Analog Subscriber Generator
Abacus 100

Overview

The Abacus 100 Analog Subscriber Generator emulates high density analog telephony functionality. Abacus 100 is an analog call generator that simulates 100 analog telephony subscribers placing and terminating calls.

The Abacus 100 Analog Subscriber Generator provides one hundred analog circuits (FXO ports) that emulate the subscriber side of an analog two-wire circuit. Each of the 100 channels on the Abacus 100 can be configured to be an originating or a terminating channel (calling or called party).

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.

Applications

PBXs, switches, central offices

- Generate traffic
- Verify correct routing
- True traffic modeling

Satellite, WLL

- Determine capacity
- Verify connectivity
- Tolerate and measure duration of interruptions in speech path
- Measure round trip delay

### Transmission equipment, channel, banks, multiplexers

- End-to-end test
- Verify transmission quality

Voicemail and Voice Response Detection (or IVR)

- Transmit and receive account codes
- Generate traffic to leave messages
- Replay and verify messages

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
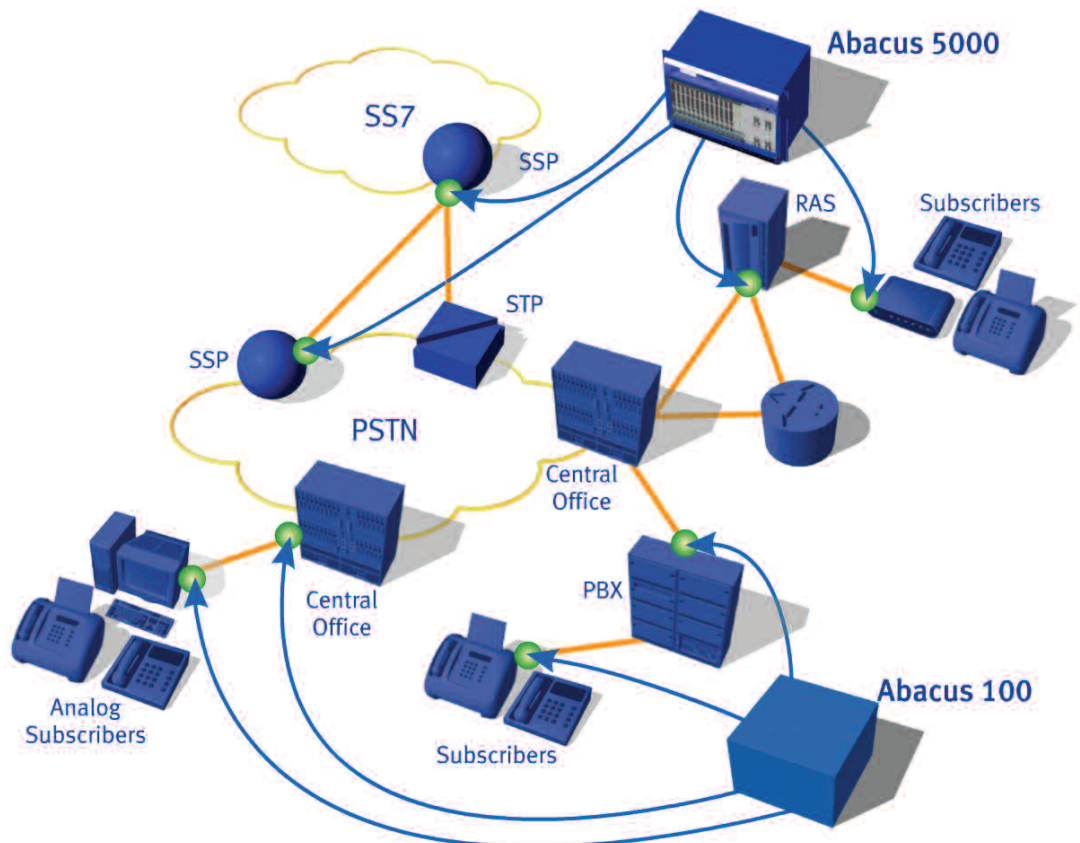
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Service providers (NSPs, SPs, ITSPs)

- Facilitate vendor selection
- Identify performance ceilings
- Enable accurate capacity planning

Features

- 100 analog FXO ports
- Loop start
- Globally compliant with FCC, NET4, CTR21, JATE, and country specific PTT specifications
- Programmable protocol state machine
- Motorola PowerOUICC processor
- 32 Mbytes of SDRAM
- 8 Mbytes of on board flash memory, to ensure full computing and upgrading capabilities (flash memory accessible from host processor)
- Compact flash memory to store application programs (optional)
- 10/100Base-T Ethernet controlled (RJ-45 front access)
- DAAs (Direct Access Arrangement) provide 100 analog FXO ports, with four 50-pin Telco connectors in the back panel and 100 LEDs on the front panel
- Two DSPs provide tone generation, tone recognition, DTMF, PSQM, PESQ, fax and modem functionality
- On board TCXO used for TDM clock and 1 PPS signal generation
- Programmable call progress tones
- DTMF, MF R1, MF R2, pulse dialing
- Detect caller ID
- Detect metering pulses
- 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
- PESQ-LQ, R-factor, J-MOS calculations from PESQ measurements
- T.30 fax up to V.17
- V.34 analog data modem (up to V.34)
- Echo measurements
- Up to 32 A100 systems from one single Abacus 5000 UI

Specifications

Tones

- Send any two frequencies with an accuracy of ±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

- 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

- PSQM, PSQM+ and PESQ voice quality measurements on 100 channels
- PSQM, PSQM+ to MOS conversion
- PESQ-LQ, R-factor and J-MOS calculations from PESQ measurements

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

Call Progress Tones

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

Audio Monitor

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

Analog Measurements

Delays

- Dial tone
- Single tone
- Dual tone
- Call acknowledgement
- Round trip

Hits and clips

- Measure up to 1 second of interruptions in speech path

µ-Law/A-Law Compounding

- Converts µ-Law or A-Law data to analog signal and vice versa

Protocols

- Loop start

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Fax and Modem Measurements

- 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 Measurements

- 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

- Power supplied through external -48VDC desktop power supply
- Power draw: Maximum of 60W
- Power switch on back panel with fuse
- External -48VDC desktop power supply:
    - 90 to 264 VAC
    - 47 to 65 Hz

LEDs

100 tricolor LEDs indicate status of channels

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||150nF)
- 120 ohm + (820 ohm||110nF)
- 350 ohm + (1000 ohm||210nF)
- 0 ohm + (900 ohm||30nF)

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
- Meter pulses: detect 12 kHz and 16 kHz, programmable duration and period

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

- A-100 – Abacus 100 Analog Subscriber Generator with 100 Analog FXO ports. Supports AC Impedance – 600 ohm, PSQM, PSQM+ voice quality measurements and PSQM to MOS conversion

Firmware options

- SWF-0101 – AC Impedance – 900 ohm
- SWF-0102 – AC Impedance – Complex
- SWF-0106 – PESQ
- SWF-0107 – T.30 Fax up to V.17
- SWF-0108 – V.34 Analog Data Modem
- SWF-0110 – Echo Measurements

For More Information

Visit Spirent Communications' Web site at www.spirentcom.com/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.

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