Speech Studio
Voice Measurement and Analysis

Speech Studio is Laryngograph's voice analysis system. The integrated software and hardware are specifically designed for the exacting requirements of voice measurement. The Laryngograph microProcessor provides a Laryngograph (EGG) and acoustic waveform. These input to the host PC via a highly specified USB interface to give precise analyses of sustained vowels and, uniquely, connected speech.

o Laryngograph Processor provides a Laryngograph (EGG) and Speech input.

o 4 channel high quality recording and playback.

o USB 2.0 interface allows use with desktop or laptop PC.

o Real time narrowband or broadband spectrogram.

o Real time formant display

o Continuous display of closed quotient (Qx) and fundamental frequency (Fx).

o Jitter, shimmer and HNR measurements for continuous vowels.

o Extensive library of quantitative analyses for connected speech. These work on different kinds of speech pattern including fundamental frequency, speech amplitude, vocal fold contact quotient, nasality and friction.

o Optional Nasality Processor for temporal nasalance measures.

Specifications

<u>Laryngograph Processor</u>

Microphone	Omnidirectional (pressure sensitive) electret, +/- 2dB 100Hz to 10kHz noise level 26dB (SPLA), dynamic range 88dB
Laryngograph	Gold plated electrodes in small, medium and large sizes
Bandwidth	+/- 1dB, 1Hz to 10kHz
Gain	0-22.5dB, software adjustable

<u>USB Interface</u>

Analog inputs	4 channel, +/- 5V, 16-bit A to D, 90dB dynamic range
Sampling rate	24, 16, 12kHz
Analog outputs	Speech and Lx waveforms, 16 bit D to A, speaker or headphone compatible
PC Interface	USB 2.0

<u>Speech Studio Software</u>

- record speech and Laryngograph and optionally up to two more waveforms to hard disk
- real time display of waveforms, fundamental frequency (Fx), amplitude (Ax), frication, contact quotient (Qx), spectrogram and LPC spectrum.
- high quality playback
- display of fundamental frequency (Fx) and/or closed quotient (Qx)
- pattern display combining Fx, amplitude (Ax), frication and optionally nasality
- realtime acoustic spectrogram with narrowband (40Hz) or broadband (200Hz) resolution
- realtime display of formants via LPC spectrum
- Sustained vowel analysis
  - Minimum, maximum, average and SD for Fx and Qx
  - Jitter (%)
  - Shimmer (% and dB)
  - HNR (harmonic to noise ratio)
  - NNE (normalised noise equivalent)
  - RAP (relative amplitude perturbation)
- Connected speech analysis (QA)
  - First and second order frequency distribution (DFx1 and 2)
  - Pitch crossplot (CFx) with irregularity score (%)
  - First and second order closed quotient distribution (DQx1 and 2)
  - Closed quotient crossplot (CQx) with irregularity score (%)
  - First and second order amplitude quotient distribution (DAx1 and 2)
  - Amplitude crossplot (CAx) with irregularity score (%)
  - Speech pattern elements – time spent in voice, non voice, friction and nasalance (with optional Nasality Processor) (%)
  - Dynamic phonetogram – Ax vs Fx, first and second order
  - Qx vs Fx, first and second order
  - Statistics

<u>Minimum PC specification</u>

P4 or Pentium-M (Centrino) processor, 512 MB RAM, 80GB IDE HDD, CD-RW, USB 2.0 interface, Windows XP Professional.