

# Intelligent Call Routing Gateway Solution for VoIP



## Toll Quality Voice and Carrier-Grade Feature Support

The SPA3102 delivers clear, high-quality voice communication in diverse network conditions. Excellent voice quality in a demanding IP network is consistently achieved via our advanced implementation of standard voice coding algorithms. The SPA3102 is interoperable with common telephony equipment like voicemail, Fax, PBX, and interactive voice response systems.

## Large-Scale Deployment and Management

The SPA3102 offers all the key features and capabilities which service providers can provide customized VoIP services to their subscribers. The SPA3102 can be remotely provisioned and supports dynamic, in-service software upgrades. A secure profile upload saves providers the time, expense, and hassle of managing and pre-configuring or re-configuring customer premise equipment (CPE) for deployment.

## Ironclad Security

Linksys understands that security for end users and service providers is a fundamental requirement for a solid, carrier-grade telephony service. The SPA3102 supports secure, standard encryption-based methods for communication, provisioning and servicing.

## Features

### Telephony

- Service Authentication via PIN, Digest, Caller ID (Bellcore Type 1)
- Per Call Authentication and Associated Routing
- Least Cost Routing Support
- Impedance Agnostics - 8 Settings
- Call Waiting, Cancel Call Waiting, Call Waiting Caller ID Detection (Bellcore Type 1)
- Caller ID with Name/Number (Multi-national Variants)
- Caller ID Blocking
- Call Forwarding to PSTN or VoIP Service: No answer, Busy, All
- Do Not Disturb
- Call Transfer
- Three-way Conference Calling with Local Mixing
- Message Waiting Indication - Visual and Tone Based
- Call Return
- Call Back on Busy
- Call Blocking with Toll Restriction
- Delayed Disconnect
- Distinctive Ringing - Calling and Called Number
- Off-hook Warning Tone
- Selective/Anonymous Call Rejection
- Hot line and Warm Line Calling
- Speed Dialing of 8 Numbers/Addresses
- Music on Hold
- Fax: G.711 Pass Through or Real Time Fax over IP via T.38

### Product Specific (SPA3102)

- VoIP to PSTN (USA) Service Call Origination and Termination
- PSTN (USA) to VoIP Service Call Origination and Termination
- Single Stage and Two Stage Dialing
- Forward Calls to VoIP service - Selective, Authenticated, All
- Forward Calls to PSTN service - Selective, Authenticated, All
- PSTN Line Sharing with Multiple Extensions
- Automatic PSTN Fallback (Loss of Power or IP Service to Unit - with Quiescence to Normal Operations)
- Advanced Inbound and Outbound Call Routing
- Independent Configurable Dial Plans - Up to 8
- Force PSTN Disconnection
- Sequential Dialing Support

### VoIP to PSTN Authentication and Routing Features

- VoIP to PSTN Gateway Enable/Disable
- VoIP Caller Auth Method (None, PIN, HTTP Digest)
- VoIP PIN Max Retry Setting
- One Stage Dialing Enable/Disable
- VoIP Caller ID Pattern Matching
- VoIP Access Allowed Caller List (No Further Authentication)
- VoIP Caller PIN and Associated Dial Plan

## PSTN to VoIP Authentication and Features

- PSTN to VoIP Gateway Enable/Disable
- VoIP Caller Auth Method (None, PIN, HTTP Digest)
- Ring Through to FXS Enable/Disable
- Ring Through Tone - Configurable
- Caller ID (Bellcore Type 1) for VoIP Service Access
- Caller ID Enable/Disable
- PIN Max Retry Settings
- Access Allowed Caller List (No Further Authentication)
- Caller PIN and Associated Dial Plan
- Least Cost Routing (via Outbound VoIP - Line1 Dial Plan)

## FXO Behavior Features

- VoIP Answer Delay Timer
- PSTN Answer Delay Timer
- VoIP PIN Digit Time-Out Timer
- PSTN PIN Digit Time-Out Timer
- PSTN-to-VoIP Call Max Dur Timer
- VoIP-to PSTN Call Max Dur Timer
- PSTN Ring Through Delay Timer
- PSTN Dialing Delay Timer
- VoIP DIG Refresh Interval Timer
- PSTN Ring Time-out Timer

## PSTN Disconnection Detection Features

- CPC (Removal of Tip/Ring Voltage Momentarily)
- Polarity Reversal
- Long Silence (Configurable Time Setting)
- Disconnect Tone (e.g. Reorder Tone)
- Silence Threshold

## International Control Features

- FXO Port Impedance - Configurable to 16 settings
- Ring Frequency - Configurable
- SPA to PSTN and PSTN to SPA Gain Settings
- Ring Frequency - Maximum Setting
- Ring Validation Time Setting
- Tip/Ring Voltage Adjustment Setting
- Ring Indication Delay Setting
- Operational Loop Current Minimum Value
- Ring Time-out Setting
- On-Hook Speed Setting
- Ringer Impedance Setting
- Line-in-Use Voltage Setting

- 1 - SPA3102 Phone Adapter Unit
- 1 - Power Adapter
- 1 - RJ-45 Ethernet Cable
- 1 - RJ-11 Telephone Cable
- 1- Quick Installation Guide

## Package Contents

## Specifications

Model	SPA3102 * Many specifications are programmable within a defined range or list of options. Please see the SPA Administration Guide for details. The configuration profile is uploaded to the SPA3102 at the time of provisioning.
Data Networking	MAC Address (IEEE 802.3) IPv4 - Internet Protocol v4 (RFC 791) upgradeable to v6 (RFC 1883) ARP - Address Resolution Protocol DNS - A Record (RFC 1706), SRV Record (RFC 2782) DHCP Client - Dynamic Host Configuration Protocol (RFC 2131) DHCP Server - Dynamic Host Configuration Protocol (RFC 2131) PPoE Client - Point to Point Protocol over Ethernet (RFC 2516) ICMP - Internet Control Message Protocol (RFC792) TCP - Transmission Control Protocol (RFC793) UDP - User Datagram Protocol (RFC768) RTP - Real Time Protocol (RFC 1889) (RFC 1890) RTCP - Real Time Control Protocol (RFC 1889) DiffServ (RFC 2475), Type of Service - TOS (RFC 791/1349) VLAN Tagging - 802.1p SNTP - Simple Network Time Protocol (RFC 2030) Upload Data Rate Limiting - Static and Automatic QoS - Voice Packet Prioritization over Other Packet Types Router or Bridge Mode of Operation MAC Address Cloning Port Forwarding
Voice Gateway	SIPv2: Session Initiation Protocol v2 (RFC 3261, 3262, 3263, 3264) SIP Proxy Redundancy - Dynamic via DNS SRV, A Records Re-registration with Primary SIP Proxy Server SIP Support in Network Address Translation Networks - NAT (incl. STUN) Secure (Encrypted) Calling via Pre-Standard Implementation of Secure RTP Codec Name Assignment
Voice Algorithms	G.711 (A-law and $\mu$ -law) G.726 (16/24/32/40 kbps) G.729 A G.723.1 (6.3 kbps, 5.3 kbps) Dynamic Payload Adjustable Audio Frames per Packet
Fax Capability	Fax Tone Detection and Pass-Through (Using G.711) Fax Pass-Through - Using G.711 DTMF: In-band & Out-of-band (RFC 2833) (SIP Info) Flexible Dial Plan Support with Interdigit Timers and IP Dialing Call Progress Tone Generation Jitter Buffer - Adaptive Frame Loss Concealment Full Duplex Audio Echo Cancellation (G.165/G.168) VAD - Voice Activity Detection with Silence Suppression Attenuation / Gain Adjustments Flash Hook Timer MWI - Message Waiting Indicator Tones VMWI - Visual Message Waiting Indicator via FSK Polarity Control Hook Flash Event Signaling Caller ID Generation (Name & Number) - Bellcore, DTMF, ETSI Music on Hold Client Streaming Audio Server - up to 10 sessions

# PRODUCT DATA

Model No. **SPA3102**

Security	Password Protected System Reset to Factory Default Password Protected Admin and User Access Authority Provisioning/Configuration/Authentication: HTTPS with Factory Installed Client Certificate HTTP Digest - Encrypted Authentication via MD5 (RFC 1321) Up to 256-bit AES Encryption
Provisioning, Administration & Maintenance:	Web Browser Administration & Configuration via Integrated Web Server Telephone Key Pad Configuration with Interactive Voice Prompts Automated Provisioning & Upgrade via HTTP, TFTP Asynchronous Notification of Upgrade Availability via SIP NOTIFY Non-intrusive, In-Service Upgrades Report Generation & Event Logging Stats in BYE Message Syslog & Debug Server Records - Per Line Configurable Per Line and Purpose Configurable Syslog and Debug Options
Physical Interfaces:	2 100baseT RJ-45 Ethernet Port (IEEE 802.3) -- 1 WAN, 1 LAN 1 RJ-11 FXS Phone Ports - For Analog Circuit Telephone Device (Tip/Ring) 1 RJ-11 FXO Phone Ports - For a Telco or PBX Connection
FXS:	Ring Voltage: 40-55 VRMS Configurable
Subscriber Line Interface Circuit (SLIC):	Ring Frequency: 10 Hz - 40 Hz Ring Waveform: Trapezoidal and Sinusoidal Maximum Ringer Load: 3 REN On-hook/off-hook Characteristics: On-hook voltage (tip/ring): -50 V NOMINAL Off-hook current: 25 mA min Terminating Impedance: 8 Configurable Settings including North America 600 ohms, European CTR21
Reg. Compliance:	FCC (Part 15 Class B), CE, ICES-003, A-Tick Certification, RoHS
Power Supply:	DC Input Voltage: +5 VDC at 2.0 A Max. Power Consumption: 5 Watts Switching Type (100-240v) Automatic Power Adapter: 100-240v - 50-60Hz (26-34VA) AC Input
Indicator Lights/LED:	Power, Internet, Phone 1, Phone 2
Documentation:	Quick Installation, User, and Configuration Guides are downloaded from <a href="http://www.Linksys.com">www.Linksys.com</a> Administration Guide - Service Providers Only Provisioning Guide - Service Providers Only
Dimensions	3.98 x 3.98 x 1.10 in. (101 x 101 x 28 mm)
Unit Weight	5.11 oz. (0.145 kg)
Operating Temp.	32°F to 113° F (0°C to 45° C)
Storage Temp.	-13°F to 185° F (-25°C to 85° C)
Operating Humidity	10 to 90% Non-condensing, operating and non-operating

## Environmental

The SPA3102 features the ability to connect standard telephones and fax machines to IP-based data networks with the additional benefit of an integrated connection for legacy telephone network “hop-on, hop-off” applications. SPA3102 users will be able to leverage their broadband phone service more than ever by automatically routing local calls from mobile phones and land lines over to VoIP service providers and vice versa. If power is lost to the unit or Internet service is down, calls can be redirected to a traditional carrier via the FXO interface.

A user calling from a mobile phone or land line will be able to reduce and even eliminate international and long distance telephone charges by first calling their SPA3102 via a local telephone number. The advanced authentication and call routing intelligence programmed into the SPA3102 will route the call via the Internet to the far end destination. In addition, when using the SPA3102 at the far end, VoIP calls placed to that location can be either answered or further processed and routed on as a local call to any legacy land line or mobile phone.

The SPA3102 supports one RJ-11 POTS (Plain Old Telephone Service) FXS port to connect an existing analog phone or fax machine. The SPA3102 also supports one PSTN FXO port to connect to a Telco or PBX circuit. The SPA3102 includes 2 100BaseT RJ-45 Ethernet interfaces to connect to a home or office LAN, as well as an Ethernet connection to a broadband modem or router. The SPA3102 FXS and FXO lines can be independently configured via software controlled by the service provider or the end user.

Installed by the end user and remotely provisioned, configured and maintained by the service provider, each SPA3102 converts voice traffic into data packets for transmission over an IP network. Compact in design, the SPA3102 can be used in consumer and business VoIP service offerings including a full-featured IP Centrex environment. The SPA3102 uses international standards for voice and data networking for reliable voice and fax operation.

### Linksys Phone Adapter Comparison Chart

SPA Model	Service Lines	Active Calls	3-Way Conferences	PSTN (FXO) Connection
SPA1001	2	2	1	0
SPA2002	2	4	2	0
SPA2100/2102	2	4	2	0
SPA3000/3102	2	3	1	1

Notes: The SPA2102/2100 and SPA3102 support up to 2 sessions using G.729. The SPA1001 and SPA3000 support 1 G.729 session.

SPA3102/3000 supports 2 incoming services (proxy registrations) and an unlimited number of outgoing VoIP services.

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