ShoreTel spectralink solving every day		**Innovation Network App Note** **TPP- 13050** **Date: June, 2013**
Product: Spectralink 8400 Series Wireless Handsets		**System version:** ShoreTel 13.2

Abstract

This application note provides the details on adding the Spectralink 8400 Series Wireless Handsets to the ShoreTel® IP Phone system.

ShoreTel tests and validates the interoperability of the Member's solution with ShoreTel's published software interfaces. ShoreTel does not test, nor vouch for the Member's development and/or quality assurance process, nor the overall feature functionality of the Member's solution(s). ShoreTel does not test the Member's solution under load or assess the scalability of the Member's solution. It is the responsibility of the Member to ensure their solution is current with ShoreTel's published interfaces.

The ShoreTel Technical Support organization will provide Customers with support of ShoreTel's published software interfaces. This does not imply any support for the Member's solution directly. Customers or reseller partners will need to work directly with the Member to obtain support for their solution.

Table of Contents

Overview 3
Spectralink Overview and Contact 3
Spectralink Product Information 3
Architecture Overview 3
Version Support 4
Certification Testing Results Summary 4
Table 1: Basic Feature Test Cases 4
Table 2: Extended Feature Test Cases 5
Configuration Overview 7
ShoreTel Configuration 7
ShoreTel System Settings - General 7
Call Control Settings 7
Switch Settings - Allocating Ports for SIP Extensions 8
Site Settings 10
Creating SIP Extension 12
Figure 9 – Adding/Editing Users 13
Figure 10 – Individual User SIP Settings 14
SIP Profiles 14
Figure 11 – SIP Profiles 15
Figure 12 – Edit SIP Profile 15
Spectralink 8400 Handset Configuration 16
Spectralink 8400 Phone Settings – Phone User Interface 16
Spectralink 8400 Settings – Web Configuration Utility 17
Troubleshooting 18

Spectralink Technical Support 19
Document Feedback 19
Document and Software Copyrights 19
Trademarks 19
Disclaimer 20
Company Information 20

Overview

The document focuses on the configuration procedures needed to set up the Spectralink 8400 Series Wireless Handsets for the ShoreTel system and the configuration needed on the ShoreTel system to support the Spectralink 8400 handsets.

Spectralink Overview and Contact

Spectralink, a global leader in wireless solutions, solves the everyday problems of mobile workers through technology, innovation and integration that enable them to do their jobs better. By constantly listening to how customers move through their workdays, Spectralink is able to develop reliable, enterprise-grade voice and data solutions and deliver them through a powerful, durable device

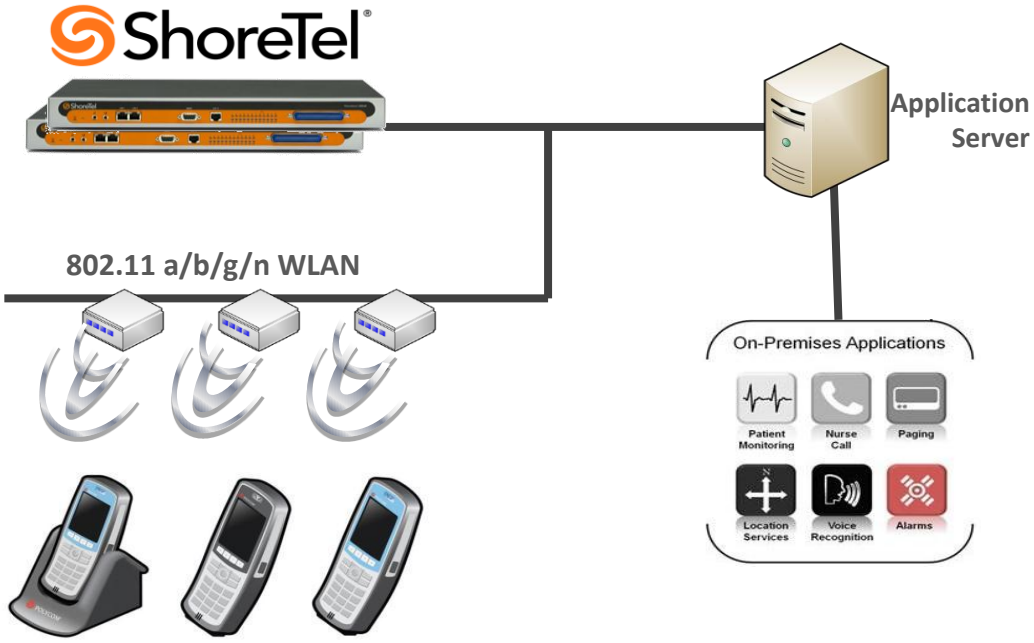
For more information, please visit www.spectralink.com or call 800-775-5330.

Spectralink Product Information

The Spectralink® 8400 VoWLAN series handsets deliver on a fundamental need for enterprise-grade on-site voice mobility. Characterized by market-leading HD Voice™ quality, durability and broad telephony and WLAN interoperability, Spectralink 8400 handsets deliver a reliable user experience and predictable return on investment.

The Spectralink 8400 series enhances the customer value proposition through an optional integrated barcode scanner and an enhanced standards-based applications interface.

Architecture Overview



Version Support

		Spectralink 8400 Series 4.2.1.003
ShoreTel Release	13.2 (build 18.42.1304.0 and above)	✓

Note: Deployment of Spectralink 8400 handsets require ShoreTel SIP Device License(s) (one per Spectralink 8400 handset) as well as the either the Extension & Mailbox License OR the Extension Only License

Certification Testing Results Summary

Table 1: Basic Feature Test Cases

ID	Name	Description	Results
1.1	Device initialization with static IP address	Verify successful startup and initialization of the device up to a READY/IDLE state using a static IP address	Pass
1.2	Device reset – idle (for static configurations)	Verify successful re-initialization of device after power loss while device is idle	Pass
1.3	Device initialization with DHCP	Verify successful startup and initialization of the device up to a READY/IDLE state using DHCP	Pass
1.4	Device reset – idle (for dynamic configurations)	Verify successful re-initialization of device after power loss while device is idle	Pass
1.5	Verify Diffserv Code Point support	Verify the ability to set Diffserv Code Point from SIP DUT (device under test)	Not Tested
1.6	Verify Date and Time Update support	Verify setting of Date and Time Update on SIP DUT	Pass
1.7	Place call	Verify successful call placement with normal dialing to a variety of terminating phones	Pass
1.8	Receive call	Verify successful call placement with normal dialing to a variety of terminating phones	Pass
1.9	Place call - redial	Verify successful call placement using re-dial to SIP Reference	Pass
1.10	Place call – speed dial	Verify successful call placement using programmed speed dial	Pass
1.11	CODEC support (DUT to ShoreTel Phone)	Verify successful call connection and audio path using all supported CODECs (G.711-Ulaw and G.729)	Pass
1.12	CODEC support (DUT to SIP reference)	Verify successful call connection and audio path using all supported CODECs (G.711-Ulaw and G.729)	Pass
1.13	CODEC negotiation	Verify successful negotiation between devices configured with different default CODECs (G.711-Ulaw and G.729)	Pass
1.14	Hold DUT to SIP reference	Verify successful hold and resume of connected call	Pass
1.15	Hold DUT to ShoreTel	Verify successful hold and resume of connected call	Pass

ID	Name	Description	Results
1.16	Forward	Verify successful forwarding of incoming calls	Pass
1.17	Forward from SIP DUT	Verify successful forwarding of incoming calls	Pass
1.18	Mute	Verify device's mute function	Pass
1.19	Out-of-band/ In-band DTMF Transmission	Verify successful transmission of in-band and out-of-band digits (RFC2833) for calls placed to and from the DUT with a variety of other devices	Pass Note-1
1.20	Missed call notification	Verify that device notifies the user about missed calls	Pass
1.21	Volume	Verify the device's volume adjustment function	Pass

Note 1: DTMF tones initiated by the Spectralink 8400 handsets work properly with Auto Attendant menus and other automated equipment that require tones. The test plan also tests the phones capability of sending tones and receiving DTMF tones from other devices (i.e. ShorePhones and other SIP endpoints). The Spectralink 8400 handsets properly send DTMF tones to the other devices and are heard by the remote device, but when the Spectralink is receiving tones from these devices it does not play the tone to the user. Since we can think of no application that would be affected by this we marked it as a passed test case.

Table 2: Extended Feature Test Cases

ID	Name	Description	Notes
3.1	Call waiting	Verify appropriate notification and successful connection of incoming call while busy with another party	Pass
3.2	Park	Verify successful park and retrieval of connected call	Pass
3.3	Extended forward	Verify extended call forwarding options – busy forwarding, ring no answer forwarding	Pass
3.4	Extended forward from SIP DUT	Verify extended call forwarding options – busy forwarding, ring no answer forwarding	Pass
3.5	Transfer – blind	Verify successful blind transfer of connected call	Pass
3.6	Transfer – monitored	Verify successful monitored transfer of connected call	Pass
3.7	Conference – ad hoc	Verify successful ad hoc conference of three parties	Pass Note-2
3.8	Place call – secondary line	Verify successful call placement using secondary line	Pass
3.9	Receive call – secondary line	Verify successful connection of incoming call on secondary line	Pass
3.10	Callback	Verify successful connection of a call using the missed-call callback feature of the device	Pass
3.11	Headset	Verify the device's support for external headsets (using headsets supplied by the 3P phone vendor)	Not Tested Supported by DUT
3.12	Ring selection	Verify the device's ability to change the ring type	Pass

Note 2: Spectralink 8400 handsets default to a maximum of three participants to a conference call. The system administrator can increase the maximum number of participants to a conference call.

ID	Name	Description	Notes
3.13	Caller ID	Verify that Caller ID name and number is sent and received from SIP endpoint device	Pass
3.14	SIP Device Generates Busy Tone	Verify that SIP DUT generates busy tone when calling a busy extension	Pass
3.15	POTS Analog Gateway supports the transfer operation by "flashing"	Verify that the POTS Analog Gateway can support the transfer operation by "flashing"	N/A
3.16	911	Verify dialing "911" on DUT could connect with "911" services	Pass Note-3
3.17	Fax Handling	Verify that fax can be sent and received through DUT	N/A
3.18	Auto Attendant Menu	Verify that DUT can initate calls properly to a ShoreTel Auto Attendant menu and that you can transfer to the desired extension.	Pass
3.19	Auto Attendant Menu "Dial by Name"	Verify that DUT can initiate calls properly to a ShoreTel Auto Attendant menu and that you can transfer to the desired extension using the "Dial by Name" feature.	Pass
3.20	Auto Attendant Menu checking Voice Mail mailbox	Verify that DUT can initiate calls properly to a ShoreTel Auto Attendant menu and that you can transfer to the Voice Mail Login Extension.	Pass
3.21	Initiate call to a Hunt Group	Initiate a call from DUT and verify that calls route to the proper Hunt Group and are answered by an available hunt group member with audio in both directions using G.729 and G.711 codecs.	Pass
3.22	Initiate call to a Workgroup	Initiate a call from DUT and verify that calls route to the proper Workgroup and are answered successfully by an available workgroup agent with audio in both directions using G.729 and G.711 codecs.	Pass
3.23	Hunt Group Member	Verify that incoming calls to a hunt group can be answered properly when DUT is a member of the hunt group.	Pass
3.24	Workgroup Agent	Verify that incoming calls to a workgroup can be answered properly when DUT is an agent of the workgroup.	Pass
3.25	Call Forward – "FindMe"	Verify that calls are forwarded to DUT's "FindMe" destination. Verify that DUT works properly when it's a "FindMe" destination	Pass
3.26	ShoreTel Converged Conferencing Server	Verify that calls are properly forwarded to the ShoreTel Converged Conferencing Server and it properly accepts the access code and you're able to participate in the conference.	Pass
3.27	Bridged Call Appearance (BCA) extension	Verify that DUT can initiate calls properly to a BCA extension and the call is presented to all of the phones that have BCA configured. Verify that the call can be answered, placed on-hold and then transferred.	Pass
3.28	Additional Phones (Simulring)	Verify that calls ring simultaneously on DUT and ShoreTel IP Phone	Pass

Note 3: The Spectralink 8400 Series handsets can generate calls to emergency numbers (911), but we did not test calling an actual emergency services center, calls were made in a controlled environment to verify call placement.

Configuration Overview

The following steps are required to configure the Spectralink 8400 handsets to work with the ShoreTel system.

ShoreTel Configuration

This section describes the ShoreTel system configuration to support the Spectralink 8400 handsets. The section is divided into general system settings and individual user configurations needed to support the Spectralink 8400 handsets.

ShoreTel System Settings - General

The first settings to address within the ShoreTel system are the general system settings. These configurations include the call control, the switch, and the site settings. If these items have already been configured on the system, skip this section and go on to the "ShoreTel System Settings – Individual Users" section below.

Call Control Settings

The Call Control Options within ShoreWare® Director may need to be reconfigured. To configure these settings for the ShoreTel system, log into ShoreWare Director and select "**Administration**", "**Call Control**", and then "**Options**" (**Figure 2**).

Figure 2 – Administration Call Control/Options

The "Call Control/Options" screen will then appear (**Figure 3**).

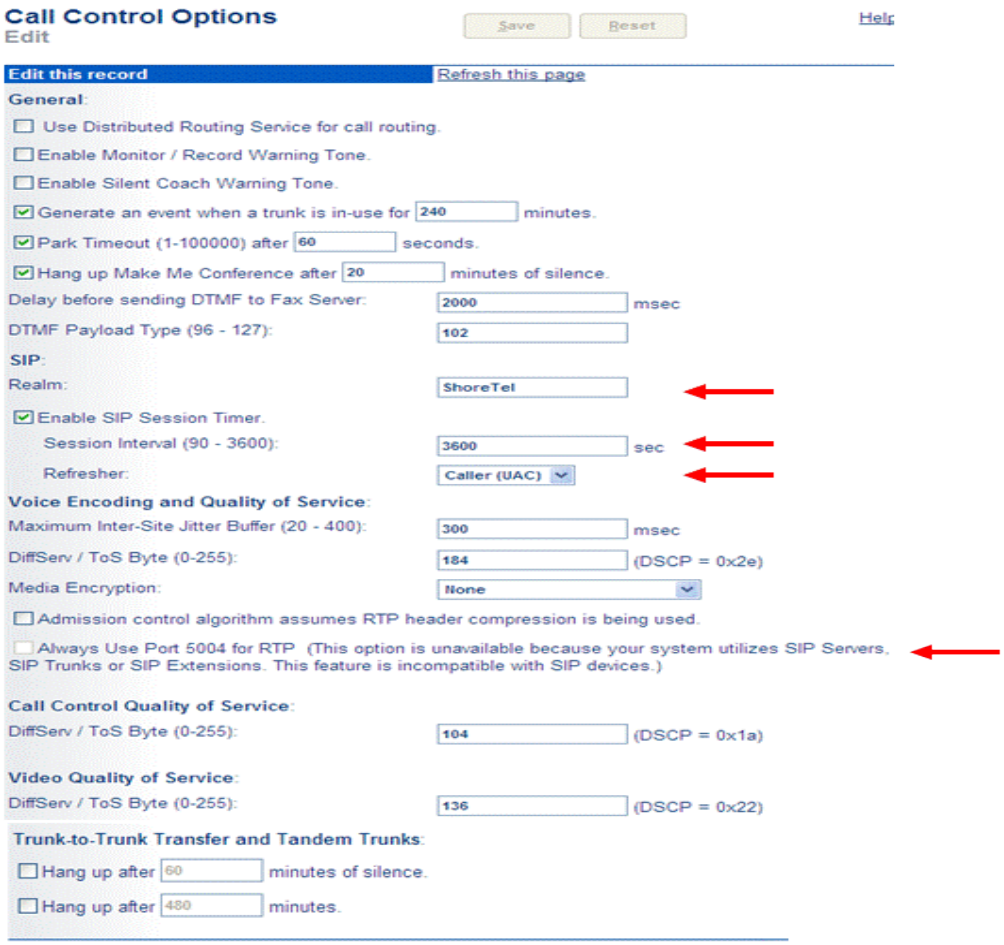


Figure 3 – Call Control/Options Screen

- If this is an upgrade from previous ShoreTel versions, you may see a parameter named "Always Use Port 5004 for RTP" If so, you will need to disable this parameter by un-checking the box and saving the setting. When enabled, SIP extension configuration will fail. It is also important to note that this "one time" setting requires a system restart (all servers first, then ShoreGear switches followed by IP Phones) to take effect. Once the server has been restarted, this configuration parameter will no longer be visible, or may be grayed out. The default for new installations is disabled, thus the parameter is not visible (as shown in Figure 3).
- **Realm**: The realm is used in authenticating all SIP devices. It is typically a description of the computer or system being accessed. Changing this value will require reboot of switches serving as SIP extensions. It is not necessary to modify this parameter to get the solution functional.
- SIP session interval: Session interval value indicates the session (call) "keep alive" period. There is no need to modify the default value of 3600 seconds.
- SIP session refresher: The refresher setting decides if user agent client or user agent server refreshes the session. Again, there is no need to modify the default value of "Caller (UAC)." This allows to be in control of the session timer refresh.

Switch Settings - Allocating Ports for SIP Extensions

When allocating Ports for SIP extensions, these changes are modified by selecting "**Administration**" then "**Voice Switches / Service Appliances...**" followed by "**Primary**" in ShoreWare Director (**Figure 4**).

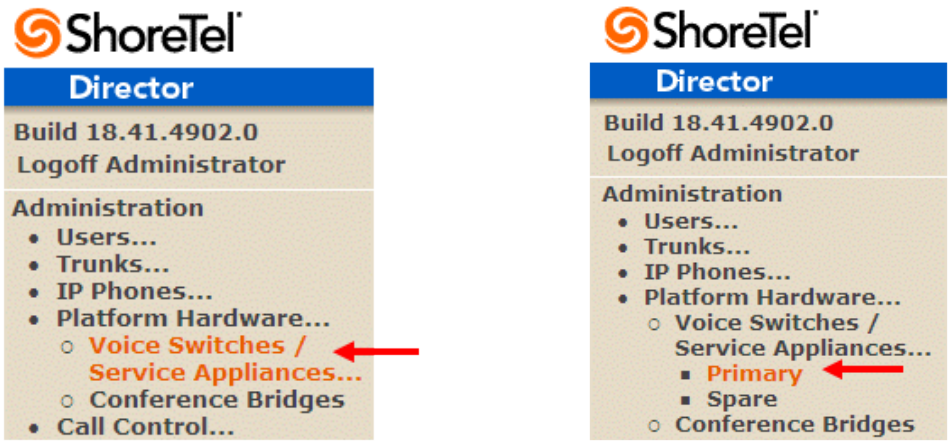


Figure 4 – Administration/Switches

This action brings up the "Switches" screen. From the "Switches" screen, simply select the name of the switch to configure. The "Edit ShoreGear …Switch" screen will be displayed. Within the "Edit ShoreGear …Switch" screen, define one of the "Port Type" settings from the available ports to "100 SIP Proxy" (**Figure 5**) as well as sufficient "IP Phone" ports to support the total number of Spectralink 8400 handsets, then save the change.

Note: If your installation requires more than 100 SIP extensions, configure the "Port Type" as "100 SIP Proxy" as necessary (i.e. two ports configured for "100 SIP Proxy" will provide 200 SIP extensions). Remember, SIP endpoints also utilize IP Phone Ports.

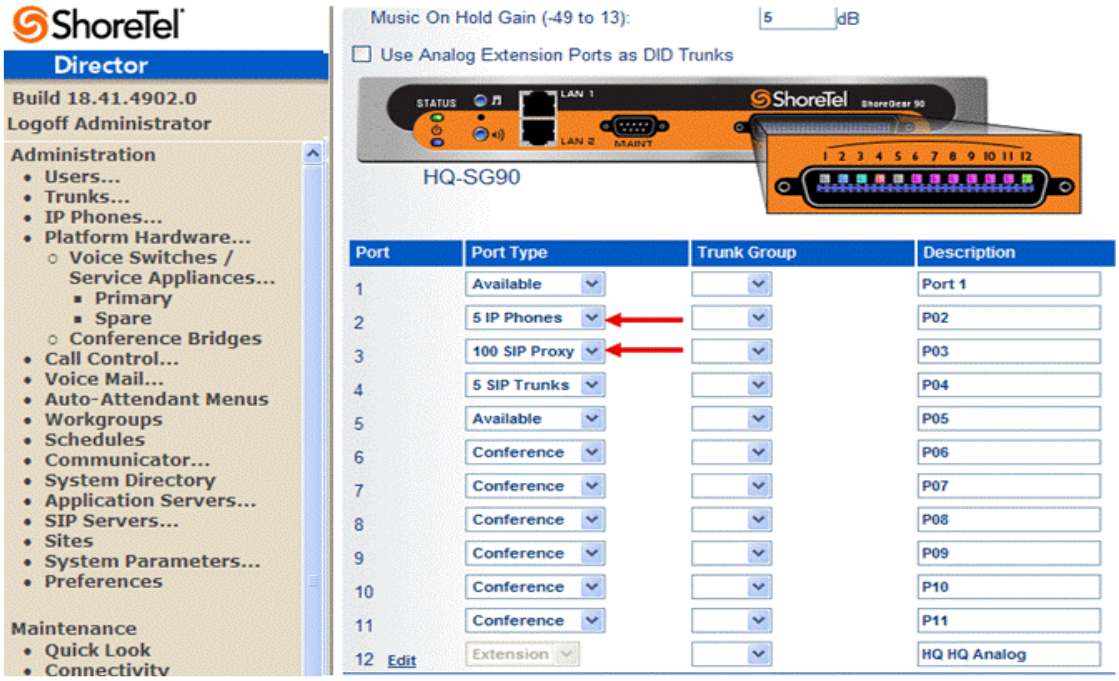


Figure 5 – Edit Switches

If the ShoreGear switch that you have selected has "built-in" capacity (i.e., ShoreGear 50/90/220T1/E1, etc.) for IP phones and SIP trunks, you can also remove 5 ports from the total number available to provide the "100 SIP Proxy" configuration necessary (**Figure 6**).

Note: Every 5 ports you remove from the total available will result in "100 SIP Proxy" ports being made available.

One dedicated ShoreGear 120 switch can act as a proxy for the entire site and support up to 2400 SIP phones.

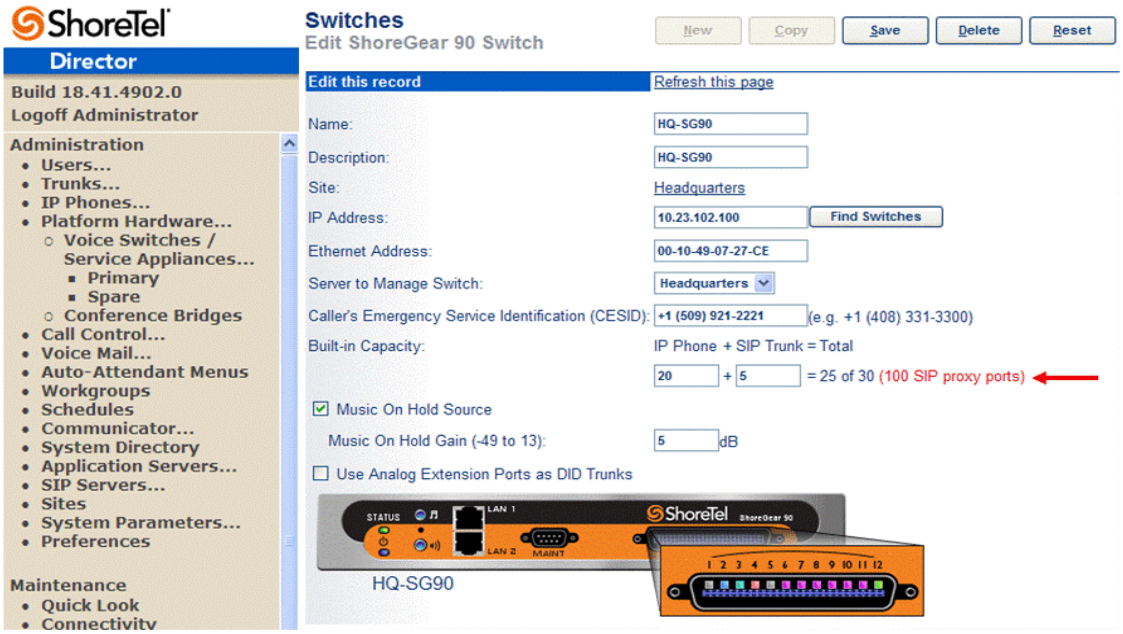


Figure 6 – ShoreGear Switch Built-in Capacity

Site Settings

The next settings to address are the administration of sites. These settings are modified under the ShoreWare Director by selecting "**Administration**" then "**Sites**" (**Figure 7**).

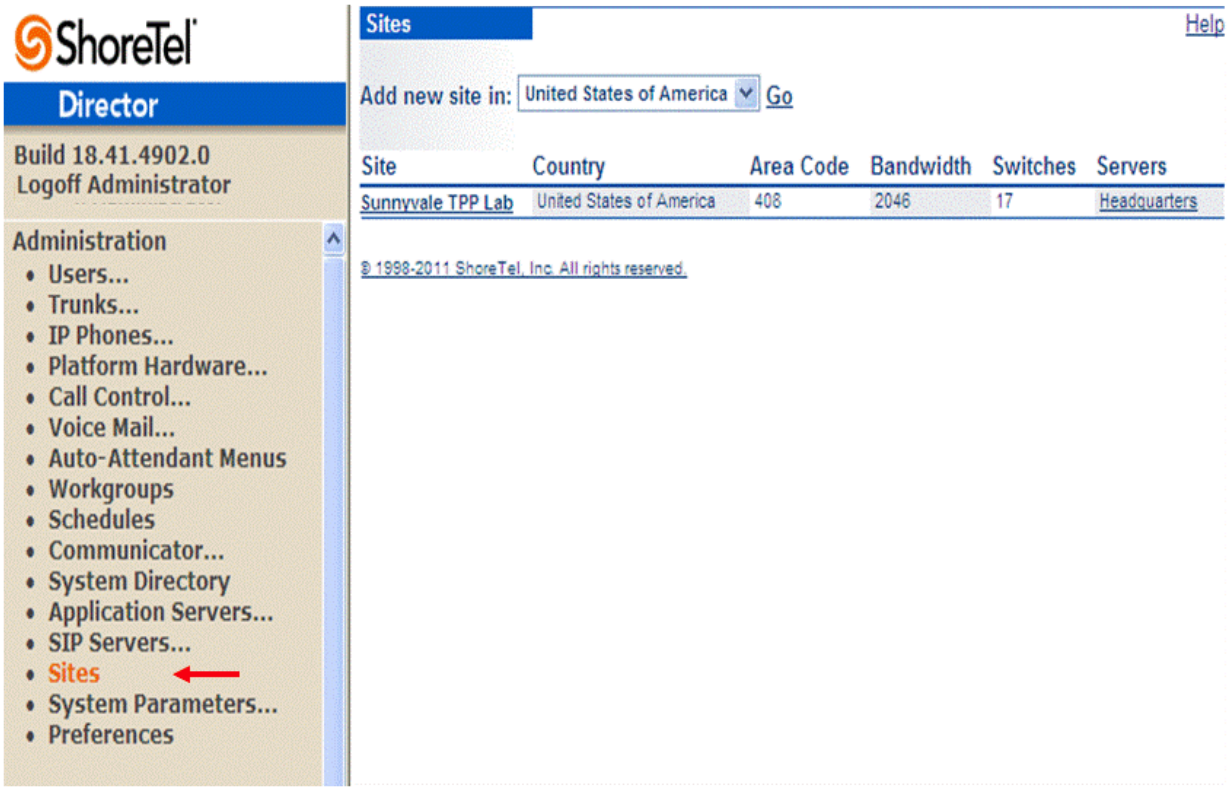


Figure 7 – Administration/Sites

This selection brings up the "Sites" screen. Within the "Sites" screen, select the name of the site to configure. The "Edit Site" screen will then appear. Scroll down to the "**SIP Proxy**" parameters (**Figure 8**).

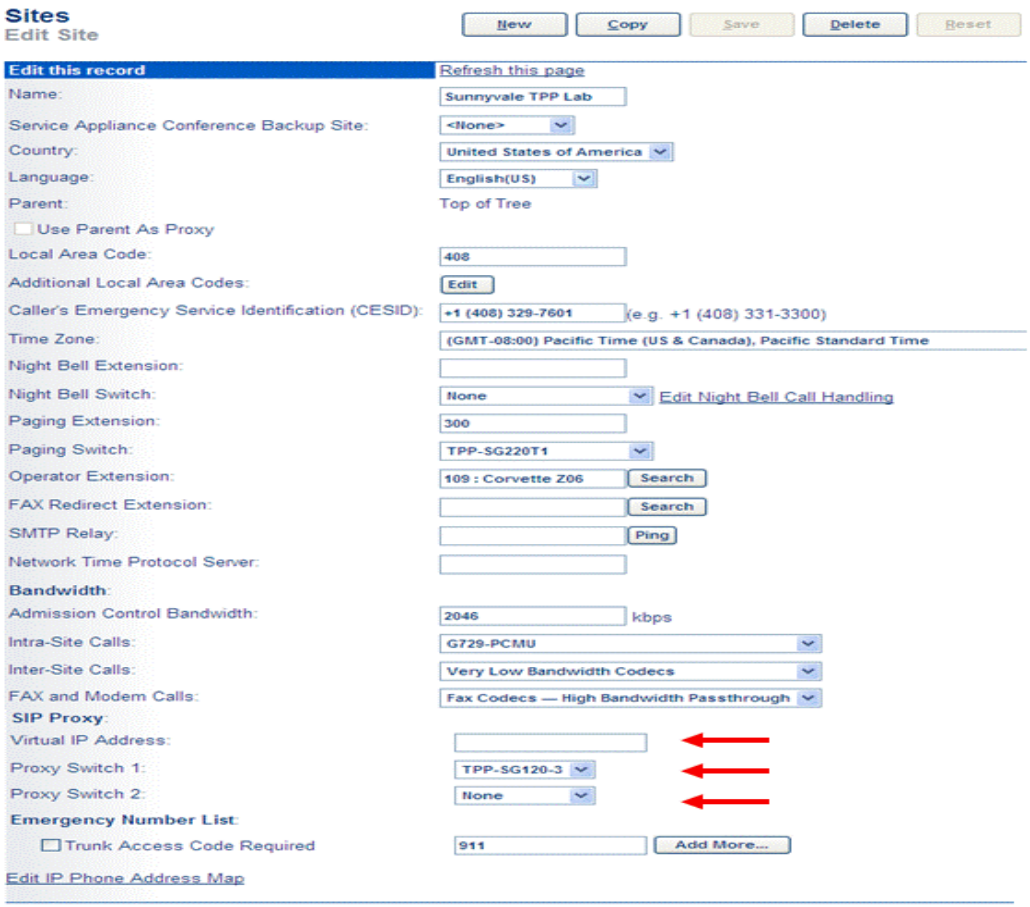


Figure 8 – Site Screen SIP Proxies

The "Virtual IP Address" parameter is a new configuration parameter beginning with ShoreTel 8. This "Virtual IP Address" is an IP address that can be moved to a different switch during a failure. For each site that supports SIP extensions, one "Virtual IP Address" is defined that will act as the SIP Proxy for the site. This IP address must be unique and static.

The ShoreTel server will assign this "Virtual IP Address" to the ShoreGear that is configured as SIP proxy for the site. Two ShoreGear switches can be configured as SIP proxy servers for redundancy and reliability purposes. If the primary proxy server goes down, the other proxy switch will take over the "Virtual IP Address." Due to this "Virtual IP Address" mechanism, SIP phones will not know if the proxy switch goes off-line.

Note: If you choose not to define a "Virtual IP Address," you can only define one proxy switch, and there will be no redundancy or failover capabilities. The switches available in the "Proxy Switch 1 / 2" will only be shown if proxy resources have been enabled on the switch.

The Admission Control Bandwidth defines the bandwidth available to and from the site. This is important as SIP endpoints may be counted against the site bandwidth. See the ShoreTel Planning and Installation Guide for more information about this.

ShoreTel 13.2 has 11 built-in CODECs by default. These CODECs can be grouped as "Codec Lists" and defined in the sites page for "Inter-site" and "Intra-site" calls. See ShoreTel's Administration Guide for more information. The default settings will work properly with the Spectralink 8400 handsets.

Creating SIP Extension

You need to create a user extension for a Spectralink 8400 handsets. This is accomplished from ShoreWare Director by selecting "**Administration**" followed by "**Users…**" then "**Individual Users**" This action will bring up the "Individual Users" screen at the top of the page. To the right of "**Add new user at site:**" select the site you wish to create the user in (from the drop down menu), and select "**Go**" (**Figure 8**).

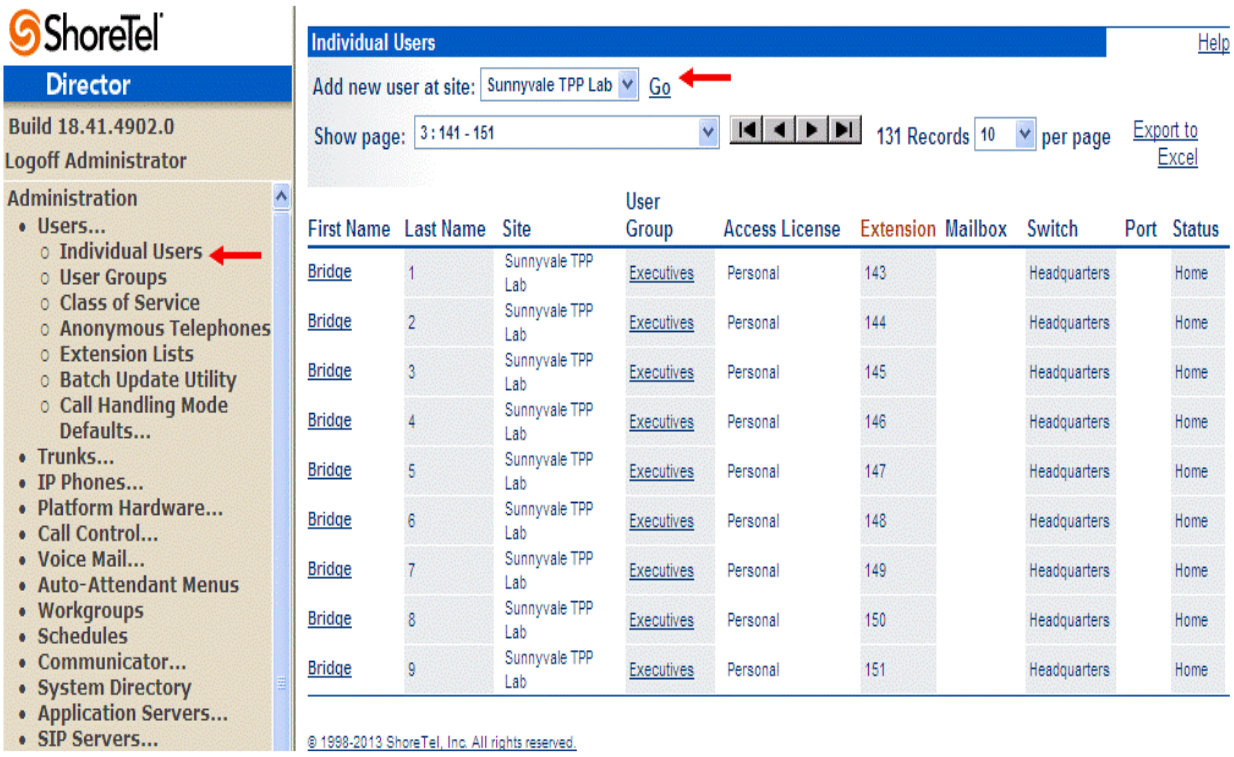


Figure 8 – Individual Users Settings

This action brings up the "Users" "Edit Users" screen (**Figure 9**).

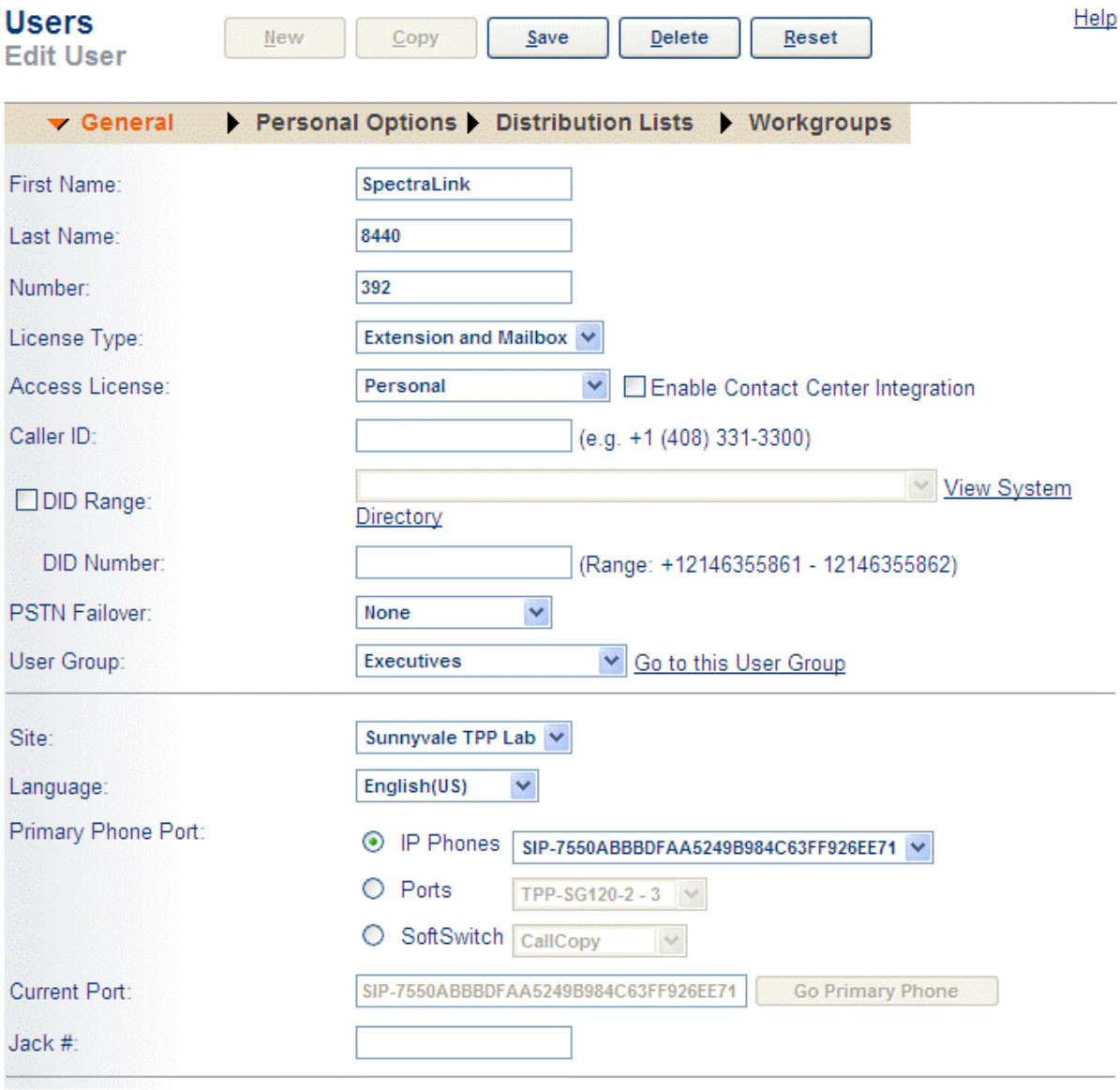


Figure 9 – Adding/Editing Users

Define the "**First Name**" and "**Last Name**" as you deem appropriate. ShoreWare Director will auto-assign the next available "**Number**" (i.e., extension), but you can modify it to any available extension. Define the "**License Type**" and "**Access Type**" as needed; in this example we chose "Extension and Mailbox" although it's not necessary to have a mailbox, and "Professional" for "Access License". Define the proper "**User Group**" and set the "**Primary Phone Port**" to "Any IP Phone", the Primary Phone Port will automatically update once the Spectralink 8400 handset registers to the ShoreTel system.

Note: If you configured the "License Type" for "Extension-Only," you cannot select "Any IP Phone" but instead must set the "Home Port" for the "SoftSwitch" selection. Save your changes, then scroll down to the "SIP Password:" section (**Figure 10**).

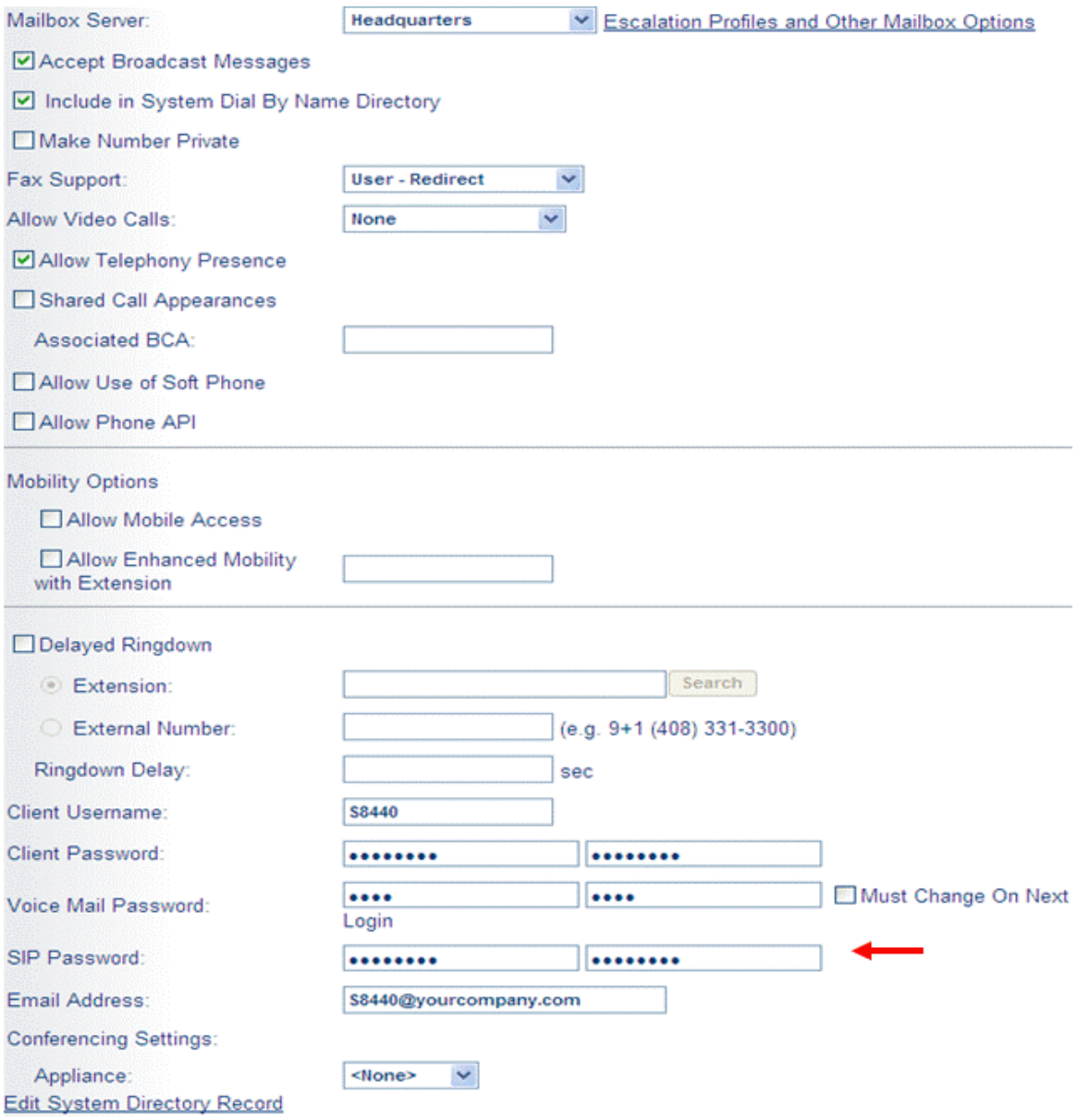


Figure 10 – Individual User SIP Settings

There is no default "**SIP Password**" it is masked with the appearance that there is, but don't be confused to think that there's a default password. You can modify it to any value you wish, but be certain to note what you changed it to, as you will need it when configuring the Spectralink 8400 handsets. **Save** your changes.

SIP Profiles

ShoreWare Director's , "IP Phones…" section contains the "SIP Profiles" option. Beginning with ShoreTel 8, the ShoreTel system comes standard with a "_System" and "_ShorePhoneIP8000" SIP profiles (they cannot be deleted - only disabled). By default, the Spectralink 8400 handset utilizes the "_System" profile. In order to optimize the functionality, you will need to add a custom profile. This is accomplished from ShoreWare Director by selecting "**Administration**" followed by "**IP Phones…**", then select "**SIP Profiles**" This action brings up the "SIP Profiles" screen. At the top of the page, below the "SIP Profiles List", select the "**New…**" radio button, as shown in Figure 11.

Figure 11 – SIP Profiles

This action brings up the "Edit SIP Profile" screen, Figure 12.

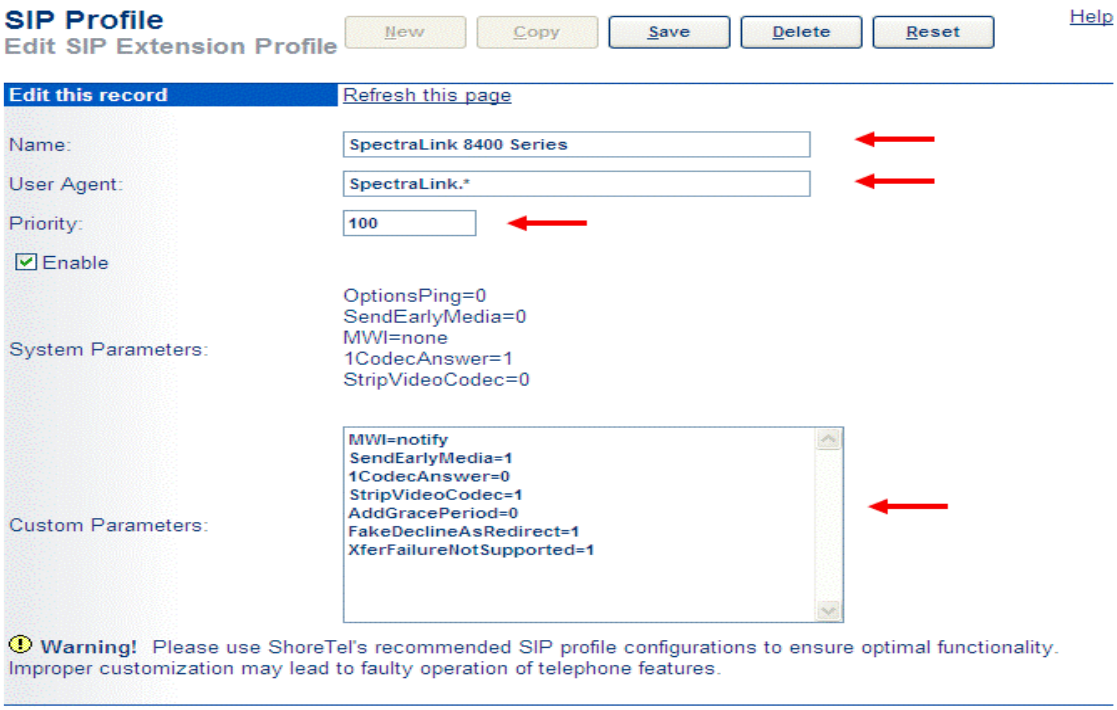


Figure 12 – Edit SIP Profile

Define a "**Name:**" for the entry as you deem appropriate, we recommend that you use a name that describes the SIP endpoint. For the "**User Agent:**" option, enter "Spectralink*." (without quotes, make sure to include the period followed by the asterisk) for the Spectralink 8400 handsets; the "**Priority:**" defaults to "100", no change is required. Enable the profile by checking (enabling) the "**Enable**" option. In the "**Custom Parameters:**" options, add the following entries:

MWI=notify
SendEarlyMedia=1
1CodecAnswer=0

StripVideoCodec=1
AddGracePeriod=0
FakeDeclineAsRedirect=1
XferFailureNotSupported=1

Save the changes.

Note: Please do not disable any of the default SIP profiles. In case there are issues with the custom profile defined, disabling the system profiles may cause the Spectralink 8400 handsets to not be added to the ShoreTel system. Refer to ShoreTel's Planning and Installation Guide for more information.

Spectralink 8400 Handset Configuration

To setup the Spectralink 8400 handsets with the ShoreTel system, it must first be installed and operating on the network, please refer to the respective Spectralink 8400 Series Wireless Telephone Deployment Guide or UC Software Administrator's Guide at:

http://support.spectralink.com/SpectralinkService/support/us/support/voice/wi-fi/spectralink_8400_wireless.html

Note: Spectralink strongly recommends using configuration files hosted by a centralized server for all Spectralink 8400 Series Handset configuration and settings. Please see Spectralink's setup & maintenance documents on configuration file management in the troubleshooting section at the end of this document. If a centralized server is unavailable, you may configure the devices by hand as directed below.

To configure the Spectralink 8400 handsets we used a DHCP server for the network parameters, and then manually provisioned the minimum configuration parameters required for validation with the ShoreTel system.

Spectralink 8400 Phone Settings – Phone User Interface

The following settings will be managed through the phone's menu interface:

1. From the Home screen, navigate to **Settings**, then **Advanced Settings**.
2. At the **Enter Password** prompt, enter the administrative password (The default password is **456**).
3. Select **Administration Settings**, then **Line Configuration**.
4. Set the **Calls Per Line Key** parameter as desired.
5. Navigate to the parameter **Line 1**and press the **OK** key.
6. Enter the desired **Display Name**. Use the **Mode** softkey to toggle between text and numbers.
7. Navigate to the parameter **Address** and enter the desired address (example: 392 Our example is set as the extension number associated for this user created in ShoreWare Director). Use the **Mode** softkey to toggle between text and numbers.
8. Navigate to the parameter **Label** and enter the desired label (example: 392) as you would like it to be displayed on the Spectralink 8400 handset. Use the **Mode** softkey to toggle between text and numbers.

9. Navigate to the parameter **Authentication**, and enter the desired **User ID**, this is the extension number associated for this user created in ShoreWare Director.
10. Next enter the **Password**, this is the SIP Password configured for this user in ShoreWare Director.
11. Navigate to the parameter **SIP Protocol**, and verify that the parameter **Enabled** is configured for **Yes**.
12. Navigate to the parameter **Server 1**.
13. For the parameter **Address**, enter the IP Address of the ShoreGear SIP Proxy Switch.
14. For the parameter **Port**, enter **5060**.
15. Verify the parameter **Register** is configured for **Yes** (Default).
16. Verify the parameter **Transport** is configured for **Naptr** (Default).
17. Press the **Back key** four times.
18. Select **Save Config**.
19. The Spectralink 8400 will reboot and register to your ShoreTel IP Phone system.

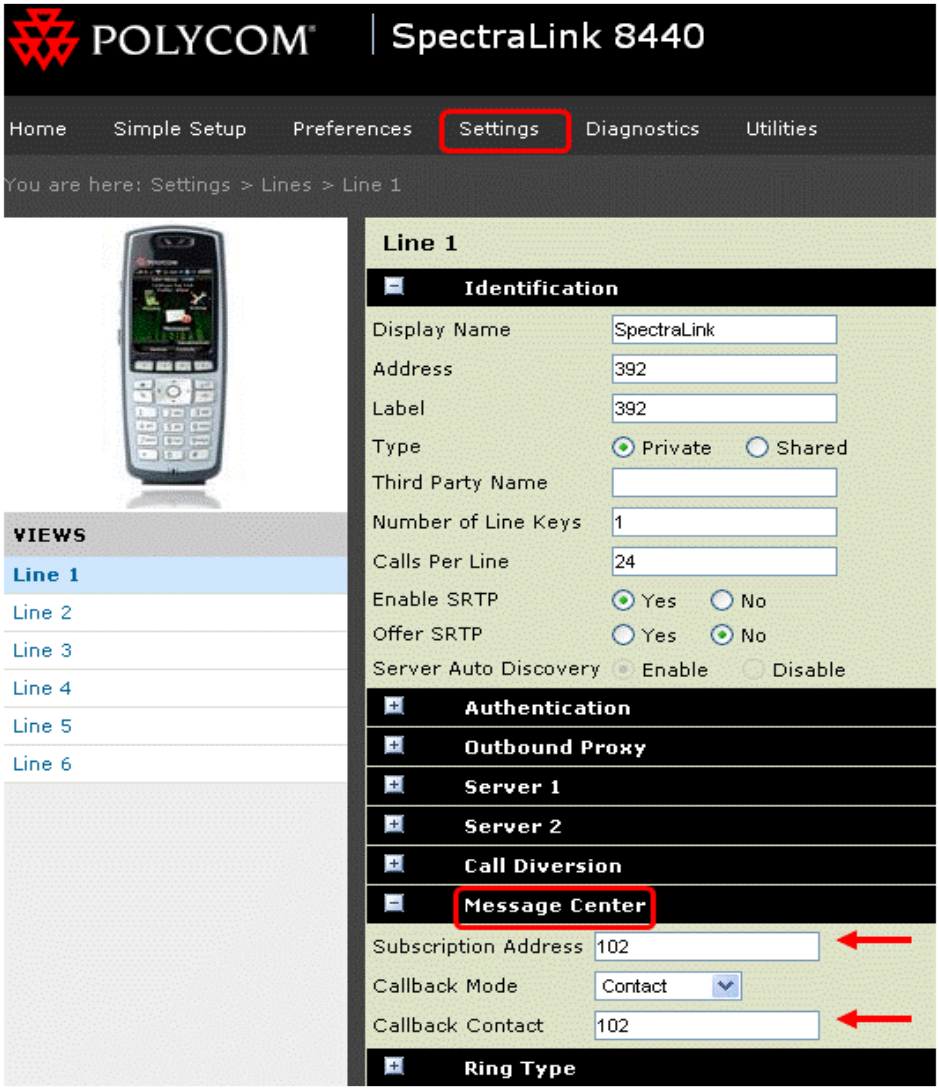
Spectralink 8400 Settings – Web Configuration Utility

In order to adjust settings via the Web Configuration Utility, you need the Spectralink 8400's IP address. Use the following steps to retrieve the Spectralink 8400's IP address.

1. From the Home screen, navigate to **Settings**, then **Status**.
2. Select **Network**, then **TCP/IP Parameters**.
3. The LCD will display the IP address of your Spectralink 8400 handset; it will be displayed at the field **IP: xxx.xxx.xxx.xxx**.

Once you have retrieved the IP address of the Spectralink 8400 handset you can set the ShoreTel Voice Mail Login Extension, in order to access your voice mail messages using your Spectralink 8400 handset.

1. Bring up a web browser on a PC/Laptop that is on the same network as, or with network access to the Spectralink 8400 handset.
2. Enter the Spectralink 8400's IP address in the browser's address bar, for example: http://xxx.xxx.xxx.xxx
3. You will be prompted to login as an **Admin** or **User.** Select **Admin**, the default administrative password is "**456**", then click **Submit**.
4. Once logged into the Web Configuration Utility, click the menu item **Settings**, and then scroll down to **Lines**.
5. Select the corresponding **Line** number, then click on the **+** to expand the section **Message Center**.



1. Enter the ShoreTel Voice Mail Login Extension into the fields for **Subscriber** and **Callback Contact**. In our example we configured the value of **102**, which can be found in ShoreWare Director, **Administration**, then **System Parameters...** followed by **System Extensions**.
2. Change the **Callback Mode** parameter to **Contact**.
3. Click **Save**, then at the **Confirmation** prompt, click **Yes** to save the change.

Troubleshooting

Refer to the following documents for troubleshooting tips.

- Technical Bulletins for Wi-Fi Communications
- UC Software Administrator's Guide (Chapter 11 Troubleshooting Your Phones)
- Spectralink 8400 Series Wireless Telephone Deployment Guide
- Safety Guide for Spectralink 8020/8030 and 8440/8450 Series Wireless Telephones

Spectralink Technical Support

Phone: 24x7x365

US/Canada: 1-800-775-5330 (Normal support hours are from 6am to 6pm Mountain Time)

EMEA: (Normal support hours are from 8am to 5pm Central European Time)

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- Germany: +08005889000
- Rest of EMEA: +44 2032841536

APAC: +61 290370834

Email: technicalsupport@spectralink.com

Emailed technical support issues will be addressed within 8 business hours of receipt. Please ensure all relevant information is provided at the time of submission to ensure a timely response back and allow for case creation.

Online Support Portal: http://support.spectralink.com

Support issues submitted via the Spectralink support portal will be addressed within 8business hours of receipt. For emergency or priority issues please call rather than utilizing the web portal to ensure a more timely response.

Document Feedback

ShoreTel IP PBX administrators who would like to provide feedback on the contents of this document should send it to INFeedback@ShoreTel.com.

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