



## Abacus™ 50 Analog ANALOG SUBSCRIBER TEST SYSTEM

The Abacus 50 Analog subscriber test system emulates analog telephony functionality. Abacus 50 is an analog call generator that simulates analog telephony subscribers placing and terminating calls.

### APPLICATIONS

#### VoIP Convergence

- A single user interface with synchronized Abacus 50 Analog and Abacus 5000 Analog, TDM and VoIP measurements

#### FTTP, PON and VoIP

- Low density analog subscriber generation for ONT-FXO port testing
- Measure ONT-OLT end-to-end One Way Delay (OWD) with Abacus 50 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, ITSPs and Enterprises)

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

The Abacus 50 Analog subscriber test system has all of the features of an Abacus 5000, but in a smaller form factor and supporting two analog ports. It is designed for lower port density laboratory test environments or to reduce the cost of deploying a remote testing solution.

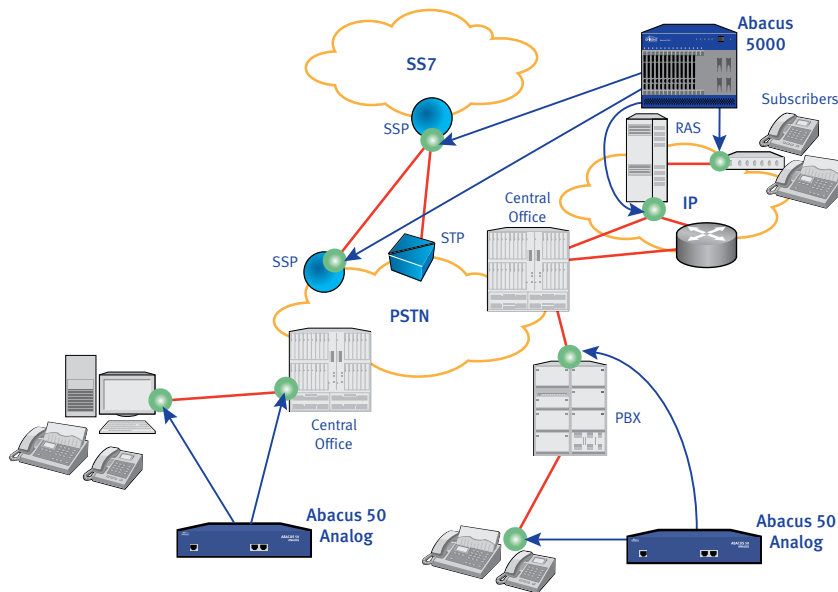
The Abacus 50 Analog system provides analog circuits (FXO ports) emulating the subscriber side of an analog two-wire circuit in a cost-efficient standalone platform designed for laboratory testing as well as testing in a network-distributed environment. With the distributed testing firmware option, multiple systems can be viewed as one system for simplified management of multiple Abacus 50 systems (along with Abacus 5000 and Abacus 100 test systems).

Abacus 50 executes a call setup and teardown for each channel, giving the user flexibility in simulating a wide range of applications associated with switch and network testing. Each of the channels on the Abacus 50 can be configured to be an originating or a terminating channel (calling or called party).

### BENEFITS

- Simplify the testing of converged IP telephony and PSTN/analog networks and services with functional and performance testing for analog, T.30 fax and V.34 analog data modem
- Enable service providers and enterprises to reduce time to market of services, while assuring that 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 and analog measurements using the same user interface





## FEATURES

- Analog CLASS Feature Testing
- Two analog FXO ports
- Loop or ground start with ground start protection switch (allows ground start or isolates circuits from ground)
- 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)
- DSPs to 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
- 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
- Voice quality measurement 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 Abacus 50 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
- 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: 4.8cm (1.9") with user-installed feet  
4.4cm (1.8") without feet
- Width: 24cm (9.5")
- Depth: 20cm (8")

### Weight

- 1.4Kg (3 Lbs.)

### Environment

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

### LEDs

- Two tricolor LEDs indicate status of channels and one status LED

## TONE SPECIFICATIONS

- Send any two frequencies with an accuracy of  $\pm 0.05\%$  or  $\pm 0.5$  Hz
- Send noise or silence

- Send with a resolution of 8 ms and an accuracy of  $\pm 20$  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  $\pm 20$  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 all 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 either channel
- 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 one second of interruptions in speech path

#### **PROTOCOL SPECIFICATIONS**

- Loop start
- Ground start

#### **FAX AND MODEM MEASUREMENT SPECIFICATIONS**

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

#### **INTERFACES**

##### **Components**

- Standalone 1U high 19" rack mountable, with included brackets

##### **Capacity**

- Two FXO circuits

##### **Connection**

- Front panel with two RJ-11 FXO and one RJ-45 connector
- Back panel with one -48 VDC power connector, grounding post, DB15 connector for future GPS/CDMA time synchronization (currently Ethernet support), and one DB9 connector communications port for configuration

#### **ELECTRICAL SPECIFICATIONS**

- Power supplied through external -48 VDC desktop power supply with locking connector or external -48 VDC source
- 90 to 264 VAC (47 to 63 Hz) or 36 to -72 VDC
- Power draw: maximum of 25W, 15W typical
- Power switch on back panel with fuse
- Ground start/isolated selection switch
- External -48 VDC desktop power supply

### **AC IMPEDANCES SUPPORTED**

- 600 ohm
- 900 ohm
- 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)
- 200 ohm + (680 ohm || 100nF)

### **Line Capabilities**

- Bandwidth: 300 Hz to 3400 Hz,  $\pm 2$  dB
- AC impedance: software selectable
- Load: 0.2 REN per circuit
- -48 VDC: supplied externally with included power supply or external -48 VDC source

### **LINE SIGNALING**

- Loop start: current limited to 60 mA
- Ground start: current limited to 20 mA
- Battery reversal: with loop start or ground start
- Battery denial
- Selection: programmable

### **RING DETECT**

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

### **ORDERING INFORMATION**

- Abacus 50 Analog FXO with 2 ports (P/N A-50-001)

### **Multi-System/Distributed Firmware Option**

Required when using Abacus 50 analog, with any Abacus 50 or Abacus 100, or Abacus 5000 systems. Note: Abacus 5000 must also have multi-system/distributed testing option enabled (P/N SWF-3210).

- Enable Abacus system for distributed testing (P/N SWF-3510)

### **Firmware Options**

- PSQM, PSQM+ (P/N SWF-3502)
- PESQ (P/N SWF-3503)
- T.30 fax up to V.17 (P/N SWF-3504)
- V.34 analog data modem (P/N SWF-3505)
- T.30 fax and V.34 analog data modem combo (P/N SWF-3506)
- Echo measurements (P/N SWF-3507)
- Feature Testing (P/N SWF-3511)
- Scripting for Voice Pattern Matching (P/N SWF-3513)

### **FOR MORE INFORMATION**

Visit Spirent Communications' Web site at [www.spirent.com/go/voice](http://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](http://www.spirent.com/gs) or contact your Spirent sales representative.



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