Speech Studio

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 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.

Features

Laryngograph microProcessor provides a Laryngograph (EGG) and Speech input.

4 channel high quality recording and playback.

Realtime narrowband or broadband spectrogram and formant display.

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

Jitter, shimmer and HNR measurements for continuous vowels.

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.

Optional Nasality Processor for temporal nasalance measures.

USB 2.0 interface allows use with desktop or laptop PC.

Advanced methods of voice analysis are linked to diagnosis and stroboscopy.

Normal

Vocal fold scarring
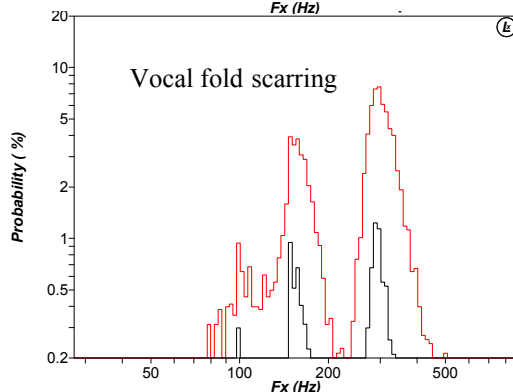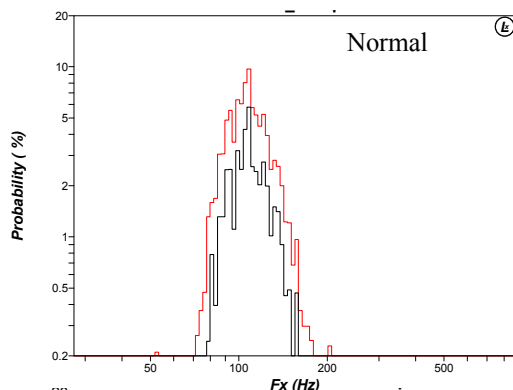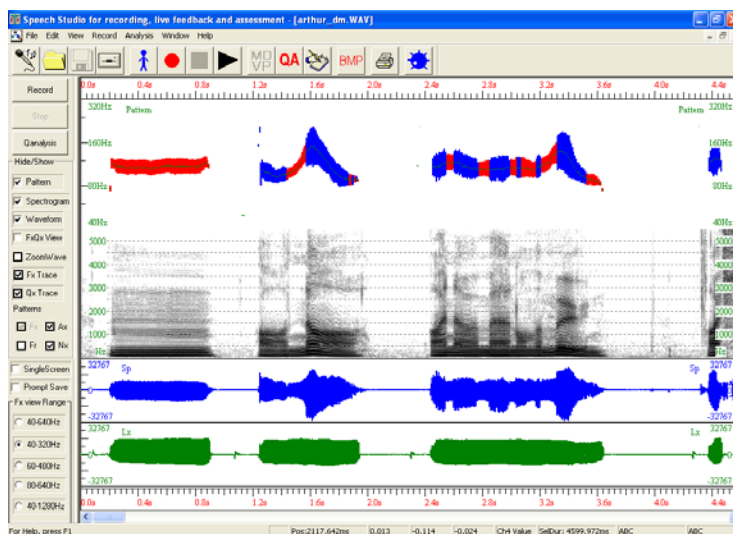
Start at	1140.0 ms	End at	1854.0 ms
No. Periods	78	Duration	714.0 ms
Minimum Fx	105.71 Hz	Maximum Fx	114.56 Hz
Average Fx	108.89 Hz	S.D. Fx	1.86%
Minimum Qx	58.37 %	Maximum Qx	65.70 %
Average Qx	63.22 %	S.D. Qx	1.65 %
Jitter First	0.98 %	Jitter Second	0.52 %
Shimmer+	16.81 %	Shimmer-	-17.34 %
JitterFactor	0.99 %	RAP	0.51 %
Shimmer dB	1.49 dB	NNE	-8.40 dB
CPP	2.61	HNR	8.37 dB

Lx Laryngograph

ISO9001:2000
ISO13485:2003
FM73968

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Specifications

Laryngograph Processor

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

USB Interface

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

Speech Studio Software

- record speech and laryngograph and optionally up to two more waveforms to hard disk at 12000 or 16000Hz
- 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

Minimum PC specification

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