Legato Telecommunications Test Interface

Features and Uses:

- Testing analog telephones, speakerphones, conferencing systems, PBX systems, voice gateways, line cards, and other telecommunications equipment
- Circuits for electroacoustic measurements in compliance with international standards like TIA-470, IEEE1329, TBR38, ETSI ES 203 038, and other standards
- USB integration with electroacoustic test platforms and automated test systems

The Legato Telecommunications Test Interface from Octave Labs provides electrical circuits for analog telecommunications testing. With integrated USB control, the Legato allows calibrated, repeatable telecommunications measurements to be performed from your existing electroacoustic test platform.

Legato extends the functionality of standard soundcards, acquisition boards, analyzers, and other test platforms by adding telecommunication testing capabilities.

The Legato provides a bridge between electroacoustic test equipment and telecom endpoints, like analog telephones and line cards. Supporting up to two talk paths, Legato can be configured for simultaneous 2-wire, conferences, and 4-wire connections. It also adds DC control and measurement capabilities to an electroacoustic test system.

AC mains, audio, and digital sections are isolated from each other, resulting in greater immunity to ground loops and other noise sources. The line driving amplifier and instrumentation amplifier are transformer isolated. Legato can be located remotely from systems under test.

All control functions are accessible from the USB 2.0 interface port. A PC application is included for controlling Legato and storage of presets. Manual intervention is greatly reduced, resulting in fewer measurement errors, faster regulatory approvals, and quicker time-to-market.

A precision feeding bridge and reference impedance sets are included. Return loss measurements are fully supported. Insertion loss and return loss exceed TBR38, ETSI ES203038, and TIA-470 requirements. A second feeding bridge, reference impedance set, and up to two line simulation banks are available as options.

The internal battery supply voltage and current limiting is digitally controlled from the USB interface. V-I characteristics can be measured at several points. Measured V-I values are displayed on the front panel and transmitted over the USB bus. V-I results are also available from the PC file system and from an API.

For higher accuracy and efficient control, analog stimulus and measured signals are isolated, conditioned, amplified, and routed according to the test being performed. The high headroom, fixed gain power amplifier will accurately drive a mouth simulator without clipping, even when high crest factor signals (such as speech and P.50) are used.

USB control permits variables in the signal chain to be altered during testing to assess DUT performance under many conditions. Measurements are available at any point in the signal chain.

A USB controlled, 8-bit bidirectional digital I/O port is provided. The port state is available through the PC file system and the API. Connections to external bridges, reference impedance sets, artificial lines, and other test equipment are available on the rear panel.

Specifications

Power Input: 24VDC, 96W max – provided from an external, regionally approved mains-to-24VDC supply

Control Interface: USB 2.0, Control application included

Options:

- Option 1 – Artificial Line Bank 1 (up to 8 sections)
- Option 2 – Artificial Line Bank 2 (up to 8 sections)

  Artificial Lines are built to order - Please specify the artificial line sections required

- Option 3 – Second feeding bridge and reference impedance set
- Option 4 – Programmable R-Ladder: Adds digitally controlled Feeding Bridge resistance, adjustable from 200Ω to 3.4KΩ in 25Ω steps
- Option 5 – CPE Load Simulator per TIA470 requirements
- Option 6 – Electrolytic 500uF Feeding Bridge capacitors (20% tolerance)

  Custom feeding bridge capacitors and feed resistance available upon request

Internal Battery Supply:

- Digitally controlled from 0 to 60VDC in 100mV steps; I_{limit} adjustable from 10 to 300mA in 1mA steps

DC Measurement :

- Measured V-I displayed on front panel & transmitted via USB
- Results are available from the PC file system and API

Instrumentation Amplifier:

- Transformer isolated
- Zin = 100KΩ
- Programmable gain from -40 to +40dB for isolated points, -20 to +60dB for non-isolated Hi-Z and Direct inputs

Line Amplifier:

- Transformer isolated
- Programmable +10dB or +20dB gain
- Two inputs (both can be balanced or unbalanced)

Reference Impedances:

- Included: 900Ω, 600Ω, TBR38 / Harmonized ETSI ES203038 Impedance "b" [270Ω + (750Ω || 150nF)]
- Other reference impedances available upon request
- Rear panel connections for external Zref sets

Artificial Mouth Power Amplifier:

- Fixed +26.4dB ±0.25dB voltage gain
- $10W_{RMS}$ continuous output power into 4Ω
- 50W peak power for high crest factor test signals
- Two inputs (both can be balanced or unbalanced)

Sound Card / Acquisition Board Interface:

- Line Amplifier Inputs: 18KΩ balanced or unbalanced
- Power Amplifier Inputs: 18KΩ balanced or unbalanced
- Measurement Output: 50Ω balanced or unbalanced
- Reference Output: 50Ω balanced or unbalanced

Feeding Bridges:

- Insertion loss & return loss exceed TBR38, ETSI ES203038, and TIA470 requirements
- R = 400Ω fixed (customizable; see Option 4 for programmable R-Ladder)
- L = 2 x ≥ 10H matched ≤ 3%
- C = 2 x ≥ 100uF precision film, set matched ≤ 0.1% (see Option 6 for electrolytic caps)
- Bridge Modes: Battery Feed, Dry, and Terminate (loop hold)
- Simultaneous 2-Wire and conferencing with Options 2 and 3 installed
- 4-Wire wet or dry with Options 2 and 3 installed
- Inbound Ring and Loop Detection
- An external ring generator (not provided) is required to produce outbound ringing

Front panel I/O and indicators:

- 3 x RJ-11 – one for each 2-wire port and Aux loop port
- 2-Wire port connections accessible from the rear panel
- Indicators for each 2-wire port: Port Active, Loop Detected, Option Active, Inbound Ring, DC Measurement Active
- Indication of measured DC voltage and current, measurement locations
- Level indicators the instrumentation amplifier, line amplifier, and artificial mouth power amplifier

Auxiliary I/O:

- 8 bits of bidirectional, USB controlled I/O
- Two instrumentation amplifier inputs for general testing and measurement (not isolated): 18KΩ and 1MΩ || 20pF (both can be balanced or unbalanced)
- Direct Feeding Bridge input
- Programmable reference channel output for dual channel analyzers
- Phoenix Contact Combicon connectors provided on the rear panel for external devices:
  - Ring generator
  - Line simulators
  - Auxiliary External Bridge
  - Reference impedances
  - Paralleled pins for front panel 2-wire connections

Dimensions:

- 19" EIA 3U rack-mountable enclosure
- 17"W x 5.25"H x 14.5"D with rack mounting brackets removed; 25 lbs. with no options installed

NOTE: Specifications are subject to change. Please contact Octave Labs for current information or customization requests.

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