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RF Engines' HyperSpeed and HyperLength FFT Cores dramatically increase performance ranges of FFT

Launched at GSPx 2004 show and selected as one of the winners in the First-Look New Product Forum

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RF Engines Limited (RFEL), the providers of high performance signal processing solutions for FPGA, will demonstrate industry leading Fast Fourier Transform (FFT) cores at the GSPx Embedded Solutions Event in Santa Clara, CA from 28-30 September 2004. The **HyperSpeed** and **HyperLength FFTs** have also been selected as one of the six winners in the First-Look New Product Forum held at GSPx.

The new designs provide silicon efficient implementations of the FFT algorithm for spectral analysis, and support **sample rates up to 3.2GHz** and **transform lengths up to 256M-points** running in continuous real-time – a major step-improvement upon current commercially available FFT technology.

The cores are targeted at a broad range of applications including electronic warfare (radar, sonar, and surveillance), test instrumentation, medical equipment, software-defined radio and radio astronomy.

"The FFT is one of the most widely used, general purpose signal processing algorithms, and provides an efficient means for converting a digital signal into its frequency representation," said John Summers, VP of Sales and Business Development at RFEL. "These latest cores push the technology to new extremes, building on RFEL's recognised leadership in signal processing architectures and the latest available FPGA and memory devices."

The ability to perform spectral analysis at such high sample rates and to achieve fine-resolution in the frequency domain, all in real time, opens up significant new opportunities in a number of key market areas:

- Electronic warfare systems will be capable of detecting events across wide bandwidths with significantly reduced equipment costs.

- Instrumentation manufacturers can use the cores to develop spectrum analysers with GHz bandwidths that allow real-time detection and analysis of very wideband signals, such as Ultra Wideband (UWB), in the frequency domain for the first time.

- In the rapidly growing Software Defined Radio (SDR) area, the cores will allow a receiver to encompass more communications standards and frequency bands, increasing the flexibility of the radio.

- Radio astronomy applications will also benefit from the increased bandwidth and finer frequency resolutions, allowing spectrometers to be built that cover a wider signal detection range or with greater sensitivity, improving the systems for probing deep space.

Two ranges are being announced: the **HyperSpeed FFT** targeted at applications that require very high sample rates and the **HyperLength FFT** aimed at applications where fine frequency resolution is required at the output of the transform. Assuming the use of a Xilinx Virtex Pro 70 FPGA device, the HyperSpeed design will support complex sample rates up to 3.2GHz with transform lengths up to 32K-points. The performance of the HyperLength core is dependent on the available memory technology. A Xilinx Virtex II 3000 used in conjunction with SRAM memory will support a 1M-point transform running at complex sample rates up to 200MHz. Use of SDRAM, will allow transform lengths up to 256M-points, at rates up to 10MHz.

The FFT cores use fixed-point arithmetic, and have been developed using a highly parallel mixed-radix architecture. Each core will be factory configured to precise user specifications, ensuring maximum silicon efficiency and performance for each application. The designs will be supplied in a netlist form as a component ready to be combined with the customer's own IP or as part of an integrated design from RFEL. To complement this technology, RFEL will also provide a range of signal processing building blocks for FPGA to build complete spectral analysis systems, including windowing functions, bit reversal, power calculation, averaging cores and half-band filters.

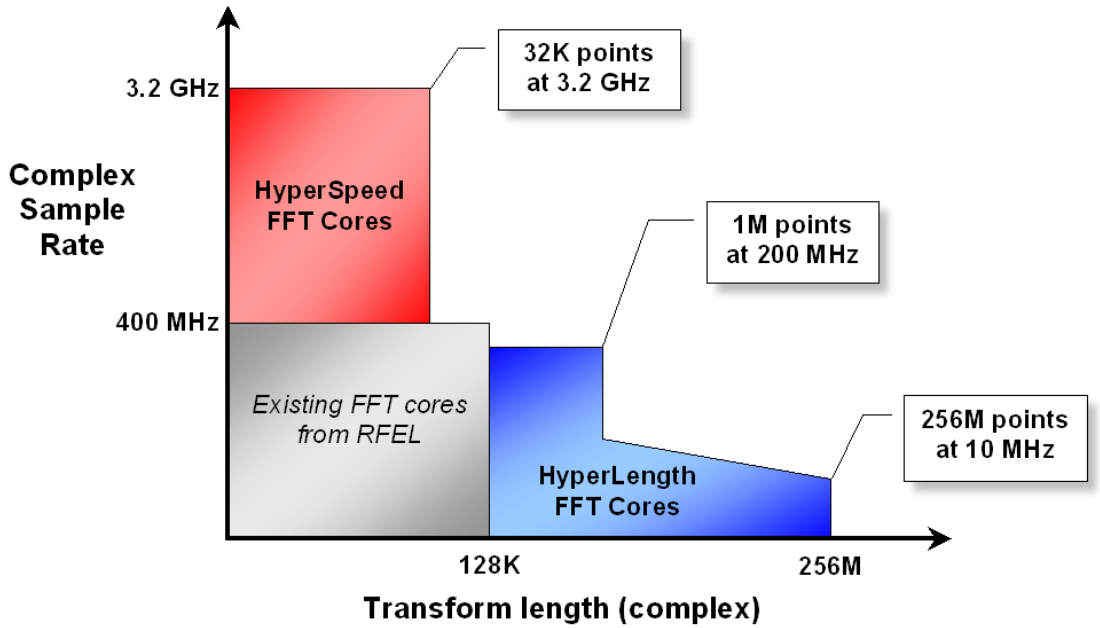

Figure 1 – Transform length and sample rate combinations for HyperLength and HyperSpeed FFT cores. Assumes a single Xilinx Virtex Pro 70 for HyperSpeed cores, and a single Virtex II 3000 with external memory for HyperLength cores

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RF Engines
RF Engines Limited (RFEL) is a UK based designer, providing high specification signal processing cores, system on chip designs, and FPGA based board solutions for applications in the defence, communications and instrumentation markets. These applications include base stations, wireless and wireline broadband communications systems, satellite communications systems, test and measurement instrumentation, as well as defence systems. More specifically, RFEL is a solutions provider for projects requiring complex front end, real time, wide and narrow band, flexible channelisation. RFEL provides a range of standard cores covering multiple FFT and unique PFT techniques, as well as system design services for specialist applications.

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