SPIRENT Communications

Abacus™ 5000 - IP Telephony Migration Test System

VOIP, SIP, IMS, PSTN AND ANALOG CONVERGENCE TESTING

Spirent Communications delivers IP Telephony test systems that help you manage the challenges of VoIP and IMS development and deployment. With an extensive suite of circuit generators and test systems, Abacus 5000 is a fully integrated IP and PSTN telephony test system in a single platform.

APPLICATIONS

Network Element Manufacturers

- Characterize system before trial
- Validate system scalability
- Identify capacity limits
- Measure call performance
- Automate regression testing

Operators and Service Providers

- Facilitate vendor selection
- Identify performance ceilings
- Enable accurate capacity planning
- Provide end-to-end service assurance testing
- Network planning and deployment analysis

Spirent's Abacus 5000 is a cost-effective, flexible and scalable IP Telephony test system, with integrated analog, TDM and Ethernet interfaces for comprehensive testing of converged IP Telephony network elements.

Abacus 5000 facilitates VoIP/PSTN convergence by providing an IP Telephony migration test system that covers the whole range of required testing capabilities for:

- IP Telephony convergence –PSTN to VoIP
- IMS convergence – fixed to mobile

Abacus 5000 is the best-of-breed IP Telephony test solution to test performance of Session Border Controllers (SBC), IP PBX, media gateways, media gateway controllers, signaling gateways, trunking gateways, softswitches, IP phones, servers, firewalls and IADs.

Abacus 5000 13-slot rack-mountable chassis

ABACUS 5000 BENEFITS

- Simplify the testing of converged IP Telephony and PSTN networks and services
- Perform synchronized and complex test scenarios to help migrate or converge into IP Telephony
- Stress signaling capacity (512K SIP channels per instance) and media processing (over 100K simultaneous calls per chassis for SIP) of IP Telephony equipment
- Emulate H.248/Megaco, MGCP call routing/switching functionality
- Emulate softswitch functionality for testing new generation of signaling gateways and trunking gateways
- Verify network information accuracy of registration servers, SIP signaling call setup of proxy servers, signaling handling of TDM and IP-PBXs, call accounting, voice messaging and conferencing servers
- Achieve overall cost savings by eliminating the need for multiple analog, TDM or IP Telephony testing devices
- Achieve higher network reliability and interoperability of IP Telephony network elements
- Track the signaling history only on the channels where errors occurred with the Event AutoTrack, providing detailed failure information around the time of the event
- Test Skinny Client Control Protocol (SCCP) – based networks alongside PSTN generated analog calls
- Perform service rollout testing and pre-production network testing with the multi-system/distributed Abacus
- Provide analog subscriber functionality for FTTP, PON, VoDSL and VoIP testing on a single integrated platform

ABACUS 5000 PRODUCT OVERVIEW

Abacus 5000 test methodology allows users to objectively measure voice quality MOS, PSQM, PSQM+, PESQ, PESQ-WB, MOS-LQO, R-Factor (P.834), J-MOS, E-Model – R-Factor (G.107) under real-world voice stream load generation.

Abacus 5000 provides test methodologies for advanced trunking signaling, functional testing, capacity, performance, interoperability, conformance, robustness, distributed testing with multi-system Abacus, VoIP and IMS feature, function and load testing, VoIP security testing, softswitch emulation for testing new generation of signaling gateways and trunking gateways.

Abacus 5000 media payload formats include tones, WAV, Video H.263 and H.264, Mobile NB GSM AMR and EVRC, AMR-WB (G.722, G.722.1, G.722.2), EVRC-B, iLBC, GSM (EFR, FR), CODEC variants G.711, G.726, G.723.1, G.729A/B.

Abacus 5000 protocols include analog FXO and FXS (loop start/ground start), T.30 fax, V.34 analog data modem, SS7, CAS, MF R1/R1.5/R2, ISDN PRI, GR-303, V5.1/V5.2, SLC-96/TR08 (Mode 1), V.90 data modem, QSIC (basic call support) on ISDN PRI, BRI over V5.2, SCCP/TCAP/IN, RTP/RTCP, Skinny, H.323, SIP, MGCP/NCS, H.248.1/ Megaco v1 and v2, H.248.1/ Megaco over SCTP, ETSI H.248.1/ Megaco, SIP-T, SIP-I, SIGTRAN M3UA/M2UA/IUA, BICC, clear channel signaling, IPv6 for SIP and RTP, echo measurements, GRQ - H.235 VoIP gateway message encryption, 3PCC, T.38 fax over IP, SRTP, TLS, stacked VLAN QinQ, 3GPP, IMS Security (IPSec, AKA), SigComp.

The Abacus 5000 platform supports interfaces for analog FXO, analog FXS, T1, E1, T3, E3, G.747, OC-3, STM-1, 10/100/1000 Copper Gigabit Ethernet and Fiber Gigabit Ethernet.

VOICE QUALITY MEASUREMENTS

Abacus 5000 is a voice quality performance measurement tool that allows users to objectively measure voice quality over analog, TDM and IP Telephony networks. Voice quality measurements over time in the presence of data enable service providers to analyze and test network equipment and infrastructure before deploying new voice services on converged data and video networks.

Send multiple standard and user-defined audio files using either G.711 over TDM, or as analog signals over analog lines, or in encoded format in RTP streams. Capture and analysis of received audio signals. Simultaneously mix traffic with speech or tones.

PSQM and PSQM+ Measurements

- Real time PSQM, PSQM+ measurements
- Conversion to Mean Opinion Score (MOS) values

PESQ Measurements

- Real time PESQ and PESQ-WB measurements
- Calculation of MOS-LQO, R-factor (P.834) and J-MOS from PESQ measurements

E-Model Measurements

- Perform voice quality measurements on thousands of RTP streams using E-Model – R-Factor (G.107)

ABACUS 5000 PLATFORM

The multipurpose Abacus 5000 delivers all of your test needs in one affordable package.

Abacus 5000 Chassis

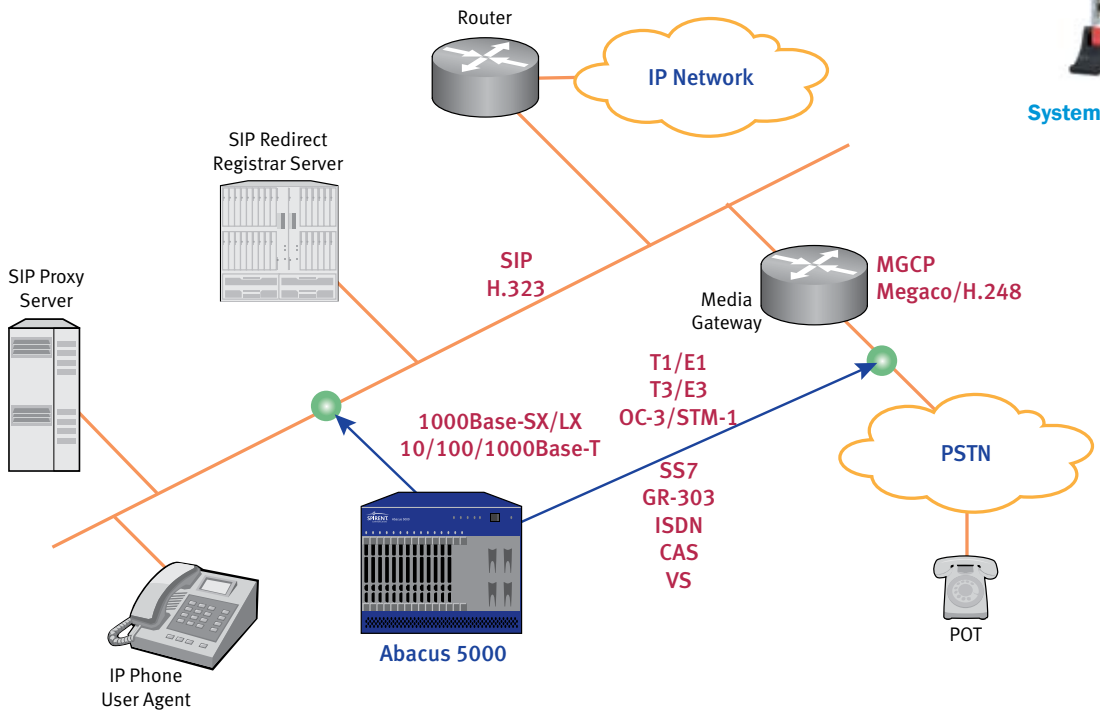
Abacus 5000 is available in three cPCI chassis form factors:

- 4-slot portable chassis
- 3-slot rack mountable chassis
- 13-slot rack mountable chassis

System Controller (SC3)

Communicate with both the user's PC (100Base-T) and the Circuit Generator (CG) subsystems.

System Controller



Convergence Testing with Abacus 5000

CIRCUIT GENERATOR SUBSYSTEMS

IP Telephony Signaling and Media Traffic Generator (ICG3 Subsystem)

The Abacus 5000 ICG3 subsystem simulates VoIP calling functionality by originating and terminating calls in one single card. The ICG3 subsystem performs high stress/performance signaling and RTP media testing.

The Abacus 5000 ICG3 subsystem provides 1- or 2-port with dual media Gigabit Ethernet.

T1 and E1 Call Generator (PCG3 Subsystem)

The Abacus 5000 PCG3 subsystem provides PCM circuits to emulate a telephone exchange (central office) or a terminal. The PCG3 subsystem provides TDM call generation and switching functionality to test PCM T1/E1 circuits with 24 or 30 channels per circuit. Each channel can be configured as an originating (calling party) or terminating (called party) channel.

T3, E3 and G.747 Call Generator (TCG3 Subsystem)

The Abacus 5000 TCG3 subsystem provides PCM circuits to emulate a telephone exchange (central office) or terminal. The TCG3 subsystem provides a full-duplex T3, E3 or G.747 (E1 over T3) circuit for TDM call generation and switching.

OC-3, STM-1 Call Generator (OCG3 Subsystem)

The Abacus 5000 OCG3 subsystem provides TDM circuits to emulate a telephone exchange (central office) or terminal. The OCG3 subsystem provides one OC-3, or STM-1 link for TDM call generation.

Enhanced Analog Subscriber (ECG3 Subsystem)

The Abacus 5000 ECG3 subsystem emulates analog telephony functionality. It is an analog call generator that simulates analog telephony subscribers (FXO) placing and terminating calls.

The ECG3 subsystem provides 14 circuits that emulate the subscriber side of an analog two-wire circuit.

Analog Exchange (XCG3 Subsystem)

The Abacus 5000 XCG3 subsystem provides analog circuits to emulate an analog exchange (FXS). It provides analog exchange call generation and switching functionality to emulate the central office side of an analog 2-wire circuit with 14 analog lines per interface.

Abacus 5000 3-slot rack-mountable chassis

OTHER ABACUS TEST SYSTEMS

The Abacus 5000 platform supports PSTN to VoIP convergence testing with a single user interface and synchronized measurements with the following test systems:

- Abacus 50 Ethernet
- Abacus 50 Analog
- Abacus 50 T1/E1
- Abacus 100 Analog subscriber

Abacus 50 Test Systems

The Abacus 50 test systems are designed for laboratory and distributed testing. Abacus 50 test systems reduce the cost of deploying a remote testing solution.

Abacus 50 Ethernet

The Abacus 50 Ethenet - VoIP Analysis and Call Generator test system has most of the features of an Abacus 5000 ICG3 subsystem, but in a more compact form.

Abacus 50 Analog Test System

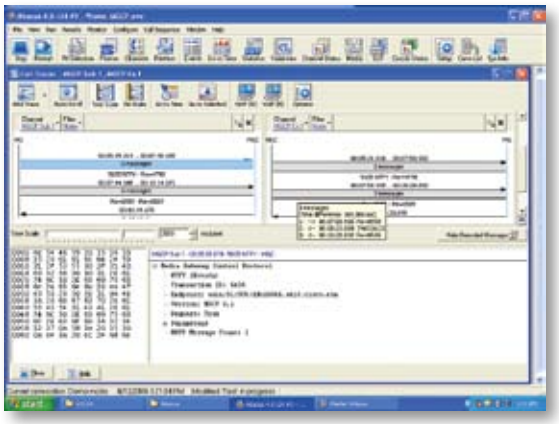
The Abacus 50 Analog subscriber test system has most of the features of an Abacus 5000 ECG3 subsystem, but in a more compact form.

Abacus 50 T1 and E1 Test Systems

The Abacus 50 T1 and E1 test systems have most of the features of an Abacus 5000 PCG3 4-ckt subsystem, but in a more compact form.

Abacus 100 Test System

The Abacus 100 Analog Subscriber Generator provides high density analog subscriber generation functionality for FTTP, PON, VoDSL and VoIP testing on an integrated single platform.



Call Tracer: PSTN/IP ladder diagram

ABACUS 5000 FEATURES

- IP Telephony
  - Call generation using SIP, Skinny, 3PCC, H.235-GRQ, H.323, H.323/Q.931, MGCP/NCS, H.248.1/Megaco v1 and v2 over UDP, H.248/Megaco over SCTP, ETSI H.248/Megaco, SIP-T, SIP-I, SIGTRAN (M3UA/M2UA, IUA-PRI/IUA-BRI), BICC, 3GPP
  - Call routing/switching using H.248/Megaco, MGCP/NCS; softswitch emulation
  - SIP Proxy emulation, registrar and call routing
  - IMS Security (IPSec and AKA)
  - SIP Signaling Compression (SigComp)
- PSTN –TDM call generation and switching
- Analog – analog FXS call generation and switching; analog FXO call generation
- One to thirteen IP Telephony cards
- One to thirteen TDM or analog cards
- Built-in protocol decoding and display
- Send/receive tones, speech, video using G.711 (μ/A-Law), G.723.1, G.726, G.726A, G.729AB, H.263, H.264, Mobile NB GSM-AMR, EVRC, Mobile NB 1/2 rate EVRC, AMR-WB (G.722, G.722.1, G.722.2), EVRC-B, iLBC, GSM EFR, FR
- Flexible Voice Action/Script Editor
- Detailed call error reports with failed sequences or messages
- Generation and termination of over 130,000 SIP channels with RTP media per system
- Executes up to 845,000 simultaneous registered SIP users per system (65K per ICG3D subsystem)
- Generation of up to 512,000 channels of SIP signaling without voice per instance
- Generation (ECG3 and XCG3) of up to 182 simultaneous analog channels per system, 14 channels per subsystem
- Switching (XCG3), maximum of 70 analog channels: 5 subsystems x 14 channels per subsystem that stand in the left-most shelf slots
- TDM generation (PCG3/TCG3) of up to 8,736 simultaneous TDM channels per system (28 ports per subsystem x 24 T1 channels x 13 slots per system)
- TDM switching (PCG3/TCG3) of up to 3,360 simultaneous channels per system (28 ports per subsystem x 24 T1 channels x 5 subsystems, that stand to the left-most shelf slots)
- TDM generation (OCG3) of up to 26,208 simultaneous channels per system (2,016 channels [OC-3 – T1 mode] x 13 slots per system)
- Verification that a speech path is established and retained for the duration of the call
- Measurements of lost packets, out of order packets, jitter, CPS and call completions over time
- Data analyzer supports continuous recording of data into memory, with trigger capabilities to record before and after an error occurs.
- Protocol development functionality to configure, add or remove individual messages
- Multi-user
- One-way delay
- TCL automation UNIX/Linux
- Video and voice in a single SIP call session
- Report generation in HTML, PDF, XML formats
- Call Tracer – PSTN/IP ladder diagram displays synchronized information available in a multi-ladder diagram for Analog, SIP, SS7, H.248/Megaco, MGCP T.38 and clear channel
- Secure RTP and TLS
- Analog CLASS Feature Testing
- SIP Scripting and SIP Supplementary Feature Testing
- Load Profiling

PHYSICAL SPECIFICATIONS

Chassis

- 3-slot rack-mountable chassis
- 4-slot portable chassis
- 13-slot rack-mountable chassis

System Controller

- System controller front card fits into Slot 1 of the Abacus 5000 chassis
- Slot 1 is a reserved slot, which does not reduce the usable slots available for the circuit generator cards
- No rear card for SC

Circuit Generator

- One circuit generator (CG) front card fits into one Abacus 5000 slot
- Up to 3 CG cards can fit in the 3-slot rack-mountable chassis
- Up to 4 CG cards can fit in the 4-slot portable chassis
- Up to 13 CG cards can fit into the 13-slot rack mountable chassis

Dimensions

- 3-slot chassis: 3.5” x 19” x 11.75” (89 mm x 482 mm x 298 mm)
- 4-slot chassis: 21.125” x 7.5” x 12.5” (536 mm x 190 mm x 317 mm)
- 13-slot chassis: 15.75” x 19” x 12” (400 mm x 482 mm x 305 mm)

Environment

- Operating range: 0° C to 40° C
- CE marked

ELECTRICAL SPECIFICATIONS

Power Supply

- Nominal AC input: 100 to 240 VAC, 50 to 60 Hz

Power Draw

- 300 Watts maximum for the 3-slot rack-mountable chassis
- 600 Watts maximum for the 4-slot portable chassis
- 1200 Watts maximum for 13-slot rack-mountable chassis

OS Architecture

- Windows XP Professional operating system
- Windows Vista Business operating system

ORDERING INFORMATION

Chassis

- 3-slot rack-mountable chassis (P/N SPT-3040)
- 13-slot rack-mountable chassis (P/N SPT-3150)
- 4-slot portable chassis (P/N SPT-3050)

Multi-System/Distributed Firmware Option

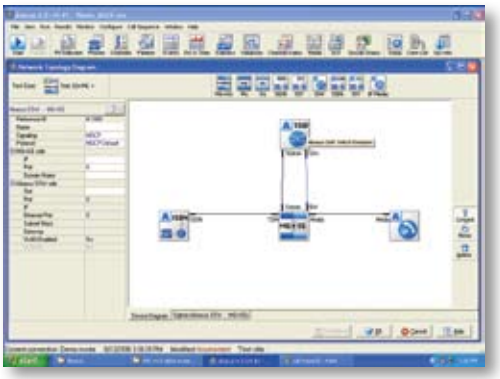
Required when using Abacus 5000 with any Abacus 50 or Abacus 100 systems. Note: Abacus 50 must also have multi-system/ distributed testing option enabled (P/N SWF-3510)

- Enable Abacus system for distributed testing (P/N SWF-3210)

Circuit Generators and Firmware Options

All the ordering information for circuit generators and firmware options for each circuit generator are available in the following data sheets:

- ICG3 Subsystem – *IP Telephony Signaling and Media Traffic Generator*
- PCG3 Subsystem – *T1 and E1 Traffic Generator with Channel Associated Signaling*
- TCG3 Subsystem – *T3, E3, G.747 Traffic Generator with Channel Associated Signaling*
- OCG3 Subsystem – *OC-3, STM-1 Traffic Generator with Channel Associated Signaling*
- ECG3 Subsystem – *Enhanced Analog Subscriber*
- XCG3 Subsystem – *Analog Exchange*



Softswitch Emulation

Other Abacus Test Systems

Ordering information for the following Abacus 50 and Abacus 100 test systems is available in the following data sheets:

- Abacus 50 Ethernet Test System – *VoIP Analysis and Traffic Generator Test System*
- Abacus 50 Analog Subscriber Test System
- Abacus 50 T1 and E1 – *T1 and E1 Traffic Generator Test System*
- Abacus 100 – *Analog Subscriber Generator*

FOR MORE INFORMATION

Visit Spirent Communications' Web site at www.spirent.com/go/voice where you can learn about Spirent IP Telephony test systems and services, download product literature, white papers and test methodologies. Contact your local sales representative for details.

SPIRENT SERVICE AND SUPPORT

Abacus 5000 comes with comprehensive warranty, maintenance, and support packages with Spirent Communications' full commitment to helping you get the most from our innovative technology.

SPIRENT GLOBAL SERVICES

Spirent Global Services provides a variety of professional services, support services and education services — all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services Web site at www.spirent.com/gs or contact your Spirent sales representative.

Abacus 5000 4-slot Portable Chassis

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