LINKSYS®

A Division of Cisco Systems, Inc.

Release Notes for Linksys SPA Firmware Release 5.x

Document Version 3.1

CISCO SYSTEMS

Release Notes for Linksys SPA Firmware Release 5.x

Compliance and Safety Information

This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. This product bears the CE Marking indicating compliance with the 89/336/EEC directive. Standards to which conformity is Declared: EN 61000-4-2:1995, EN 61000-4-3:1997, EN 61000-4-4:1995, EN 61000-4-5:1995, EN 61000-4-6:1996, EN 61000-4-8:1994, EN 61000-4-11:1994, EN 61000-3-2:2001, EN 61000-3-3:1995 & EN 55022:1998

Class B Modifications to this product not authorized by Linksys could void FCC approval, thereby terminating end user authority to use this product. For indoor use only. Read installation instructions before connecting to a power source. The electric plug and socket must be accessible at all times as this is the main method to disconnect power from the device.

Shock Hazard: Do not operate near water or similar fluid. Do not work with this device during periods of lightning activity. Do not touch wires at the end of cables or within sockets.

One Year Limited Hardware Warranty

Linksys provides a one (1) year limited hardware warranty. Linksys warrants to customer that this product conforms to its published specifications and will be free from defects in material and workmanship at the time of delivery and for a period of one year thereafter. Without limiting the foregoing, this warranty does not cover any defect resulting from (i) any design or specification supplied by an entity other than Linksys, (ii) non-observance of technical operating parameters (e.g., exceeding limiting values), or (iii) misuse, abuse, abnormal conditions or alteration by anyone other than Linksys. Replacement, Repair, Refund: After the receipt of an RMA (Return Materials Authorization) request, Linksys will attempt to refund, repair or replace this device. To receive an RMA number for this device, contact the party from whom it.

C O N T E N T S

Release Notes for Linksys SPA Firmware Release 5.x

These release notes describe the caveats resolved and new features and enhancements added in Linksys SPA Firmware Release Version 5.0.x. This document includes the following sections:

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Introduction

This section describes how to use these release notes and provides general background information that applies to all firmware releases. It includes the following topics:

Hardware Supported

The Linksys hardware devices supported by Firmware Version 5.x include the following:

Product Name	FXS (Analog Phone)	FXO PSTN Connection	RJ-45 Internet (WAN)	RJ-45 Ethernet (LAN)	Configurable Voice Lines	Additional Features/Notes
SPA9000	Two (2)	—	One (1)	—	Up to 4 SIP trunks	IP PBX, Auto-Attendant, Setup Wizard to Configure SPA400
SPA901	—	—	—	One (1)	One (1)	Small, affordable, no display
SPA921	—	—	—	One (1)	One (1)	One-line business phone
SPA922	—	—	—	Two (2)	One (1)	Power over Ethernet (PoE) support
SPA941	—	—	—	One (1)	Four (4)	Default is two lines active; upgradeable to four lines
SPA942	—	—	—	Two (2)	Four (4)	Default is two lines active; upgradeable to four lines. Power over Ethernet (PoE) support
SPA962	—	—	—	Two (2)	Six (6)	Six lines, hi-res color display
PAP2T	Two (2)	—	One (1)	—	Two (2)	Voice adapter with two FXS ports
SPA1001	One (1)	—	One (1)	—	One (1)	Small VoIP adapter
SPA2102	Two (2)	—	One (1)	—	One (1)	Voice adapter with router
SPA3102	One (1)	One (1)	One (1)	One (1)	Two (2	Voice adapter with router and PSTN gateway

Table 1 shows the features supported by each Linksys VoIP product.

Table 1   5.x Features Included in Linksys VoIP Products

Feature	9000	941 921	901	942 922	962	PAP2T	1001	2102	3102
SIP over TCP	X			X	X			X	X
SIP over TLS	X			X	X			X	X
REGISTER enhancements	X	X	X	X	X	X	X	X	X
CTI	X			X	X				
Bridge Xfer/Cfwd	X								
Renew DHCP on Request timeout	X	X	X	X	X	X	X	X	X
GUI localization		?		X	X				
Downloadable AA prompts	X								
NAT friendly LVS	X	X	X	X	X				
Media loopback				X	X	X		X	X

The following products cannot be upgraded to Firmware Version 5.x and must be used with Firmware Version 3.x:

- SPA1000
- SPA2000
- SPA2002
- SPA2100
- SPA3000 (GW)
- SPA841 IP Phone
- RTP300
- WRTP54G

Determining the Firmware Version

For a Linksys 900 Series IP phone with an LCD display, perform the following steps to determine the current firmware version:

Step 1   Press the **Menu** button on the 900 Series IP phone.

Step 2   Press **10**, or scroll down until **Product Info** is highlighted and then press the **select** soft key.

Step 3   Press **4** from the Product Info menu or scroll down to highlight **Hardware Version** and press the **select** soft key.

For Linksys VoIP products with interactive voice response (IVR) capability, perform the following steps to determine the current firmware version:

Step 1 Connect an analog telephone to a phone port on the VoIP device.

✎

Note You can access the IVR menu only through an analog telephone, not an IP phone.

Step 2 Press **** (quickly press the star key four times).

Wait until you hear "Linksys configuration menu."

✎

Note You cannot access the IVR from a phone that is currently connected to a call.

Step 3 Press **150#** to determine the current firmware version.

Downloading the Firmware

To download the firmware, you need a computer with an active Internet connection.

To download new firmware for a Linksys VoIP device, perform the following steps:

Step 1 To begin, direct your browser to the following URL: http://www.linksys.com.

From the website homepage menu, select **Support** > **Downloads**.

Step 2 Select your device from the pull-down selection list and click **Downloads For This Product**.

Step 3 Click **Firmware** to go to the firmware download page.

Step 4 Click **Download** to download the firmware file.

If you are using Windows XP Service Pack 2 (SP2) and Internet Explorer, you may see the "Pop-up blocked" message in your browser information bar.

If you see this message, click the information bar and select **Temporarily Allow Pop-ups**. Then click **Download** again.

Step 5 Click **Save** in the File Download dialog box that appears.

Step 6 In the Save As dialog box, choose a location for the file and click **Save**.

Step 7 When the download is complete, if prompted, click **Close**.

✎

Note The name of the file depends on the firmware file of your device.

Step 8 If the firmware file you download is in zip format, double-click the file and extract its contents to a single folder or to the desktop.

To extract the firmware file from the archive, use a utility such as WinZip, or use the built-in decompression features of Windows XP.

After downloading and uncompressing the firmware, upgrade the device firmware by following the steps in the following section.

Upgrading the Firmware

Note If you are using the SPA900 Series phones with a SPA9000, see the *SPA9000 Administration Guide* for instructions to upgrade your phones using the SPA9000 Installation Wizard.

To install firmware on a Linksys VoIP device, perform the following steps:

Step 1 After extracting the file, run the executable file to upgrade the firmware.

Step 2 When the Firmware Upgrade warning window appears, click **Continue**.

Step 3 Enter the IP address of the device in the field provided.

Step 4 To check the IP address of the Linksys device through the IVR menu, press ****110# on the analog phone.

The IVR announces the current IP address of the device.

If the device has an FXO port, make sure it is disconnected from the PSTN because the IVR does not work if a PSTN line is connected.

The Connecting Status screen appears while a connection to the device is in progress. Another window appears when the upgrade has completed.

Note For information about remotely upgrading a Linksys VoIP device, see the *Linksys SPA Provisioning Guide*.

Related Documentation

The following documentation describes how to use, configure, or provision Linksys Voice System products:

- *SPA9000 Administrator Guide*
- *SPA900 Series IP Phones Administrator Guide*
- *SPA 2.0 Analog Telephone Adapter Administrator Guide*
- *Linksys SPA Provisioning Guide*

Service and Support

If you are an end user of Linksys VoIP products and need technical support, contact the reseller or Internet telephony service provider (ITSP) that supplied the equipment. Technical support contact information for authorized Linksys Voice System partners is as follows:

- Linksys VoIP support (requires an authorized partner PIN)

  888 333-0244 Hours: 4am-6pm PST, 7 days a week

- E-mail support

  voipsupport@linksys.com

New Features in Firmware Version 5.x

Firmware Version 5.x is a major release that aligns its voice products with the latest features desired by service providers and end users.

The following are the most relevant features included in this release:

SIP Over TCP

To guarantee state-oriented communications, Linksys voice devices introduce the option of choosing TCP as the transport protocol for SIP with Release 5. This protocol is "guaranteed delivery", which assures that lost packets are retransmitted. TCP also guarantees that the SIP packages are received in the same order that they were sent. As a result, TCP overcomes the main disadvantages of UDP. In addition, for security reasons, most corporate firewalls block UDP ports. With TCP, new ports do not need to be opened or packets dropped, because TCP is already in use for basic activities such as Internet browsing or e-commerce.

Because these advantages may require more processing power, SIP over TCP has been developed in the most robust Linksys platforms.

SIP Over TLS

SIP Over TLS eliminates the possibility of malicious activity by encrypting the SIP messages by the SIP proxy of the service provider and the end user. SIP Over TLS relies on the widely-deployed and standardized Transport Layer Security (TLS) protocol. Note that SIP Over TLS encrypts only the signaling messages and not the media. A separate secure protocol such as Secure Real-Time Transport Protocol (SRTP) can be used to encrypt voice packets.

Media Loopback

Service providers can use media loopback to quantitatively and qualitatively measure the voice quality experienced by the end user. One device acts as the audio transmitter and receiver while the other device acts as the audio mirror. The audio mirror transmits the audio packets that it receives back to the transmitter/receiver instead of transmitting the data sampled on its local microphone (IP phone) or attached analog telephone (ATA-type device).

Register Retry Enhancements

The Register Retry Enhancements feature adds additional flexibility to the delay timers that are activated when the SIP REGISTER of a device fails. The timers are selected based on the failure response code sent by the SIP proxy. Depending on the type of registration failure, either a short timer or a long timer is activated. The new available parameters are as follows:

- Reg_Retry_RSC—List of response codes to use the short timer
- Reg_Retry_Random_Delay—Minimum and maximum random delay to be added to the short timer
- Reg_Retry_Long_Random_Delay—Minimum and maximum random delay to be added to the long timer
- Reg_Retry_Intvl_Cap—Maximum value of the exponential delay

DHCP Renewal on Timeout

Linksys voice devices typically operate in a network where a DHCP server assigns the device its IP address. Because IP addresses are a limited resource, the DHCP server periodically renews the device lease on the IP address. Therefore, if a device loses its IP address for any reason, or if some other device on the network is assigned its IP address, the communication between the SIP proxy and the device is either severed or degraded.

Whenever an expected SIP response is not received within a programmable amount of time after the corresponding SIP command is sent, the DHCP Timeout on Renewal feature causes the device to request a renewal of its IP address. If the DHCP server returns the IP address that it originally assigned to the device, the DHCP assignment is presumed to be operating correctly. Otherwise, the device resets to try to fix the issue.

GUI Localization

The GUI Localization feature for the SPA900 series telephones enables the Linksys IP phone menu to be displayed in languages other than English. This feature applies to all the SPA900 Series phones that have a display.

Downloadable Auto-Attendant Prompts

In Release 5, an option is added to download a pre-recorded sound clip into any of the ten auto-attendant messages through the SPA9000 Ethernet network interface.

API for Computer-Telephony Interface

The Computer-Telephony Interface (CTI) API for the SPA9000 was designed and implemented to enable adjunct applications and services to have configurable control over SPA9000 endpoints as well as to provide the potential for tight integration with third-party applications residing on the PC of the SPA900 Series IP phone user.

Initial INVITE and MWI Challenge

Starting with Release 5, the SIP INVITE (initial) and MWI message in a session can be challenged by the endpoint. The purpose of this challenge is to restrict the SIP servers that are permitted to interact with the devices on the service provider network, which significantly increases the security of the VoIP network by preventing malicious attacks against the device.

Firmware Version 5.1.10 (SPA922/942)

This firmware release applies to the SPA922/942.

Known Issue (SPA922/942)

The following is a known issue affecting Firmware Version 5.1.10 and applies to the SPA922 and SPA942:

- Issue: Unable to download a new foreign language dictionary using version 5.1.10.
- Workaround: load the new foreign language dictionary using a previous firmware version and then upgrade to version 5.1.10.

Resolved Caveat (SPA922/942)

The following issue, which was resolved in Firmware Version 5.1.10, applies to the SPA922 and SPA942:

When using the SPA.942 (or SPA962) to make a 3-way conference call, and the phone acts as the conference bridge, when the speaker phone on the phone is enabled and muted, the other two phones in the conference are also muted.

Firmware Version 5.1.9

This firmware release applies to the SPA922/942 and the SPA2102.

5.1.9 (SPA922/942)

New Features and Enhancements

The following features, which were introduced in Firmware Version 5.1.9, apply to the SPA922/942:

- Localization Phase 2—All character encoding was changed to unicode, iso8859-1 through iso8859-16 inclusive. Support was added for wide-character dictionaries, backward compatible with old dictionaries. The firmware now lets you upgrade fonts without affecting the firmware version.

- New information has been added that is displayed in Status option of the LCD display.k

- Name of <Proxy> on Setup/Menu > Status > EXT

- Provisioning status on Setup/Menu > Status > Provisioning Status

- RTP statistics for last call on Setup/Menu > Status > Call Statistics History

- DHCP option 60, Vendor Class ID, has been added to the DHCP request. "LINKSYS product_name" is used as the Vendor Class ID, and product_name is SPA-942, SPA-922, or SPA-962

Resolved Caveats

The following issues, which were resolved in Firmware Version 5.1.9, apply to the SPA922 and SPA942:

A problem occurs displaying *codes. When the phone is taken off hook and the softkey is selected, the first selection should be *69, but only *6 is displayed.

The SPA fails to escape occurrences of '#' in the dial string with %23 in an outbound INVITE.

A problem with the dictionary occurs when you add guard code to prevent string overrun during translation and you remove excessive error syslog message upon bootup when dictionary is not loaded. Some letters (g, j, p, q, and y) are displayed in superscript position on the LCD.

5.1.9 (2102)

New Feature (SPA2102)

The following features, which was introduced in Firmware Version 5.1.9, applies to the SPA2102:

If REGISTER results in a 301 response with a Contact header that has a maddr URI parameter, and if the <Outbound Proxy>is an IP address, the SPA will change the outproxy proxy address to the value of the maddr address. This value will remain valid until the next 301 response, if any, or will restore to the originally configured value upon reboot.

Firmware Version 5.1.8

5.1.8 (SPA921/942 and SPA922/942)

The following features and resolved caveats apply to the SPA921/941 and the SPA922/942.

New Features and Enhancements (SPA921/941)

The following new features, which were introduced in Firmware Version 5.1.8, apply to SPA921 and SPA941:

- The phone 2-line license feature is disabled to make the default 4 extensions.
- The speakerphone performance is improved.
- The phone replies 200 OK to a NOTIFY/ping event inside a dialog.
- Support is added for Broadsoft shared call appearance bridging.

Resolved Caveat (SPA921/941 and SPA922/942)

The following issue, which was resolved in Firmware Version 5.1.8, applies to the SPA921/941 and SPA922/942:

On the incoming page, the phone does not automatically put the current calls on hold. Instead it mixes the incoming audio with that of the currently active calls. When the user tries to put an incoming page call on hold, the ends the call instead. The phone plays a brief PAGE tone at the beginning of an incoming page.

New Features and Enhancements (SPA922/SPA942)

The following feature, which was introduced in Firmware Version 5.1.8, applies to the SPA922 and SPA942:

Added 9th cadence edit and 3 preferred codecs; support for 3 preferred codecs in order for each extension. Parameters in flash are added to support these features. Codec is selected in order from the preferred codec list. Duplicate codecs are ignored.

Resolved Caveats (SPA922/SPA942)

The following issue, which was resolved in Firmware Version 5.1.8, applies to the SPA922 and SPA942:

A problem occurs when using the dictionary with foreign language settings enabled, where the network mask setting from the display does not work.The mask can be changed using the **static IP** option from the LCD, but the system setting is changed to DHCP.

5.1.8 (PBX)

New Features and Enhancements (SPA9000)

The following features, which were introduced in Firmware Version 5.1.8, apply to the SPA9000:

- When swapping calls in a call-waiting or similar situation, the SPA will order the operations to make sure that call hold is invoked before call resume.

- Use the value from the Retry-After header in a 5xx response to Register request to schedule the next Register retry, if the header is present. If this Retry-After is present, all the statically configured retry timer values are ignored.

- Do not accept Media Loop Back calls (reply Busy) if the phone is already off-hook. If the user takes the phone off-hook while a media loopback call is in session, the unit will end the media loopback call immediately.

Resolved Caveats (SPA9000)

Fixed this problem: Shared line fails to work as expected on some phones after a while.

Removed Yahoo! from Info web page

Fixed this problem: When ITSP reply 100 to outbound INVITE with a TO-Tag, followed by a 407 to challenge the INVITE, the 9000 will terminate the call as if the call has failed.

Fixed this problem: Unit stops playing incoming RTP audio once it receives a 180/183 w/o SDP; regardless setting of <Sticky 183> parameter

9000 might reboot randomly when STUN is enabled.

In the error case when the external ITSP fails to send an ACK to the 9000 after it sends 200 to the INVITE, the 9000 might reboot if the call was answered by the AA and transferred to a hunt group

9000 should not include the additional margin in the expires parameter of the Contact header in response to station REGISTER requests

Firmware Version 5.1.7

5.1.7 (SPA922/942 and SPA962)

This firmware release applies to the SPA922, SPA942, and SPA962.

New Features and Enhancements (SPA962)

The following features were introduced in Firmware Version 5.1.7 and apply to the SPA962.

- Phone adds realtime NEWS/TRAFFIC RSS reader and Stock quote reader support

- Phone allows %xx scape syntax in <NAT Keep Alive Msg>. For example, %0d%0a means to use CRLF as the keep alive message.

- Phone now interprets '#' as '@' before the first '.' when dialing in the "IP" input mode.

Resolved Caveats (SPA922/SPA942 and SPA962)

The following issues, which were resolved in Firmware Version 5.1.7, apply to the SPA922/942 and SPA962:

- SDP in INVITE response includes annexb=yes/no if present in INVITE message.

- Problem with CDP packets reporting incorrect full/half duplex value. Active SCA calls are ended by the other line because proxy does not support SCA bridge mode (barge in feature). This feature is now configurable with SCA Barge In Enable parameter.

Resolved Caveats (SPA962)

The following issues, which were resolved in Firmware Version 5.1.7, apply to SPA962:

- Phone does not play network ringback even if early media is negotiated to G711.

- Phone does not use the same Authorization header fields in the ACK as in the corrsponding INVITE, per RFC 3261.

- Entering '#' terminates dialing.

- Sending keep-alive message to $PROXY does not work when SIP transport is TCP/TLS

- 200 response to reINVITE does not contact transport parameter in the Contact header (which is necessary when transport is TCP/TLS).

- When using the dictionary, the web server enable option turns off by itself when any network configuration is changed using GUI. This was caused by a comparision of "yes" to the translated version of "yes".

5.1.7 (PBX)

New Features (SPA9000)

The following features, which were introduced in Firmware Version 5.1.7, apply to the SPA9000:

"strict" dtmf tx mode works for AVT. Before it only works for SIP info.

Accept %xx escape syntax in <NAT Keep Alive Msg> paramter. For example %0d%0a will be unescaped into \r\n (CRLF).

Added QoS policy feature to allow user to activate Qos only when phone is in use. New parameter "QoS Policy" is added with two options: "Always On" and "On When Phone In Use."

If REGISTER results in a 301 response with a Contact header that has a maddr URI parameter, and if the <Outbound Proxy> is an IP address, the SPA will change the outproxy proxy address to the value of the maddr address. This value will remain valid until the next 301 response, if any, or will restore to the originally configured value upon reboot.

Resolved Caveats (SPA9000)

- Fixed this problem: Unit does not use the same Authorization header fields in the ACK as   in the corresponding INVITE, per RFC 3261.

- Fixed this problem: If <SIP Transport> is set to TCP or TLS, unit might not send keep alive messages properly when destination is $PROXY.

- Fixed this problem: When <SIP Transport> is TCP/TLS, unit does not include transport=tcp or transport=tls, respectively in the Contact header's URI in the 200 OK response to an re-INVITE request.

- Fixed this problem: Added the missing character u and l for IVR

- SDP in INVITE response, includes annexb=yes/no if present in INVITE message.

- Fixed this problem: 9000 includes extra CR/LF at the end of SDP.

- Fixed this problem: A,B,C,D digits are dropped when dialing.

- Fixed this problem: SPA9000 only sends $NOTIFY (SIP NOTIFY method) as NAT keep alive messages for Line 1/2/3/4 regardless what is set in the <NAT Keep Alive Msg> parameter.

Firmware Version 5.1.6

5.1.6 (SPA2102)

The caveats and features described in this section apply only to the SPA2102.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- When doing RTP packet loopback, the unit sends encapsulated RTP packets but also normal audio packets with the same SSRC.
- The unit does not use the same Authorization header fields in the ACK as in the corresponding INVITE, per RFC 3261.
- If <SIP Transport> is set to TCP or TLS, the unit might not send keepalive messages properly when destination is $PROXY.
- When <SIP Transport> is set to TCP or TLS, the unit does not include transport=tcp or transport=tls, respectively in the Contact header URI in the 200 OK response to a REINVITE request.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- Removed Polarity Reversal from the "DTMF(Denmark)" caller-id method. Instead, a new "DTMF(Denmark) With PR" caller-id method is added that behaves the same as the former "DTMF(Denmark)" method.
- The strict DTMF Tx mode works for AVT. Previously, it works only for SIP information. For the SPA2100, the minimum duration for DTMF detection is as follows:
  - Strict mode for AVT—70 ms
  - Normal mode for AVT—40 ms
  - Strict mode for SIP info—90 ms
  - Normal mode for SIP info—50 ms
- Added the IVR options 1910, 1920, 1911, and 1921 to check and set the SIP transport setting for Line 1 and Line 2.
- Accepts the %xx escape syntax in the <NAT Keep Alive Msg> parameter. For example, %0d%0a is unescaped into \r\n (CRLF).
- Allows each SIP message to be as large as 5119 bytes.

5.1.6a (PBX)

The caveats and features described in this section apply to the SPA9000/9000T.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- Should not detect off-hook during polarity reversal transients (during on-hook caller-id generation for some regions); otherwise, the off-hook signal may be false because the loop current might flow because of the transients.

- SPA9000 does not pass 183 from an external ITSP to the calling PBX station.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- Added the <Phone DLG Refresh Intvl> parameter. If not zero, this parameter is the interval in seconds at which the SPA9000 sends a SIP NOTIFY/ping event to each station that is currently engaged in an external call. The default value is 0.

- Removed Polarity Reversal from the "DTMF(Denmark)" caller-id method. Instead, a new "DTMF(Denmark) With PR" caller-id method is added that behaves the same as the former "DTMF(Denmark)" method.

Known Issues

The following is a known issue:

- The inbound call does not hear a ringback when the call is transferred from AA to an internal extension. To download workaround version 3.3.6, see the following URL: http://www.sipura.net/download/spa9000t/spa9000t-3.3.6.zip.

Firmware Version 5e 5.1.5

5.1.5 (SPA2102)

The caveats and features described in this section apply to the SPA2102.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- _SIPTCP_ only—After backoff when TCP connect is rejected by the server, the default server port always becomes 0, so re-connect always fails without attempting the TCP connect messages.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- Added the "dtmf detection tx mode" parameter with normal and strict settings. The default setting is strict mode, for which the following are true:
  - A DTMF digit requires an extra hold time after detection.
  - The DTMF level threshold is raised to -20 dBm.
  - For the SPA2100, the minimum duration threshold is 60 ms for AVT and 100 ms for SIP-INFO.
  - For the SPA2102, the minimum duration threshold is 60 ms for AVT and 90 ms for SIP-INFO.

5.1.5 (GW)

The caveats described in this section, which are resolved in this release, apply to the SPA3102.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- _SIPTCP_ only—After backoff when TCP connect is rejected by the server, the default server port always becomes 0, so re-connect always fails without attempting the TCP connect messages.
- Line 1 fallback PSTN and ring-through does not work if either Line 1 or the PSTN line is set to use TCP or TLS as the SIP transport.
- If the keepalive message is not a valid $SIP-METHOD macro, the keepalive destination is $PROXY, and REGISTER is enabled, the keepalive message is not sent to the last Register destination.

Firmware Version 5.1.4

5.1.4 (SPA962)

The caveats and new features described in this section apply to the SPA962.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- Memory corruption after entering and exiting corporate directory several times.
- Better speakerphone performance in the presence of noise or when the volume of the talker is low.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- A shared line can accept and make calls before the subscription is complete.
- Better speakerphone-to-speakerphone performance:
  - Better half-duplex switching of lower microphone gain to reduce saturation.
  - Better noise floor estimation using voice activity detection (VAD).

5.1.4 (SPA942)

The caveats and new features described in this section apply to the SPA942.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- The NOTIFY request for a refer event during call transfer does not include the subscription-state header that is required per RFC 3265.
- The SPA does not include the RTP-Stat header in the BYE after the BYE is challenged.
- When the unit fails over to the secondary proxy during INVITE, the corresponding ACK might be sent to the primary if <Proxy Fallback Intvl> expires between the INVITE and the ACK.
- The phone ACD window cannot disappear when the user switches from the ACD login window to the Dial window.
- The phone reboots when pressing DND/CFWD with both the ACD login window and the Dial window displayed.
- After logout of the ACD group, the available/unavailable softkey still shows.
- Memory corruption after entering and exiting corporate directory several times.
- Better speakerphone performance in the presence of noise or when the volume of the talker is low.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- Updated SIP-B implementation.
- A shared line can accept and make calls before the subscription is complete.

Firmware Version 5.1.3

This firmware version was an engineering maintenance release with no effect on features or functionality.

Firmware Version 5.1.2

The caveats and new features described in this section apply to the SPA962.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- The NOTIFY request for a refer event during call transfer does not include the subscription-state header that is required per RFC 3265.

- If <NAT Keep Alive Msg> is not $PING, $NOTIFY, or $REGISTER), and <NAT Keep Alive Dest> is $PROXY, the unit does not send the keepalive message to the same address:port as the last REGISTER message. Instead, it resolves the current <Proxy> or <Outbound Proxy> address using the DNS A Record and sends the keepalive message there.

- The SPA does not include the RTP-Stat header in the BYE after the BYE is challenged.

- When the unit fails over to the secondary proxy during INVITE, the corresponding ACK might be sent to the primary if <Proxy Fallback Intvl> expires between the INVITE and the ACK.

- The phone reboots when on-hook dialing with dial assistance is on.

- The phone ACD window cannot disappear when the user switches from the ACD login window to the Dial window.

- The phone reboots when pressing DND/CFWD with both the ACD login window and the Dial window displayed.

- Cannot show the full translation of a foreign language for the GUI Property menu.

- After logout of the ACD group, the available/unavailable softkey still shows.

Firmware Version 5.1.1

Resolved Caveats

The caveats resolved in this firmware release include the following:

- The DTMF detection for the SPA2102, SPA3102, and SPA9000T during conversations is too long; calibrated to 60 ms for AVT and 90 ms for SIP-INFO.

- Includes "replaces" in the Supported header in outbound SIP messages and accepts "replaces" in the Require header in inbound SIP messages.

- The NOTIFY request for a refer event during call transfer does not include the subscription-state header that is required per RFC 3265.

- If <NAT Keep Alive Msg> is not $PING, $NOTIFY, or $REGISTER), and <NAT Keep Alive Dest> is $PROXY, the unit does not send the keepalive message to the same address:port as the last REGISTER message. Instead, it resolves the current <Proxy> or <Outbound Proxy> address using the DNS A Record and sends the keepalive message there.

- The SPA does not include the RTP-Stat header in the BYE after the BYE is challenged.

- When the unit fails over to the secondary proxy during INVITE, the corresponding ACK might be sent to the primary if <Proxy Fallback Intvl> expires between the INVITE and the ACK.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- Added the <Auth INVITE> option for Lines 1/2 to enable the challenging of incoming initial INVITE requests.

- Three parameters are added:
    - <Reg Retry Random Delay>—Random delay range (in seconds) to add to <Register Retry Intvl> when retrying REGISTER after a failure. The default is 0, which disables this feature.
    - <Reg Retry Long Random Delay>—Random delay range (in seconds) to add to <Register Retry Long Intvl> when retrying REGISTER after a failure. The default is 0, which disables this feature.
    - <Reg Retry Intvl Cap>—The maximum value to cap the exponential backoff retry delay (which starts at <Register Retry Intvl> and doubles every retry). The default value is 0, which disables the exponential backoff feature (that is, the error retry interval is always at <Register Retry Intvl>). If this feature is enabled, <Reg Retry Random Delay> is added on top of the exponential backoff delay value.

- A new feature is added to re-validate the DHCP-assigned IP address when the application fails to communicate to the peer.

Firmware Version 5.1.0

Resolved Caveats

The caveats resolved in this firmware release include the following:

- Ext 3/4/5/6 dialplan change cannot cause the phone to reboot.

- Cannot reset the call history to the factory default.

- Includes "replaces" in the Supported header in outbound SIP messages and accepts "replaces" in the Require header in inbound SIP messages.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- Added the <Auth INVITE> option for Lines 1/2 to enable the challenging of incoming initial INVITE requests.

- Three parameters are added:

  - <Reg Retry Random Delay>—Random delay range (in seconds) to add to <Register Retry Intvl> when retrying REGISTER after a failure. The default is 0, which disables this feature.

  - <Reg Retry Long Random Delay>—Random delay range (in seconds) to add to <Register Retry Long Intvl> when retrying REGISTER after a failure. The default is 0, which disables this feature.

  - <Reg Retry Intvl Cap>—The maximum value to cap the exponential backoff retry delay (which starts at <Register Retry Intvl> and doubles every retry). The default value is 0, which disables the exponential backoff feature (that is, the error retry interval is always at <Register Retry Intvl>). If this feature is enabled, <Reg Retry Random Delay> is added on top of the exponential backoff delay value.

5.1.0 (PBX)

The caveats and new features described in this section apply to the SPA9000 and SPA9000T.

Resolved Caveats

The caveats resolved in this firmware release include the following:

- Sending the network ringback tone to a caller using G729 while another call is already using G729 causes a reboot. This is fixed by not sending the network ringback tone (using the 180 instead of the 183 response) if the negotiated codec is a low bit-rate codec. The caller in this case hears silence instead of the ringback tone when an external call is transferred by the auto-attendant (AA) or a phone to another phone.

- Includes "replaces" in the Supported header in outbound SIP messages and accepts "replaces" in the Require header in inbound SIP messages.

New Features and Enhancements

New features and enhancements added in this firmware release include the following:

- Added the "All+Self" option in <VMSP Bridge> to let the SPA9000 bridge external calls to the voicemail server even when both the Internet telephony service provider (ITSP) and the voicemail service provider (VMSP) are on the same line interface. Note that using the All option causes the SPA9000 to bridge only when the ITSP/VMSP are on different line interfaces.

- Added the <Auth INVITE> option for Lines 1/2 to enable the challenging of incoming initial INVITE requests.

- Three parameters are added:

  - <Reg Retry Random Delay>—Random delay range (in seconds) to add to <Register Retry Intvl> when retrying REGISTER after a failure. The default is 0, which disables this feature.

  - <Reg Retry Long Random Delay>—Random delay range (in seconds) to add to <Register Retry Long Intvl> when retrying REGISTER after a failure. The default is 0, which disables this feature.

  - <Reg Retry Intvl Cap>—The maximum value to cap the exponential backoff retry delay (which starts at <Register Retry Intvl> and doubles every retry). The default value is 0, which disables the exponential backoff feature (that is, the error retry interval is always at <Register Retry Intvl>). If this feature is enabled, <Reg Retry Random Delay> is added on top of the exponential backoff delay value.