

# SPA400 Internet Telephony Gateway with 4 FXO Ports



## Administration and Configuration Guide v1.0

## **Using the SPA400**

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The SPA400 features the ability to connect up to four (4) standard analog telephones lines to a Linksys Voice System (LVS) VoIP network and includes the additional benefit of a voicemail application. A total of 4 SPA400 devices can be configured per SPA9000 utilizing up to 16 analog phone lines and automatically routing calls to and from your existing PSTN telephone service.

Designed to be implemented only with a SPA9000, the SPA400 enables cost-conscious business users to utilize the high value features on the LVS that are typically found on much more expensive voice communications systems. The SPA400 includes an integrated voicemail application supporting up to 32 voicemail accounts with customized greetings, providing LVS users the ability to receive and playback voicemail messages.

This section provides all the necessary steps to make the SPA400 operational with the SPA9000 IP Telephony System. Refer to the other Chapters within this guide for information about configuring the SPA9000.

## **Understanding How the SPA400 Interacts with the SPA9000**

The SPA400 provides the SPA9000 access to the PSTN by connecting the FXO ports to analog lines. There are specific "Line" settings on the SPA9000 that are configured to recognize a SPA400 as a service enabling calls from an IP Phone on a LVS network to be routed out to the PSTN and vice versa. The SPA400 sets up and tears down calls between the PSTN and IP Phones offering seamless telephone service with Linksys VoIP equipment.

## **Using the SPA9000 Setup Wizard**

It is highly recommended that the SPA9000 Setup Wizard is used to install and configure the SPA400 Telephony Gateway on a LVS network. Version 1.1.0.3 (or higher) of the SPA9000 Setup Wizard supports the SPA400 for the initial or an existing LVS installation.

Connect the SPA400 to the network via the Ethernet port before running the SPA9000 Setup Wizard.

The latest version of the SPA9000 Setup Wizard can be downloaded from <http://www.linksys.com>.

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### Configuring the SPA400

The SPA400 *and the SPA9000* have corresponding fields that must be properly configured for a successful installation. If the SPA9000 Setup Wizard is not used, the SPA400 can alternatively be configured using the web-based configuration utility.

To access the Web-based configuration utility, launch a browser application and enter the IP address of the SPA400. By default, the SPA400 is configured to obtain an IP Address via DHCP. Running the SPA9000 Setup Wizard will automatically detect the IP Address of the SPA400 to simplify installation.

#### Accessing the Web-base Configuration Utility

Upon entering the IP Address of the SPA400 into the browser, a password request page will appear. The default User Name is **Admin**. Leave the password field blank (no password). Click the OK button to access the configuration utility.

Using a password to access the SPA400 prevents unauthorized users from changing the settings of the device. A new password can be entered by selecting the Administration Tab and then clicking on the Management menu item.

#### Configuring the SPA400 with the associated SPA9000 settings

The following section provides the principal steps to configure a SPA400 on a LVS network with a SPA9000. The example configuration assumes that a SPA9000 will be configured to access the PSTN only and therefore the SPA400 is configured in the "Line 1" tab on the SPA9000. However, if a VoIP Service Provider is also to be defined, then a SPA400 can be configured in any of the available Lines (1-4) tabs in the SPA9000 configuration utility.

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*A complete listing of all SPA400 menu items can be found towards the end of this guide that provides additional information on the SPA400 parameters and settings using the web-based configuration utility.*

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From the SPA400 configuration utility, click the Setup tab and select the SPA9000 Interface menu item.

#### User ID:

Enter the User ID of the SPA9000 in the User ID field. The User ID setting must be identical to the User ID configured in the associated field in the Line # on the SPA9000.

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## Discover Automatically:

The Discover Automatically radio button enables the SPA400 to learn the IP address and the UDP port of the SPA9000 from the SIP Registration packets sent by SPA9000.

## Static Address:

It is preferred that the SPA400 is configured with a static IP address. Enter the IP address and the UDP port of the SPA9000 to enable the SPA400 to listen for the SIP Registration request from the SPA9000

If the SPA9000 obtains an IP address from a DHCP server, it is preferred that the "Discover Automatically" option is selected to avoid registration failure due to SPA9000 IP address changes.

Figure 1 and Figure 2 reflect the web-based configuration utility for the SPA400 and SPA9000. In the configuration example below, the SPA400 is listed as the Line 1 service, permitting PSTN access for the SPA9000. The two User ID fields are referenced below with the identical "SPA9000" User ID entered on each configuration utility.

LINKSYS®  
A Division of Cisco Systems, Inc. Firmware Version: 1.0.0.2

4-Port FXO VoIP Gateway SPA400

Setup Administration Status Event Logs

Basic Setup SPA9000 Interface Voice Voicemail Server Voicemail Users

SPA9000 User ID

User ID: SPA9000

SPA9000 Address

Discover Automatically  
 Static Address

IP Address: 192.168.1.101

Port: 5060

Port ID

Port ID 1: FXO\_Port\_ID\_1  
Port ID 2: FXO\_Port\_ID\_2  
Port ID 3: FXO\_Port\_ID\_3  
Port ID 4: FXO\_Port\_ID\_4

Signaling

Signaling Port: 5060

RTP

RTP Port: 10000

IP ToS/DiffServ

Call Signaling Packets: 7 (2 Hex digit byte value)  
RTP Packets: b0 (2 Hex digit byte value)

Session

Enable Session Timer

Desired Refresh Time: 0 (sec)  
Minimum Refresh Time: 0 (sec)

Save Settings Cancel Changes

Figure 1: SPA400 Configuration Utility,  
Setup / SPA9000 Interface Page

LINKSYS®  
A Division of Cisco Systems, Inc. Linksys Phone Adapter Configuration

Router Voice

Info System SIP Provisioning Regional FXS 1 FXS Line 1 Line 2 Line 3 Line 4 P&I Status

User Logs Basic Advanced

Line Enable: yes

Network Settings

SIP ToS/DiffServ Value: 0x68 SIP CoS Value: 3 [0-7]

SIP Settings

SIP Port: 5060 SIP 100REL Enable: no

Auth Resync-Reboot: yes SIP Proxy-Require: no

SIP Remove Auth ID: yes SIP GUID: no

SIP Debug Option: none Restrict Source IP: no

Referer Bye Delay: 4 Refer Target Bye Delay: 0

Referer Bye Delay: 0 Refer-To Target Contact: no

Subscriber Information

Display Name: SPA9000 User ID: SPA9000

Password: Use Auth ID: no

Auth ID: Call Capacity: 4

Contact List: aa

Cfwd No Ans Delay: 20

Dial Plan

Dial Plan: (<9;>xxx.)

NAT Settings

NAT Mapping Enable: no NAT Keep Alive Enable: no

NAT Keep Alive Msg: \$NOTIFY NAT Keep Alive Dest: \$PROXY

EXT SIP Port:

Proxy and Registration

Proxy: 192.168.15.107 (SPA400 IP Address)

Outbound Proxy:

Use Outbound Proxy: no Use OB Proxy In Dialog: yes

Register: yes Make Call Without Reg: no

Register Expires: 3600 Ans Call Without Reg: no

Use DNS SRV: no DNS SRV Auto Prefix: no

Proxy Fallback Intvl: 3600 Proxy Redundancy Method: Normal

Mailbox Status: 106:2/0,107:0/0,104:1 Mailbox Subscribe URL: 8888@192.168.15.107:

Mailbox Deposit URL: 900@192.168.15.107:5 Mailbox Subscribe Expires: 2147483647

Mailbox URL: 800@192.168.15.107:5 VMSP Bridge: All

Figure 2: SPA9000 Configuration Utility,  
Voice / Line 1 Page

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Click Save Settings at the bottom of the page and then the Restart button on the SPA400 configuration utility. The SPA400 device will reboot. Continue to *Configuring the SPA9000 to register the SPA400*.

### Configuring the SPA9000 to register the SPA400

There are three settings that must be configured on the SPA9000 to complete the SPA400 installation. Select the appropriate Line tab from the SPA9000 configuration utility (Line 1 is used in the example in Figure 2). From this configuration page, the following fields must match the settings entered in the SPA400 configuration:

SIP Settings: SIP Port = **5060** (*SPA400 Port*)  
Subscriber Information: User ID = **SPA9000** (*SPA400 User ID*)  
Proxy and Registration: Proxy = **192.168.15.107** (*SPA400 IP Address*)

Click the Submit All Changes button on the SPA9000 configuration utility. The SPA9000 device will reboot.

The SPA9000 is now configured to access the PSTN allowing calls to be routed to and from the analog line(s) connected to the SPA400.

### Using the Integrated Voicemail Application Server - Optional

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The SPA400 includes a USB Adapter with an integrated voicemail application, providing an essential voicemail service for users (or extensions) configured on a SPA9000. The integrated voicemail application server supports 32 configurable voicemail accounts enabling users to leave and play back voice messages. (Although a SPA9000 can be configured with up to 4 SPA400 devices, only 1 SPA400 can be configured with the voicemail application).

The SPA9000 can be configured with up to four SPA400 devices, the voice mail service can either concentrate with one SPA400 or distribute among the four SPA400. However, an IP Phone can only subscribe to one mailbox from one SPA400..

#### Configuring the SPA400 Voicemail Server

The SPA400 *and the SPA9000* have corresponding fields that must be properly configured for a successful installation. If the SPA9000 Setup Wizard is not used, the SPA400 can alternatively be configured using the web-based configuration utility. Refer to *Accessing the Web-base Configuration Utility* in the section above.

From the SPA400 configuration utility, click the Setup tab and select the Voicemail Server menu item.

#### Server Port:

Enter the UDP port over which the Voicemail Server will listen for signaling between the SPA400 and the SPA9000. **Note:** This port number must be different from the UDP port configured in the *SPA9000 Interface* menu.

#### SPA9000 User ID:

Enter the User ID that the SPA9000 will use to register the SPA400 Voicemail Server. This setting must be identical to the User ID configured in the *SPA9000 Interface* menu.

#### SPA9000 Subscriber ID:

Enter a Subscriber ID that the SPA9000 uses to subscribe to the SPA400 Voicemail Server for obtaining notification.

#### Mailbox Deposit Number:

Enter the associated telephone number that the SPA9000 uses to deposit voicemail.

#### Mailbox Access Number:

Enter the associated telephone number that the SPA9000 uses to access voicemail.

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Click Save Settings at the bottom of the page and then the Restart button on the SPA400 configuration utility. The SPA400 device will reboot. Continue to *Configuring the SPA9000 Voicemail Settings*.

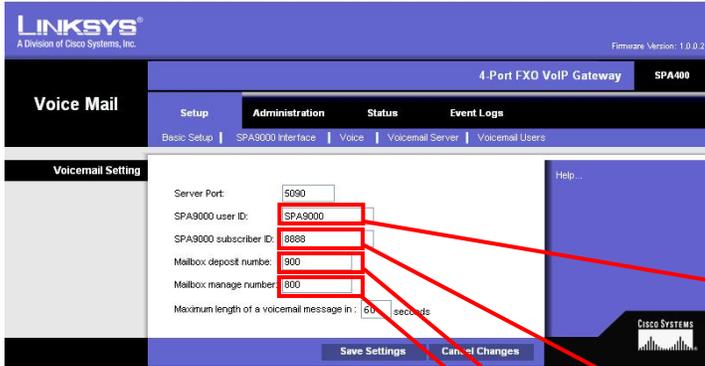


Figure 3: SPA400 Configuration Utility, Setup / Voicemail Server Page

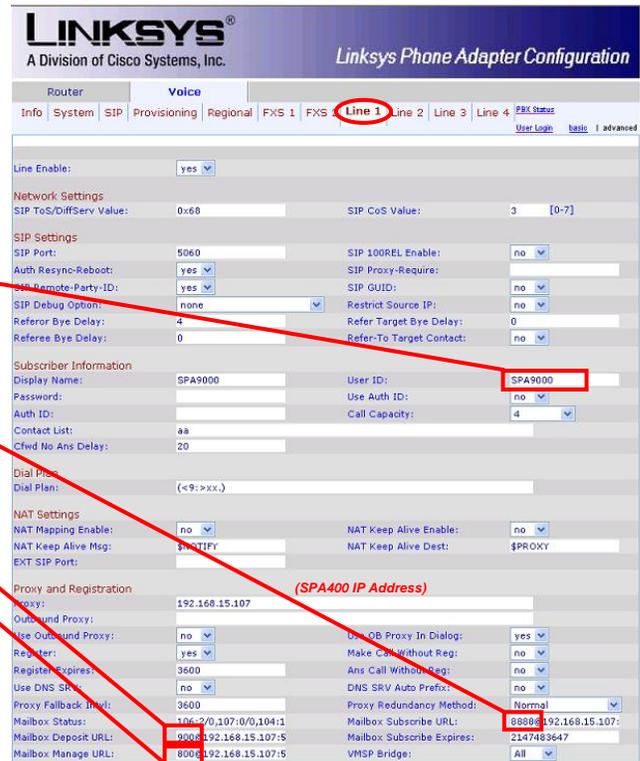


Figure 4: SPA9000 Configuration Utility, Voice / Line 1 Page

## Configuring the SPA9000 Voicemail Settings

The parameters entered in the SPA400 Voicemail Server fields must also match in the SPA9000 configuration utility under the associated Line # used for the SPA400 Voicemail Server.

The example in Figure 4 assumes the SPA9000 is configured to use Line 1. The configuration and installation of the SPA400 and the integrated voicemail application server can be configured on the same SPA9000 Line tab. It is not a requirement to configure the SPA400 and Voicemail Server using separate SPA9000 Line tabs.

Three settings (URL) must be configured to enable the SPA9000 users to subscribe, access, deposit, and manage their voicemail services. The settings are entered in their respective fields on the SPA9000 in the following format:

**<service\_id#>@<spa400\_ip\_address>:<port>**

Where **service\_id#** and **port** must match the setting entered in the SPA400 Voicemail Server menu defined in Figure 3.

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From the SPA9000 Line 1 tab, the following fields must match the settings entered in the SPA400 Voicemail Server page. From the example above, the settings would be as follows:

Subscriber Information: User ID = **SPA9000** (*SPA9000 User ID*)  
Proxy and Registration: Mailbox Deposit URL= **900@192.168.15.107:5090** (*Mailbox Deposit Number*)  
Proxy and Registration: Mailbox Manage URL= **800@192.168.15.107:5090** (*Mailbox Manage Number*)  
Proxy and Registration: Mailbox Subscribe URL= **8888@192.168.15.107:5090** (*SPA9000 Subscriber ID*)

Click the Submit All Changes button on the SPA9000 configuration utility. The SPA9000 device will reboot. The SPA400 and the SPA9000 are now configured to use the integrated voicemail application server.

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## Configuring SPA400 Voicemail Accounts

The SPA400 supports up to 32 voicemail accounts providing LVS Users the ability to receive and playback voicemail messages. Creating a voicemail account for an LVS User requires entering a Mailbox ID in the configuration of their SPA IP Phone and then associating it to a SPA400 Voicemail User ID.

A Voicemail User ID is defined as a valid SPA IP Phone extension that has been configured in the SPA9000. Voicemail User IDs and passwords may be added or changed from the SPA400 configuration utility.

From the SPA400 configuration utility, click the Setup tab and select the Voicemail Users menu item. If the installation and configuration of the SPA400 was initially performed using the SPA9000 Setup Wizard, each extensions configured for voicemail will be populated in the SPA400 Voicemail Users page. By default, a user's voicemail account will be active with the password to access the voicemail account being identical to their extension (i.e., ext.=100 password=100).

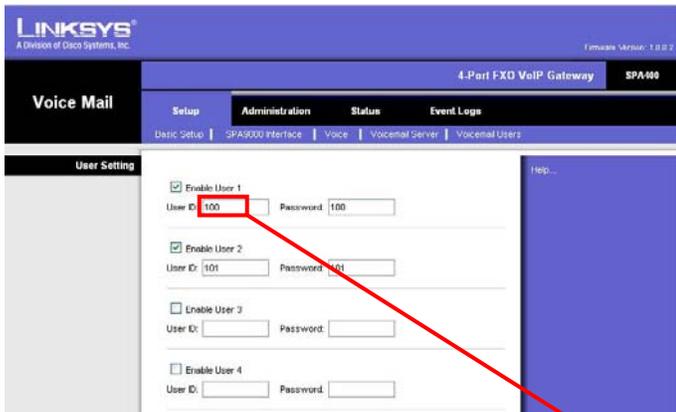


Figure 5: SPA400 Configuration Utility, Setup / Voicemail Users Page



Figure 6: SPA IP Phone Configuration Utility, Ext 1 Page

Click Save Settings at the bottom of the page and then the Restart button on the SPA400 configuration utility. The SPA400 device will reboot. Continue to *Configuring a SPA IP Phone for Voicemail Service*.

## **Configuring a SPA IP Phone for Voicemail Service**

Each valid SPA IP Phone extension configured in the SPA9000 may be configured for voicemail service. The SPA IP Phone configuration page (Figure 6) can be accessed by either clicking on the *PBX Status* link in the upper right location of the SPA9000 configuration utility or by entering the SPA IP Phone IP address into the browser.

From the SPA IP Phone configuration utility, click the Ext 1 tab. The voicemail setting is entered in the Mailbox ID field in the following format:

**<line#><User ID>**

Where **<line#>** refers to the SPA9000 Line (1–4) of the SPA400 configuration and **<User ID>** must match the setting entered in the SPA400 Voicemail Users menu.

From the example in Figure 5 and Figure 6, the setting is as follows:

Call Feature Settings: Mailbox ID = **1100**

The IP address reflected in the Voice Mail Server field on the SPA IP Phone Ext 1 page (Figure 6) is correctly configured as the IP address of the SPA9000. The SPA9000 acts as a proxy to the SPA400 voicemail server.

Click the Submit All Changes button on the SPA IP Phone configuration utility. The SPA IP Phone will reboot. The SPA IP Phone has now been configured to access the voicemail service.

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LVS Voicemail Users may refer to the *SPA IP Phone Voicemail Quick Reference Card* for details on using the voicemail service.

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## SPA400 Configuration Utility Menu Options

Advanced menu items for the SPA400 are set through the Web-based Configuration Utility.

### Setup: Basic Setup

#### Data – Network Setup

<b>Dynamic IP Address</b>	Check this button for obtaining networking parameters from a DHCP server
<b>Fixed IP Address</b>	Check this button to allow the SPA400 to be configured with a Static IP address
<b>IP Subnet Mask</b>	Subnet mask
<b>Gateway IP Address</b>	IP address of the Gateway/Router

#### Data – Domain Name Server Address

<b>Primary DNS</b>	IP address of the primary domain name server
<b>Secondary DNS</b>	IP address of the secondary domain name server

#### Data – NTP

<b>NTP Server</b>	IP address or FQDN of a NTP server
<b>Time Zone</b>	Select the time zone

### Setup: SPA9000 Interface

#### Data – SPA9000 User ID

<b>User ID</b>	The User ID of the SPA9000. Must be identical to the User ID configured in the SPA9000 Line # tab
<b>Discover Automatically</b>	Select this radio button if you want the SPA400 to learn the SPA9000 User ID from the SIP Registration packet sent by the SPA9000. You will need to specify the SPA9000 IP address and the UDP port. The SPA400 listens for the SIP Registration request from SPA9000. ..
<b>Static Address</b>	Select this radio button to enter the IP address of SPA9000 “Static Address” means the SPA400 won't automatically discovery the SPA9000's IP address and port number. User has to specify it in the “IP Address” and “Port” fields. It also means SPA400 will only accept the SIP message from this address.
<b>IP Address</b>	IP address of the SPA9000
<b>Port</b>	UDP port number that SPA9000 registers its User ID to SPA400

#### Data – Port ID Each line port on the SPA400 may have a unique ID to allow the SPA9000 to identify incoming calls from PSTN

<b>Port ID 1</b>	ID of port 1
<b>Port ID 2</b>	ID of port 2
<b>Port ID 3</b>	ID of port 3
<b>Port ID 4</b>	ID of port 4

#### Data – Signaling

<b>Signaling Port</b>	UDP port that SPA400 listen for incoming call setup request
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#### Data – RTP

<b>RTP Port</b>	Base UDP port that SPA400 uses for RTP and RTCP. SPA400 uses a block of UDP ports for sending/receiving RTP and RTCP packets starting from this port number.
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#### Data – IP ToS/DiffServ

<b>Call Signaling Packets</b>	TOS field in IP header for outgoing SIP packets
<b>RTP Packets</b>	TOS field in IP header for outgoing RTP/RTCP packets

#### Data – Session

<b>Enable Session Timer</b>	Check this button if you want the SPA400 to encode the Timer header in all INVITE requests for ringing timeout.
<b>Desired Refresh Time</b>	Desired session timer in seconds.
<b>Minimum Refresh Time</b>	Minimum value of the session timer, in seconds, that SPA400 prefers.

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## Setup: Voice

### Data – Voice Coders

<b>Preferred Coder</b>	Select the preferred voice codec that SPA400 uses to negotiate with remote VoIP devices for determining the voice codec.
<b>Packetization</b>	Select the packetization time for a voice coder.
<b>VAD</b>	Enable or disable Voice Activity Detection for a voice codec.

### Data –Calling Timers

<b>Wait-for-Answer time</b>	Specify the time in seconds that SPA400 wait for the called party to answer the call. If the called party does not answer the call within this time period, the call is terminated automatically.
<b>Call Limit</b>	Specify the maximum number of seconds for a call. When the duration of a call exceeds this value, the call is terminated automatically.

### Data –Dialing Parameters

<b>Tone out on</b>	Specify the tone on time in millisecond for an out dialing DTMF digit.
<b>Tone out off</b>	Specify the tone off time in millisecond for an out dialing DTMF digit.
<b>DTMF power</b>	Power level in 0.1 dBm of the DTMF tones SPA400 dial toward TELEPHONY ports
<b>Answer after</b>	Number of rings SPA400 waits before answering incoming calls
<b>Dial out wait</b>	Time in milliseconds SPA400 wait after seizing a telephony port and before dialing out DTMF digits
<b>Dial out battery threshold</b>	Before seizing a telephony port for dialing out, SPA400 detects voltage level on the port to ensure that the port is connected and available. If the voltage level is below this threshold level, the port is declared unavailable.

### Data – Line Settings

<b>Transmit Gain</b>	SPA400 may increase or attenuate the power level before transmitting to the telephony port. This field allows you the set this gain level in dB.
<b>Receive Gain</b>	SPA400 may increase or attenuate the power level of telephony port. This field allows you the set this gain level in dB.
<b>Impedance Selection</b>	Select the impedance of the lines connecting to SPA400's telephony ports.

## Setup: Voicemail Server

### Data – Voicemail Settings

<b>Server Port</b>	UDP port over which the voicemail server listens. Note: The port number must be different from the signaling port on the SPA9000 Interface page.
<b>SPA9000 User ID</b>	User ID SPA9000 uses to register to SPA400 voicemail server
<b>SPA9000 subscribe ID</b>	ID SPA9000 uses to subscribe to SPA400 voicemail server for obtaining notification.
<b>Mailbox deposit number</b>	Phone number that SPA9000 uses to deposit voicemail
<b>Mailbox manage number</b>	Phone number that SPA9000 uses to access the voicemail box

**Notes:** Settings on this page must match the SPA9000 Line # tab which connects to SPA400 voicemail server.

## Setup: Voicemail Users

### Data – Voicemail Users

<b>Enable User</b>	Check this box to enable the mailbox
<b>User ID</b>	Mailbox ID
<b>Password</b>	Password for accessing the mailbox

**Notes:** Each mailbox serves a SPA IP Phone managed by the SPA9000. The User IDs on the Voicemail Users page must be consistent with the SPA IP Phones Mailbox ID before the phone can deposit and access voicemail.

## Administration: Management

### Data – Gateway Access

<b>Gateway Username</b>	New login name
<b>Gateway Password</b>	New login password
<b>Re-enter to Confirm</b>	Re-enter the new password. This entry must match the value above.

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### Administration: Factory Default

#### Data – Factory Default

<b>Restore Factory Defaults</b>	Clicking this button will erase the current settings and reset the SPA400 to the original factory default settings.
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### Administration: USB Setting

#### Data – USB Device

<b>File Path</b>	Specify the file to be loaded to the USB storage device.
<b>Download</b>	Clicks this button loads the file onto the USB storage device.

### Administration: Firmware Upgrade

#### Data – Firmware Upgrade

<b>File Path</b>	Click the "Browse" button to browse for the location on your PC where the firmware upgrade file is stored. Select this file.
<b>Browse</b>	Click the "Browse" button to select the firmware upgrade file on your PC .
<b>Upgrade</b>	Click this button to start the Firmware upgrade.

### Administration: Reboot

<b>Restart System</b>	Clicking this button will restart the SPA400. All SPA400 connections will be broken.
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### Status

<b>Gateway</b>	Firmware Version and SPA400 Status
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### Event Logs

<b>Set Log Levels</b>	SPA400 logs significant events onto its internal buffer.. The events are categorized into several groups. This page allows you to set the log levels for each event group.
<b>Event Logs</b>	This page allows you the display the contents of SPA400 event log buffer. Contents of the log buffer provide technical support personnel useful information to troubleshoot SPA400 issues.