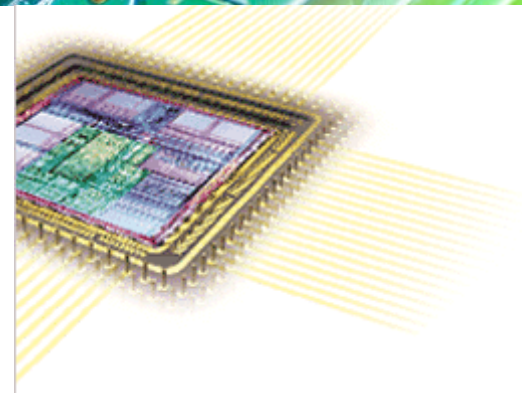


ntBFFT

Block N-point FFT/IFFT Radix 2/4



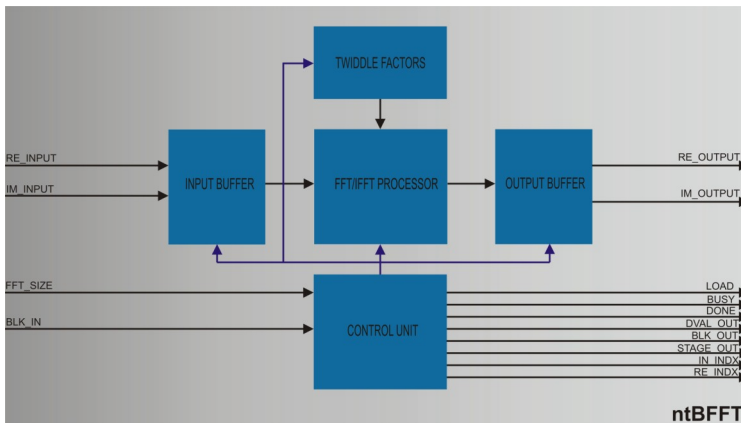
ntBFFT core is a fully configurable solution that performs the FFT and IFFT transform. It is on-the-fly programmable in terms of transform size and type. It supports complex input/output and the results are output in normal order. The core uses fixed-point 2's complement arithmetic with internal auto scaling to avoid arithmetic overflow and simplify dynamic range management. The ntBFFT core supports both radix2 & radix4 decimation in frequency algorithms. The ntBFFT uses a butterfly sequential architecture that provides balanced performance and silicon resources requirements. The implementation is portable to various silicon technologies, with a simple interface for easy integration in SoC applications.

Applications

The ntBFFT core can be used in a variety of applications, including:

- Communication Systems.
- Spectrum Analysis.
- OFDM modems.
- Image processing.
- Defense Receivers and Signal Monitoring.
- Medical and Scientific Instruments.

Block Diagram



Features

- Fully configurable, FFT/IFFT core.
- Programmable transform type.
- Programmable transform size from 8-points to 8K points.
- 16-bit complex I/O in 2's complement format.
- Internally generated twiddle factors.
- Supports radix2 and radix4 architecture.
- Output in natural order.
- Fully synchronous design, using single clock.
- Silicon proven in ASIC and FPGA technologies for a variety of applications.

Implementation results

The core has been targeted to both ASIC and FPGA technologies for various applications. Noesis Technologies can also deliver netlist versions of the core optimized to specific area resources and performance requirements.

| FFT size/ radix | Resources Xilinx Spartan3 Device | Fmax (MHz) |
|--------------------|-------------------------------------|---------------|
| 128/radix2 | 554 CLB Slices / 4 Block RAMs | 77 |
| 512/radix2 | 662 CLB Slices / 4 Block RAMs | 73 |
| 1024/radix2 | 749 CLB Slices / 4 Block RAMs | 79 |
| 2048/radix2 | 1147 CLB Slices / 8 Block RAMs | 71 |
| 1024/radix4 | 1246 CLB Slices / 4 Block RAMs | 88 |

| FFT Version | Description | Latency |
|-------------------|--------------------------------|--------------|
| ntBFFT/ radix2 | Radix2 Sequential Block FFT | $N \log_2 N$ |
| ntBFFT/ radix4 | Radix4 Sequential Block FFT | $N \log_4 N$ |

Deliverables

Noesis has engaged an "open" licensing philosophy in order to allow maximum technology transfer to our client's engineering teams and to facilitate the integration of our IP cores into our client's product. Various licensing models are available. The ntBFFT core is available as a soft core (synthesizable HDL) or as a firm core (netlist for FPGA technologies). The following deliverables are included:

- Fully commented synthesizable VHDL or Verilog source code or FPGA netlist.
- VHDL or Verilog test benches and example configuration files.
- Matlab code.
- Comprehensive technical documentation.
- Technical support.

Support

Technical support by phone or email is included. First year of maintenance is also included. Additional support and annual maintenance options are available.

Ordering information

To purchase or make any further inquiries about our ntBFFT core, or any other Noesis Technologies products or services, contact us at info@noesis-tech.com. Noesis Technologies products are purchased under a License Agreement, copies of which are available on request.