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## RF Engines adds world's first off-the-shelf Polyphase DFT cores to its range of signal processing technologies

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RF Engines Limited (RFEL), the signal-processing specialist based on the Isle of Wight, UK, has added high speed Polyphase DFT (Discrete Fourier Transform) cores to its extensive range of digital signal processing technologies. These are the world's first Polyphase DFT cores to be available as standard licensable IP that are fully characterised and ready to use off the shelf. They provide high quality filter banks to process complex input data in continuous real time with no gaps in data, at sample rates of up to 800 Mega samples per second or more, in higher radix designs.

This family of core designs, called Ventrix™, is intended for use in applications where filter performance and processing speed are critical and optimal use of the available silicon is required. They are pipelined for maximum data throughput and provide significantly superior filter performance compared with weighted FFT techniques, giving better in-band ripple, stop-band rejection and roll-off, see Figure1 below. The number of polyphase taps can be optimised to match the required filter performance, and this is particularly beneficial for systems that require high dynamic ranges, good filter selectivity, precise amplitude accuracy or a combination of these features. Examples of applications for the Ventrix™ designs, include wide-band filter banks, communications systems, electronic warfare covering radar, sonar and surveillance, medical instruments, real-time spectral analysis, and multi-channel systems, where many low speed channels are interleaved through the high-speed core.

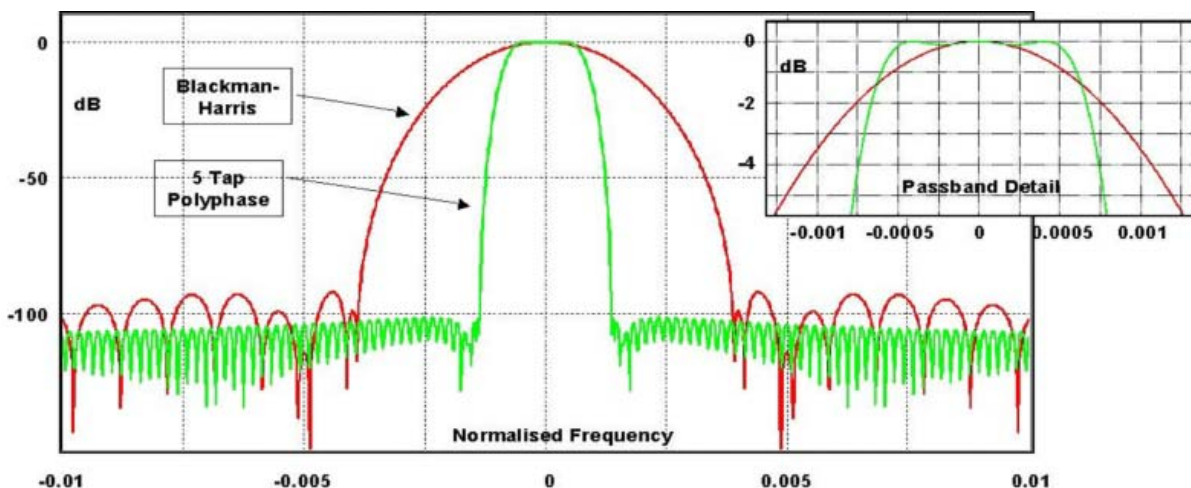


Figure 1. 5-tap Polyphase DFT (5120 effective window) Frequency Response vs 1024 point Blackman-Harris Windowed FFT Frequency Response.

RF Engines' Polyphase DFT solution is a highly optimised pipelined polyphase core incorporating RFEL's high performance Pipeline FFT core. The design is highly parameterisable by RFEL to allow an optimal solution for the application. Versions from eight points to over one million points, are available. Custom filter design techniques allow RFEL to design very high specification filters of almost any length for use within the Polyphase DFT. Critically sampled, twice oversampled and n times oversampled versions are available.

The 10-bit, 3 tap, twice oversampled 16K-point version fits in a single Xilinx XC2V3000. Architectural designs have shown that a real-time one million point, 5-tap, 14-bit, 20MHz complex data rate, version fits in a single XC2V6000 and three external SDRAMs.

John Summers, RFEL's VP of Sales and Business Development, commented: "This latest Ventrix™ range of Polyphase DFTs are an important addition to our range of DSP architectures. Customers come to us with a DSP design challenge and we select the most appropriate solution from our range of PFT, Tuneable PFT, FFT and now Polyphase DFTs that exactly meets their requirements of filter characteristics and performance. Polyphase DFT has been around for a while but we believe that we are the first to package it as a commercial piece of IP that is fully tested and characterised."

Detailed information on the Ventrix™ range of Polyphase DFT cores can be found on the company's website at [www.rfel.com](http://www.rfel.com)

## **RF Engines**

RF Engines Limited (RFEL) is a UK based designer, providing high specification signal processing cores and FPGA based board solutions in the defence, communications and instrumentation markets. Applications include base stations, wireless and wireline broadband communications systems, satellite communications systems, test and measurement instrumentation, as well as defence systems. More specifically it 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.

For further information, please see the website at [www.rfel.com](http://www.rfel.com) or contact RF Engines at Innovation Centre, St Cross Business Park, Newport, Isle of Wight, PO30 5WB, Great Britain. Tel +44 (0) 1983 550330. E-mail [info@rfel.com](mailto:info@rfel.com).

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