

Real-Time Filter Design System

March 2010, Northwich, Cheshire, Kane Computing Ltd in conjunction with Manchester University recently announced the latest version of SignalWizard real-time filter design kit.

The SignalWizard 2.5 Kit, which includes hardware and software providing a unique, integrated system for designing, downloading and running very high performance filters in real-time. It includes the high-level PC-based software interface that designs the filter according to the user's requirements, a hardware module based on an advanced digital signal processor and a low-level firmware operating system that implements the filtering operations.

The Signal Wizard 2.5 brings the power of digital signal processing to any audio-bandwidth domain that requires electronic signal filtering. Applications include audio signal processing, sensor signal conditioning, signal analysis, vibration analysis, education and research in electrical, electronic and other physical sciences.

The Signal Wizard is a total-solution package. Due to its flexibility, it is particularly well suited to the real-time processing of audio signals. High quality analogue signal conditioning and a stereo 24-bit resolution codec provide extremely high resolution, sufficient for the most demanding applications.

Richard White, Managing Director of Kane Computing Ltd felt this unique product package would be the ideal low cost design package for many of their signal processing customers in the UK and Europe.

Gregory Kovacs, Professor of Electrical Engineering, Stanford University USA, said "I got everything running and it is simply marvellous! ... The system reflects deep thought, design talent, and meticulous implementation. I love it! ... Overall, I'm super impressed...The ability to so rapidly prototype filters is amazing."

Once designed, an integrated software interface is used to download the filter to the hardware module via a serial link where it is executed on demand. Most important, the system requires no knowledge of digital signal processing (DSP) theory on the part of the user, or of the mathematics associated with digital filter design. New features of version 2.5 include true stand-alone operation (without PC) once configured, IIR and adaptive filters, true dual channel operation, impulse response import, real or complex frequency response import, delay options for in/out and FIR filter modes, real-time spectrum analyzer, dual channel sine wave generator, arbitrary function generator.

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The SignalWizard Hardware Module Kit connects to a PC via a standard serial (RS232) link. Essentially, the module comprises signal pre- and post-conditioning circuitry, a high-resolution stereo codec, a high-speed DSP device, memory, timing and control sub-systems. The 24-bit over-sampling stereo codec system is configurable by the user to any one of twelve sample rates, ranging from 48 kHz down to 4 kHz. In terms of input signal frequency ranges, this equates to 24 kHz down to 2 kHz. The codec accepts or generates a 2 V peak-to-peak signal. The power of the hardware module depends on its own operating system, which is invisible to the user, but communicates with the PC software.

The SignalWizard PC Software performs the following major functions: It designs the filter according to the user's specifications. The filter is expressed as a set of FIR coefficients or taps, IIR coefficients or as an adaptive expression. Collectively, the coefficients of a filter are known as the impulse response.

It converts the floating-point representation of the coefficients to 24-bit fractional arithmetic (again, this is invisible to the user).

It automatically downloads the low-level firmware operating system to the hardware via a serial link.

It automatically communicates with the firmware embedded in the digital system to download the filter coefficients via the same serial link.

It allows the user to alter the system's gain, sampling rate and delay during run-time.

It allows the user to switch instantaneously between a filtered or non-filtered signal at runtime.

Most important, the software includes a flexible filter design section, a window that displays the frequency or impulse response of the realised filter in various formats, and a hardware control section for downloading a filter and generally communicating with the filter module.

The SignalWizard Hardware Module Kit can be purchased as a separate item.

SignalWizard was originally conceived in the UK and the intellectual property rights reside with Professor Patrick Gaydecki, The University of Manchester, Manchester, M60 1QD, United Kingdom. Tel: +44(0)161 306 4906. www.signalwizardsystems.com.

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About Kane Computing

KCL (www.kanecomputing.co.uk) has been providing Image Processing, DSP and high performance computing products for use in industry, education and research since 1987 and is a Texas Instruments Third Party Partner specialising in consultancy and advice on TI development tools/platforms and image processing applications. KCL have extensive knowledge and experience of providing video compression solutions for many industries particularly for digital video security and high quality broadcast applications. KCL has a policy of continual improvement and operates its business in accordance with the requirements of ISO9001:2008.

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