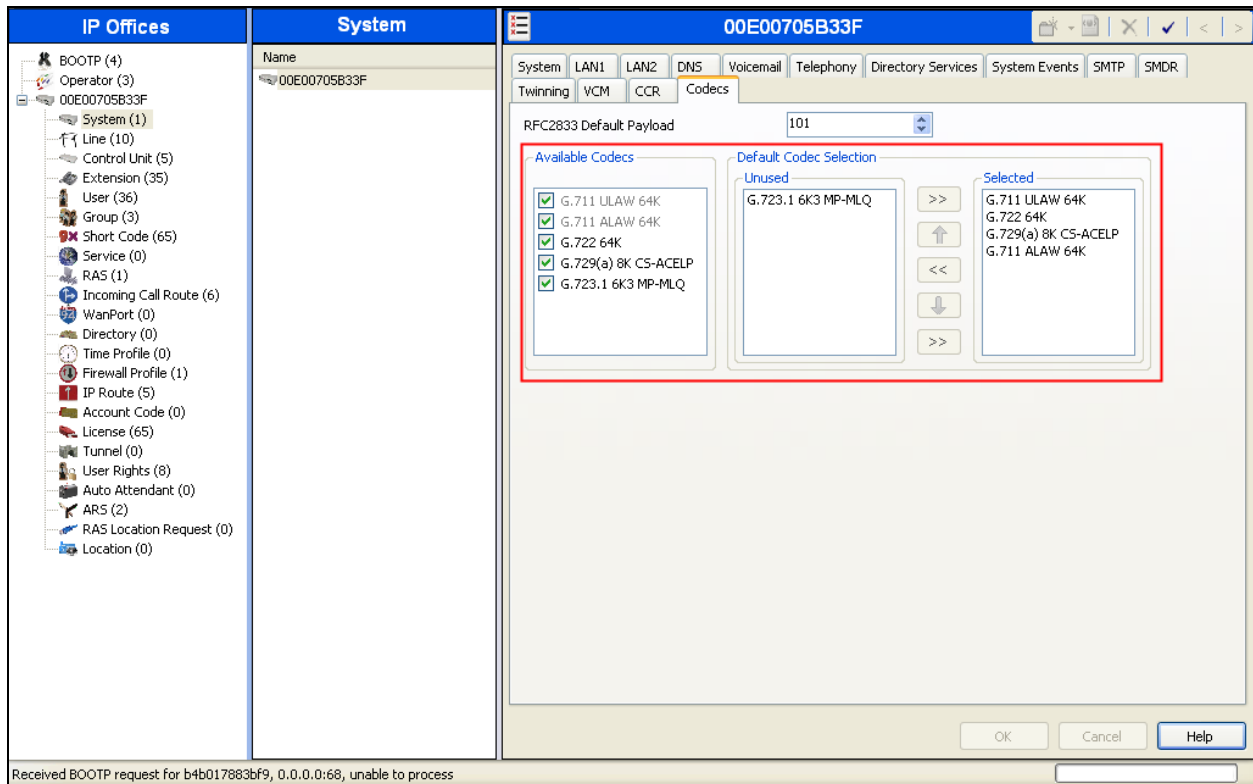
At the bottom of the console, a status message reads: "Received BOOTP request for 00049608a530, 0.0.0.0:68, unable to process".

Next, navigate to **Supervisor Settings**→**Login Code** and enter a code up to 31 digits that will be used to log the extension into the IP Office system.



## 5.6. Administer Codecs

From the configuration menu in the left pane, select **System** and then the **Codecs** tab in the right pane. Check the **G.722 64K** option under **Available Codecs** and then be sure that **G.711 ULAW 64K**, **G.722 64K** and **G.711 ALAW 64K** codecs are moved to the right under the **Default Codec Selection**→**Selected** window. Note, while the **G.729(a) 8K CS-ACELP** codec was left as a choice in the **Selected** window, since Revolabs FLX endpoints do not support this codec, it was not used.



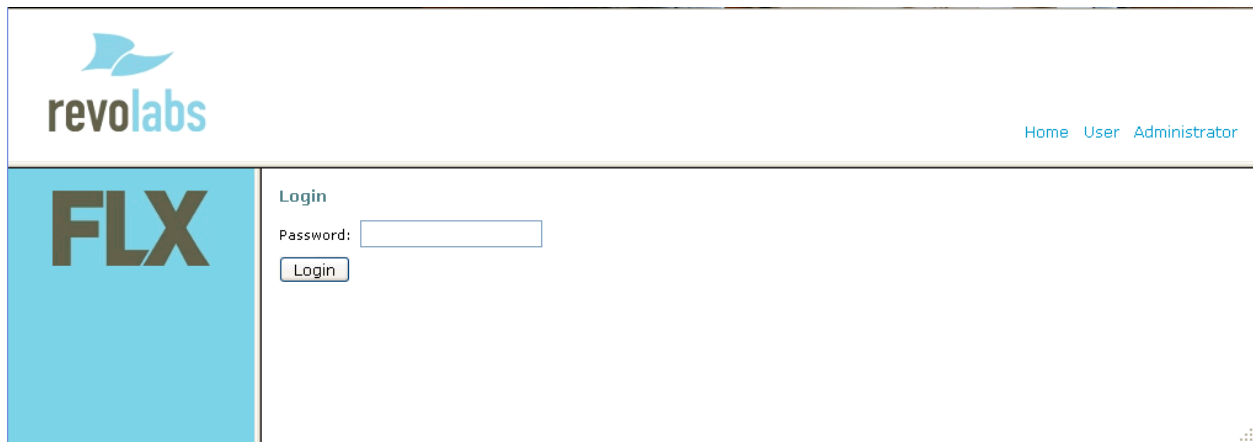
## 6. Configure Revolabs FLX

This section provides the procedures for configuring Revolabs FLX. The procedures include the following areas:

- Launch web interface
- Administer network settings
- Administer SIP settings
- Configure media settings

### 6.1. Launch Web Interface

Once the Revolabs FLX is physically connected to the network, it will obtain a network address via DHCP. This address may be changed to a static IP address if desired. Access the Revolabs FLX web-based interface by using the URL “http://ip-address” in an Internet browser window, where “ip-address” is the IP address of the Revolabs FLX endpoint. The Revolabs homepage screen is displayed, as shown below. Log in using the appropriate password.

The image shows the web interface of a Revolabs FLX device. At the top left is the 'revolabs' logo. At the top right are links for 'Home', 'User', and 'Administrator'. On the left side, there is a large blue square with the text 'FLX' in white. To the right of this square is a login form with the following elements: the word 'Login', a 'Password:' label, a text input field, and a 'Login' button. The entire interface is enclosed in a thin blue border.

Once logged in, click on **Administrator** in the upper right-hand corner (not shown).

## 6.2. Administer Network Settings

To configure networks settings, click on **Network** from the menu on the left and enter the following values for the specified fields. Retain default values in the remaining fields. While the default setting for **Connection Type** is DHCP, for the compliance test a static IP address was used. DHCP may be used if supported at the customer site.

- **Connection Type:** Select either **DHCP** or **Static IP** from the drop down menu depending on customer requirements.
- **Static IP Address:** Enter the IP address for the Revolabs FLX endpoint.
- **Subnet Mask:** Enter the appropriate subnet mask for the network.
- **Default Gateway:** Enter the default gateway for the network.
- **Primary DNS Server:** Enter the IP address of the DNS server for the network.

revolabs

Home User Administrator

**Administrator Menu**

- Network
- SIP Registration
- SIP Configuration
- Transport
- Media
- Call Settings
- Advanced Audio
- RF Settings
- Access Control
- Language and Country
- Import/Export
- System Log
- Call Status

Restart  
Logout

205.3.3.47/top.html#

**Network Settings**

Connection Type:

Static IP Address:

Subnet Mask:

Default Gateway:

Domain Name:

Primary DNS Server:

Secondary DNS Server:

**VLAN Settings**

Voice VLAN:

Voice VLAN ID:

**NTP Servers:**

Server 1:

Server 2:

Server 3:

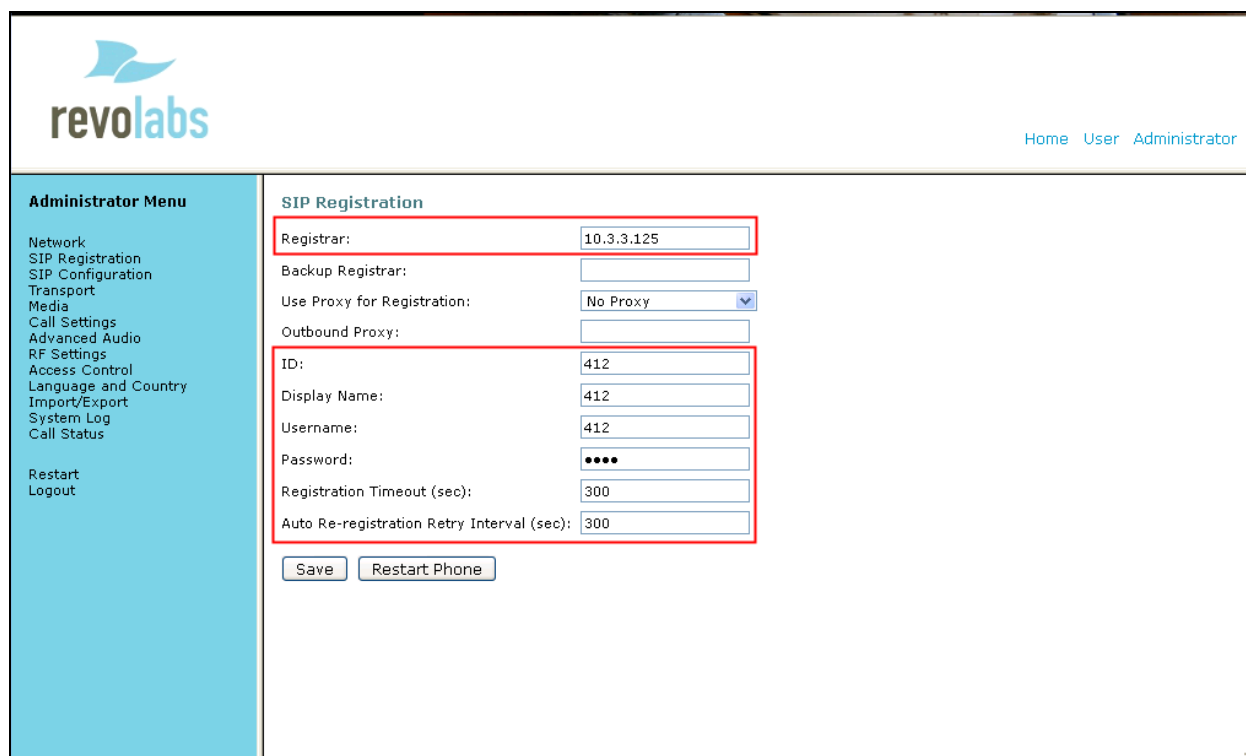
Server 4:

## 6.3. Administer SIP Settings

### 6.3.1. Administer SIP Registration Settings

To configure SIP registration settings, click on **SIP Registration** from the menu on the left and enter the following values for the specified fields. Retain default values in the remaining fields.

- **Registrar:** Enter the LAN IP address of IP Office from **Section 5.2**.
- **ID:** Enter the SIP Base Extension from **Section 5.4**.
- **Display Name:** Enter the SIP User name from **Section 5.5**.
- **Username:** Again, enter the SIP User name from **Section 5.5**.
- **Password:** Enter the Supervisor Login Code from **Section 5.5**.
- **Registration Timeout:** For the compliance test, the default registration interval, and auto re-registration retry interval, of **300** seconds was used.



The screenshot shows the Revolabs web interface for SIP Registration settings. The top header features the Revolabs logo and navigation links for Home, User, and Administrator. A left sidebar contains the Administrator Menu with options like Network, SIP Registration, SIP Configuration, Transport, Media, Call Settings, Advanced Audio, RF Settings, Access Control, Language and Country, Import/Export, System Log, and Call Status, along with Restart and Logout buttons. The main content area is titled 'SIP Registration' and contains several input fields. A red box highlights the Registrar field (10.3.3.125), ID (412), Display Name (412), Username (412), Password (masked with dots), Registration Timeout (300), and Auto Re-registration Retry Interval (300). Other fields include Backup Registrar, Use Proxy for Registration (set to No Proxy), and Outbound Proxy. At the bottom are Save and Restart Phone buttons.

SIP Registration	
Registrar:	10.3.3.125
Backup Registrar:	
Use Proxy for Registration:	No Proxy
Outbound Proxy:	
ID:	412
Display Name:	412
Username:	412
Password:	••••
Registration Timeout (sec):	300
Auto Re-registration Retry Interval (sec):	300

### 6.3.2. Administer SIP Configuration Settings

To administer the SIP configuration settings, click on **SIP Configuration** from the menu on the left and enter the following values for the specified fields. Retain default values in the remaining fields.

- **User SIP session timers:** Select either **Inactive**, **Optional**, **Mandatory** or **Always** from the drop down menu. For the compliance test, **Always** was used.
- **Session timers expiration period:** Enter the desired value for when to send Re-INVITES or UPDATES.
- **Session timers minimum expiration period:** A value of **90** was used for the compliance test.
- **DTMF signaling method:** While the screen below shows a setting of **RTP (RFC2833)**, both RFC2833 and SIP INFO methods were tested successfully in the compliance test.

**Administrator Menu**

- Network
- SIP Registration
- SIP Configuration
- Transport
- Media
- Call Settings
- Advanced Audio
- RF Settings
- Access Control
- Language and Country
- Import/Export
- System Log
- Call Status
- Restart
- Logout

**SIP Settings**

Use SIP session timers: Always

Session timers expiration period (sec): 1800

Session timers minimum expiration period (sec): 90

Require reliable SIP provisional response: ☐

Enable SIP traversal behind symmetric NAT: ☒

Suppress SIP event subscription when transferring calls: ☐

Allow strict routing: ☐

Minimize SIP message size: ☐

DTMF signaling method: RTP (RFC2833)

Media on-hold method: M line only (RFC3264)

Save Restart Phone

## 6.4. Configure Media Settings

Click on **Media** from the left side menu. Choose the desired codecs using the drop-down menus on the right. One can configure up to four supported codecs. For the compliance testing, the four codecs shown below were used, but only G.711MU and G.722 were tested. Default values were used for the remaining fields.

The screenshot displays the Revolabs web interface for configuring media settings. The left sidebar contains the 'Administrator Menu' with options like Network, SIP Registration, SIP Configuration, Transport, Media, Call Settings, Advanced Audio, RF Settings, Access Control, Language and Country, Import/Export, System Log, and Call Status. The 'Media' option is selected. The main content area shows the 'Media Settings' form. A red box highlights the four codec selection dropdowns: Codec 1 (G.711 u-law (PCMU)), Codec 2 (G.722), Codec 3 (G.711 A-law (PCMA)), and Codec 4 (G.726-32). Below these are fields for Audio Quality (6 (default)), Codec ptm override (msec) (20), a checkbox for 'Disable silence detector/voice activity detector', and a Jitter buffer maximum delay (ms; -1=auto) (-1). At the bottom are 'Save' and 'Restart Phone' buttons.

Media Settings	
Codec 1:	G.711 u-law (PCMU)
Codec 2:	G.722
Codec 3:	G.711 A-law (PCMA)
Codec 4:	G.726-32
Audio Quality (decrease to reduce CPU usage):	6 (default)
Codec ptm override (msec):	20
Disable silence detector/voice activity detector:	<input type="checkbox"/>
Jitter buffer maximum delay (ms; -1=auto):	-1
<div>Save Restart Phone</div>	

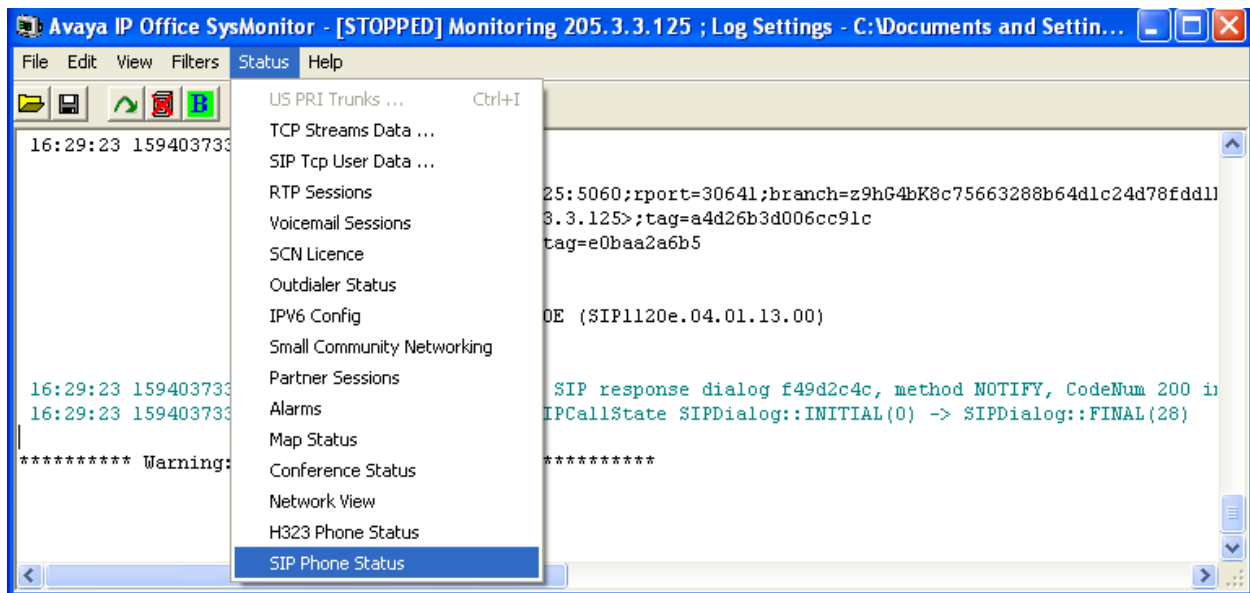


## 7. Verification Steps

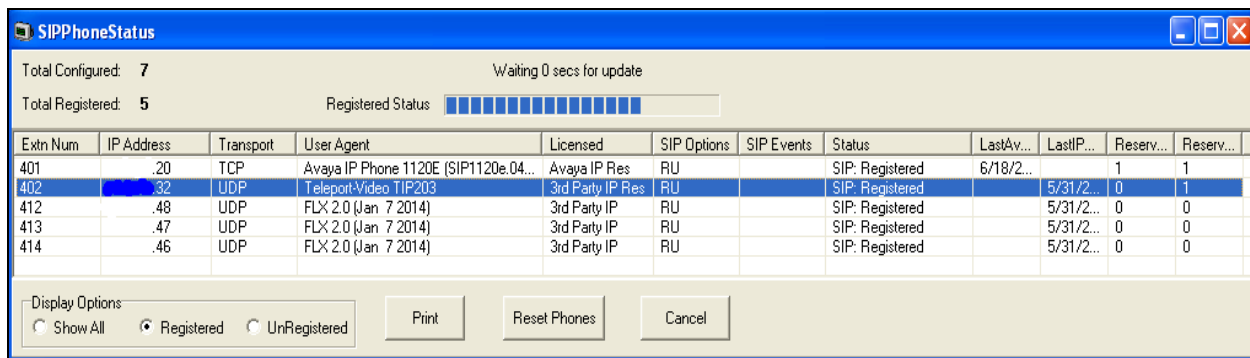
This section provides the tests that can be performed to verify proper configuration of Avaya IP Office and Revolabs FLX.

### 7.1. Verify Registered SIP Extensions on Avaya IP Office

From a PC running the Avaya IP Office Monitor application, select **Start → Programs → IP Office → Monitor** to launch the application. The **Avaya IP Office SysMonitor** screen is displayed, as shown below. Select **Status → SIP Phone Status** from the top menu.



The **SIPPhoneStatus** screen is displayed. Verify that there is an entry for each SIP extension from **Section 5.4**, that the **User Agent** is “FLX2.0” and that the **Status** is “SIP: Registered” as is shown for the three Revolabs FLX extensions shown beneath the blue bar below.



## 8. Conclusion

These Application Notes describe the configuration steps required for Revolabs FLX to successfully interoperate with Avaya IP Office. All feature and serviceability test cases were completed.

## 9. Additional References

This section references the product documentation relevant to these Application Notes.

1. *Avaya IP Office Manager*, Release 9.0, Issue 9.01, September 2013, Document Number 15-601011, available at <http://support.avaya.com>.
2. *Revolabs FLX SIP Multimedia Intercom User Guide* available at <http://www.Revolabs.com>.

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