The Latest Generation of the Most Widely Used Speech Therapy Instrument

Visi-Pitch IV
MODEL 3950

APPLICATIONS

• Voice Disorders
• Motor Speech Disorders
• Voice Typing
• Fluency
• Selected Articulation Training
• Hearing-Impaired Speech
• Professional Voice
• Accent Reduction and Second Language Learning

KAYPENTAX™
Overview

Visi-Pitch IV is the latest version of the most widely used clinical instrumentation tool for speech-language pathologists. Encompassing the many features of previous generations of this acclaimed speech therapy tool, Visi-Pitch IV provides the latest, state-of-the-art, high-fidelity hardware for robust data acquisition and playback. As a clinical tool, Visi-Pitch IV offers clinicians an unmatched assortment of powerful methods to assess and treat their clients.

Since its introduction in 1978, Visi-Pitch has become an indispensable tool in speech clinics worldwide. Its reputation has been earned by highly reliable performance and a versatile set of features. With eight standard modules, Visi-Pitch IV can be used with virtually every type of communication disorder in both assessment and therapy tasks. Critical speech and voice parameters are extracted and displayed in true real time to help clients achieve therapy goals with visual feedback. Protocol-driven assessment tasks provide clinicians with valuable objective data using parameters that are well documented in the professional literature. In addition to visual feedback and analysis of important speech/voice parameters, Visi-Pitch IV also provides multiple auditory feedback tools (based on the KayPENTAX Facilitator) that complement the visual feedback offered by other modules.

Visi-Pitch IV helps clinicians objectively track patient progress and assists with the important goal of evidence-based clinical practice. Visi-Pitch IV analysis sophistication has been implemented without sacrificing ease of use for which the Visi-Pitch family has always been lauded. Clinicians new to the Visi-Pitch system are “up and running” in a matter of moments after system installation.

Importance of Speech Biofeedback

Visi-Pitch IV extracts acoustic parameters (e.g., pitch, amplitude, and spectral characteristics) during speech/voice production and presents these in real time, providing clients with clear, intuitive visual displays. Using target vocalizations provided by a clinician, client attempts can be directly compared both graphically and with auditory playback. Monitoring important speech/voice behaviors with concrete visual displays helps clients reach therapy goals more easily.

Extensive Measurements of Speech and Voice Behavior

To help objectify a client’s baseline performance and subsequent change, Visi-Pitch IV extracts an extensive range of measurements relevant to speech and voice. In addition to fundamental frequency, amplitude, and spectral measurements, Visi-Pitch IV contains modules with tasks and concomitant parameters specific to disorders (e.g., dysphonia and motor speech problems). These parameters are displayed graphically and summarized quantitatively; both sets of information can be used in client reports.

Real-Time Pitch

A key module of Visi-Pitch IV is Real-Time Pitch, which displays fundamental frequency and relative intensity in real time. Stress, timing, intonational patterns, as well as target pitch and/or amplitude values during running speech can be seen as they are said by the client. Split screens allow target vocalizations to be compared to a client’s attempt to imitate critical parameters (e.g., amplitude levels, speech rate, pitch range, etc.). The target and the client’s attempt can then be compared
visually and quantitatively; high-fidelity audio playback allows the clinician and client to listen critically to important speech/voice behaviors.

**Voice Games**

The Voice Games module provides animated graphics to represent the same parameters (i.e., pitch and amplitude) extracted in Real-Time Pitch. The games are particularly effective as therapy tasks for motivating children and rewarding good speech/voice behavior. Each game can be modified by the clinician to make a task more or less challenging, depending on the child’s level of performance.

**Real-Time Spectrogram**

The spectrogram has been a benchmark analysis tool of speech signals for over a half-century because of its innovative, revealing, three-dimensional display. The real-time performance of Real-Time Spectrogram allows it to be used for selected articulation training (sample protocols are provided) and for voice “typing” of dysphonic voices as recommended by the National Center for Voice and Speech (NCVS).

Selected articulation therapy can be accomplished with the Real-Time Spectrogram module. The protocol above is for /r/ training.

**Motor Speech Profile**

Primarily an analysis tool, Motor Speech Profile assesses, in depth, the speech performance of patients with motor speech problems (i.e., dysarthria).

Distinct tasks are elicited in systematic protocols (with message prompts) to help profile the patient’s performance and identify potential motor speech problems; results of each task are quantified and graphed against a normative database. For example, a task for analyzing second formant transitions is sensitive in tracking vowel neutralization often observed in dysarthric patients; similarly, diadochokinetic rate and periodicity have been shown to be closely associated with articulatory agility. As with all Visi-Pitch IV parameters, the data can be included in a report summarizing patient performance.

Games are used to motivate children in therapy with visually appealing graphics representing important speech/voice parameters.

MSP parameters are sensitive to various aspects of dysarthric speech. This display analyzes second formant transitions which are frequently diminished in patients who neutralize vowels.
**Multi-Dimensional Voice Program (MDVP)**

MDVP extracts objective quantitative values on sustained phonation, which are displayed graphically and numerically in comparison to built-in normative data. These are useful in profiling a patient’s voice before and after surgery or voice therapy and complement stroboscopic, aerodynamic, and other methods used to assess the patient’s voice.

MDVP is the most frequently cited program in professional journals for analyzing sustained phonation because of its robustness and accuracy with both normal and dysphonic voices. Other programs calculate some of the MDVP parameters, but many of them do not hold up well when presented with dysphonic voices. MDVP has been tested and run on thousands of voice patients and has come to be viewed as a standard acoustic analysis method in voice clinics internationally. An optional CD-ROM of some 700 normal and pathological cases is available from KayPENTAX to help familiarize clinicians with acoustic profiles of various disorders.

**Waveform Editor**

This module is a convenient tool for speech waveform acquisition, editing, and playback. Selected portions of a speech sample can be edited and saved to disk. The Waveform Editor can also be used for dual-channel data acquisition. For example, a speech sample can be acquired with KayPENTAX’s electroglottograph signal in the second channel.

**Auditory Feedback Tools**

Auditory Feedback Tools (AFT) is a highly useful module for critical listening feedback (using headphones) and various types of auditory feedback that have been found to be effective in achieving desired speech behaviors. A key premise of AFT is the seminal role of auditory feedback in speech therapy. Included are high-fidelity amplification, looped playback of selected speech tokens (e.g., word, phrase, or sentence level), Delayed Auditory Feedback (DAF), white-noise masking, speech-rate modification (e.g., prolonging an acquired utterance without altering its pitch on playback), and a metronome pacer. Most of these tools are a subset of features provided in the KayPENTAX Facilitator, which contains five modes of auditory feedback in a portable (wearable) instrument.

**Features**

- True real-time displays for visual feedback of critical speech/voice parameters
- Robust hardware for high-fidelity speech acquisition and playback
- Direct DAT input (without redigitization)
- Eight separate modules applicable across the spectrum of disorders
- Innovative graphic displays and quantitative measurements
- Auditory feedback tools (based on the KayPENTAX Facilitator)
- Vowel and sibilant training
- Single keystroke operation of commonly used protocols
- Games and graphic rewards to motivate children in therapy
- Numeric summaries of client performance for reports

The MDVP graph provides a useful snapshot of the client’s voice quality. Client performance (olive/red) is plotted against normative data (green) that is built into the software.
Multiple innovative displays of the spectral patterns of sustained phonation (e.g., vowels and sibilants) are offered with the Sona-Match module. These are particularly useful for articulation training, second-language acquisition, and the singing voice. Sona-Match displays these spectral parameters in real time so that it can be used in therapy for visual feedback or as a teaching tool.

Visi-Pitch IV Hardware

The Visi-Pitch IV hardware environment meets most of the exacting demands of the NCVS with over 80 dB dynamic range, two channels of input, excellent low-noise/high-fidelity input with an external hardware module for signal conditioning. The external hardware provides convenient access to connectors and controls for adjusting input levels during speech input. DAT players can be connected to the hardware for direct input without redigitizing the signal. A special Voice Range Profile (VRP) switch was designed into the Visi-Pitch IV external hardware module to provide absolute amplitude measurements. (VRP software is optional.) Additionally, Visi-Pitch IV is supplied with a quality microphone, headphones for critical listening, and a high-fidelity speaker. With the exception of the host computer (see requirements), Visi-Pitch IV is a complete hardware/software system with matched components for excellent performance.

Optional Programs for Visi-Pitch IV

Additional programs are available for Visi-Pitch IV. These include the Voice Range Profile (VRP) program (Model 4326), the Real-Time EGG Analysis program (Model 5138), and an extensive database of some 700 disordered voice samples on the Disordered Voice Database and Program (Model 4337). Separate flyers on these programs are available from KayPENTAX.

Sona-Speech II for Sound Cards

The software designed for Visi-Pitch IV is also available as a product called Sona-Speech II that works in conjunction with generic sound cards (e.g., SoundBlaster). Sona-Speech II is purchased without Visi-Pitch IV hardware and is, therefore, less expensive and may be ideal for the budget-minded clinician. Given the variability and specification limitation of most sound cards for speech acquisition, Sona-Speech II is generally not recommended for research applications. A separate brochure on Sona-Speech II is also available.

**MINIMUM HOST COMPUTER REQUIREMENTS FOR VISI-PITCH IV**

- 500 MHz Pentium III PC
- Windows 98SE/ME/2000/XP operating system
- 64 Mbytes RAM
- S-VGA graphic adapter and monitor
- One available, full-size PCI slot
- CD-ROM
For more information on Visi-Pitch IV, please contact KayPENTAX or your local representative.