



Abacus™ 100 ANALOG SUBSCRIBER GENERATOR

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.

APPLICATIONS

VoIP Convergence

- A single user interface with synchronized Abacus 100 Analog and Abacus 5000 Analog, TDM and VoIP measurements

FTTP, PON, VoIP

- High density analog subscriber generation for ONT-FXO port testing
- Measure ONT-OLT end-to-end One Way Delay (OWD) with Abacus 100 and Abacus 5000

Network Equipment Manufacturers (chips, IP-PBX, gateway, MSs and SSs)

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

Service Providers (NSPs, SPs and ITSPs)

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

The Abacus 100 Analog Subscriber Generator provides one hundred analog circuits (FXO ports) emulating the subscriber side of an analog two-wire circuit in a cost-efficient standalone platform. With the multi-system functionality, multiple systems can be viewed as one system for simplified management of multiple Abacus 100 systems (along with Abacus 5000 and Abacus 50 systems).

Abacus 100 executes a call setup/tear down for each channel. The Abacus 100 gives the user flexibility to simulate a wide range of applications associated with switch and network testing.

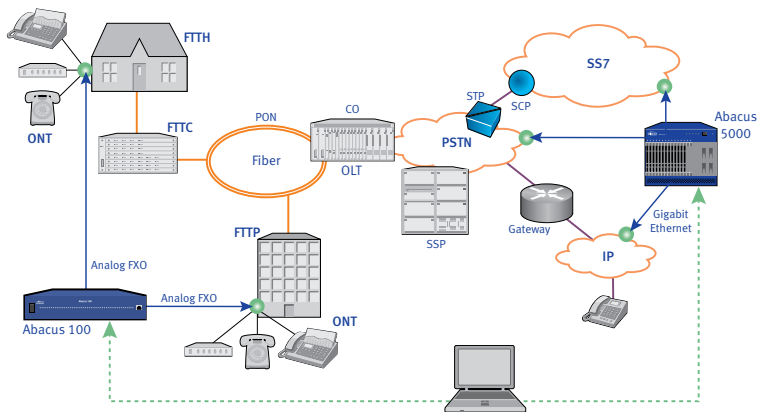
Each of the 100 channels on the Abacus 100 can be configured to be an originating or terminating channel (calling or called party).

Abacus 100 provides real time voice quality (MOS, PSQM, PSQM+, PESQ, MOS-LQO, J-MOS, R-Factor (P.834), V.34 analog data modem, or T.30 fax measurements. Base model includes (at no additional charge) feature scripting, caller ID, real voice files, and real PSQM/PSQM+ scores based on the standard ITU files on every call.

BENEFITS

- Simplify the testing of converged IP telephony and PSTN/analog networks and services with functional and performance testing for analog, T.30 fax, V.34 analog data modem
- Enable network equipment manufacturers and service providers to reduce time to market of FTTP/PON services, while assuring they meet the quality requirements as perceived by users
- Achieve overall cost savings by giving the user full flexibility for convergence testing with synchronized Abacus 5000 IP, TDM, analog measurements with the same user interface
- Save time, especially in high density testing, with per-port LEDs that indicate port activity





FEATURES

- Analog CLASS Feature Testing
- 100 analog FXO ports
- Loop start
- MF R1 and MF R2
- Globally compliant with FCC, NET4, CTR21, JATE, and country specific PTT specifications
- Programmable protocol state machine
- Compact flash memory to store application programs
- 10/100Base-T Ethernet controlled (RJ-45 front access)
- 100 analog FXO ports, with four 50-pin Telco connectors in the back panel and 100 LEDs on the front panel
- DSPs provide tone generation, tone recognition, DTMF, PSQM, PESQ, fax and modem functionality
- On board TCXO used for increased accuracy
- Programmable call progress tones
- Detect caller ID
- Detect battery reversal and battery denial
- Flexible call sequences
- Verify speech path is established and retained for call
- Results automatically and continuously gathered and presented in tables and graphs
- End-to-end testing with other interfaces on Abacus 5000
- Performs voice quality measurements using PSQM, PSQM+ or PESQ
- PSQM, PSQM+ to MOS conversion
- MOS-LQO, R-factor (P.834) and J-MOS calculations from PESQ measurements
- T.30 fax up to V.17 (up to 14.4 kbps)
- V.34 analog data modem (up to 26.4 kbps)
- Echo measurements
- Manage multiple A100 systems from a single user interface

- Call Tracer (ladder diagram for Analog)
- Interface by country
- MDMF and SDMF format for caller ID over analog (CID2)
- Load Profiling (Saw Tooth, Rectangle, Trapezoid and Poisson)
- Graphical display of Measurements-over-Time
- Analog synchronized channels
- TCL API for analog PhoneBook
- Perform QoS validation using the Scripting for Voice Pattern Matching
- Distinctive ringing status
- Call ID during call waiting

ANALOG CLASS FEATURE TESTING

- 3-way Calling
- Automatic Call Back
- Call Forwarding
- Call Transfer
- Call Waiting
- Caller ID
- Caller ID Blocking
- Call on Hold
- E911

PHYSICAL SPECIFICATIONS

Dimensions

- Height: 4.32 cm (1.7")
- Width: 43.18 cm (17")
- Depth: 37.34 cm (14.7")

Weight

- 4.5 Kg (10 lbs.)

Environment

- Operating temperature range: 0 – 40° C at 20% – 80% non-condensing humidity
- CE marked

LEDs

- 100 tricolor LEDs indicate status of channels

TONE SPECIFICATIONS

- Send any two frequencies with an accuracy of $\pm 0.05\%$ or ± 0.5 Hz
- Send noise or silence
- Send with a resolution of 8 ms and an accuracy of ± 20 ms
- Detect any two frequencies with a minimum difference of 80 Hz for no noise
- Detect energy or silence
- Detect signals with a minimum duration of 40 ms at various thresholds, with an accuracy of ± 20 ms

PATH CONFIRMATION SPECIFICATIONS

- 3-tone: Use series of three single frequencies
- Physical: Use series of dual frequencies to identify unique address of channel
- Resilient: Exchange tones with precise voice activation factor (VAF), and measure disturbances in the speech path

VOICE QUALITY SPECIFICATIONS

- PSQM, PSQM+ and PESQ voice quality measurements on 100 channels
- PSQM, PSQM+ to MOS conversion
- MOS-LQO, R-factor (P.834) and J-MOS calculations from PESQ measurements

SPECIFICATIONS FOR MAKING AND RECEIVING CALLS

Sending and Receiving Digits

- Signaling: DTMF, MF R1, MF R2 and pulse
- Programmable times for tone on and tone off
- Programmable make interval, break interval, and inter-digit pause for pulse dialing
- Number of digits is fixed or automatically detected
- Detect caller ID
- Programmable tone transmission and detection

Call Progress Tones

- Detect dial tone, ring back, busy, howler tone and congestion
- Programmable frequencies and cadences

Audio Monitor

- Listen to any 2 channels
- Listen to channels from the controlling PC over Ethernet

ANALOG MEASUREMENT SPECIFICATIONS

Delays

- Dial tone, single tone, dual tone, call acknowledgement, round trip, user timer

Hits and Clips

- Measure up to 1 second of interruptions in speech path

PROTOCOL SPECIFICATIONS

- Loop start

FAX AND MODEM MEASUREMENT SPECIFICATIONS

- Support T.30 (G3) fax (up to V.17) on 96 channels
- Support V.34 analog data modem (up to V.34) on 32 channels

ECHO MEASUREMENT SPECIFICATIONS

- Echo cancellation on/off
- Echo delay
- ERL (Echo Return Loss)
- ERLE measurement (Echo Return Loss Enhancement)
- TELR measurements (Talk Echo Loudness Rating)
- Support echo measurements on 4 channels

INTERFACES

Components

- Stand alone 1U high 19" rack mountable

Capacity

- 100 FXO circuits

Connection

- Front panel with 100 LEDs and one RJ-45 connector
- Back panel with four 50-pin Telco connectors and one DB9 connector

ELECTRICAL SPECIFICATIONS

- Power supplied through external -48 VDC desktop power supply or external -48 VDC source
- Power draw: Maximum of 60W
- Power switch on back panel with fuse
- External -48 VDC desktop power supply:
 - 90 to 264 VAC
 - 47 to 63 Hz

AC IMPEDANCES SUPPORTED

Base Model (A-100)

- 600 ohm

900 Ohm Option (SWF-0101)

- 900 ohm

Complex Option (SWF-0102)

- 600 ohm + 1uF
- 600 ohm + 2.16uF
- 900 ohm + 1uF
- 900 ohm + 2.16uF
- 270 ohm + (750 ohm || 150nF)
- 220 ohm + (820 ohm || 120nF)
- 370 ohm + (620 ohm || 310nF)
- 320 ohm + (1050 ohm || 230nF)
- 370 ohm + (820 ohm || 110nF)
- 275 ohm + (780 ohm || 115nF)
- 120 ohm + (820 ohm || 110nF)
- 350 ohm + (1000 ohm || 210nF)
- 200 ohm + (680 ohm || 100nF)

LINE CAPABILITIES

- Bandwidth: 300 Hz to 3400 Hz, ± 2 dB
- AC impedance: software selectable (if options enabled)
- Load: 0.2 REN per circuit
- -48 VDC: supplied externally

LINE SIGNALING

- Loop start: current limited to 60 mA
- Battery reversal: with loop start

RING DETECT

- Frequency range: 15 to 68 Hz
- Voltage level: 20 to 150 Vrms
- DC component: 0 VDC to ± 105 VDC
- Go off hook: after programmable number of rings

ORDERING INFORMATION

- Abacus 100 Analog Subscriber Generator with 100 Analog FXO ports. Base model includes AC Impedance - 600 ohm, PSQM, PSQM+ voice quality measurements, PSQM to MOS conversion and multi-system functionality. (P/N A-100)

Multi-System Functionality

The multi-system functionality is included with Abacus 100, but the multi-system/distributed testing options SWF-3210 on Abacus 5000 and SWF-3510 on any Abacus 50 systems must be enabled when using Abacus 100 with any other Abacus 5000, or Abacus 50 systems.

Firmware Options

- AC Impedance - 900 ohm (P/N SWF-0101)
- AC Impedance - Complex (P/N SWF-0102)
- PESQ (P/N SWF-0106)
- T.30 Fax up to V.17 (P/N SWF-0107)
- V.34 Analog Data Modem (P/N SWF-0108)

- Echo Measurements (P/N SWF-0110)
- Feature Testing (P/N SWF-0111)
- Analog synchronized channels (PN/SWF-0112)
- Scripting for Voice Pattern Matching (P/N SWF-0113)

Accessories

- Telco cable, 50 pin male to 50 pin male, 2 m (6 ft) (P/N 90-01172)
- Telco cable, 50 pin female to 50 pin male, 4.5 m (15 ft) (P/N 90-01534)
- Telco cable, 50 pin male to 50 pin male, 10 m (6 ft) (P/N 90-01081)
- Telco cable, 50 pin male to 50 pin male, 30 m (100 ft) (P/N 90-01082)
- Telco distribution panel, male and female 50 pin Telco to 25 RJ-11 jacks, (USOC wiring) (P/N 90-01168)

FOR MORE INFORMATION

Visit Spirent Communications' Website 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 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 website at www.spirent.com/gs or contact your Spirent sales representative.



Spirent Communications
1325 Borregas Avenue
Sunnyvale, CA 94089 USA

SALES AND INFORMATION
sales@spirent.com
www.spirent.com

Americas
T: +1 800.SPIRENT
+818 676.2683

Europe, Middle East, Africa
T: +33 1 6137.2250

Asia Pacific
T: +852 2511.3822