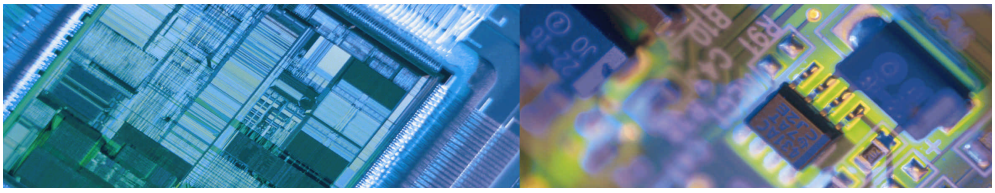
MATHSTAR™

Fast Silicon, Faster Solutions



Product Brief

FilterBuilder

High performance solutions with the lowest cost of ownership

Target Markets

- 3G wireless basestation
- Synthetic aperture radar
- Image processing
- Machine Vision
- Test and Measurement

Features

Silicon Object Array

- Highest performance programmable logic device available
- Fully programmable field/feature upgradeable
- 1GHz max clock rate

High Speed Parallel I/O

- 51.2Gb/s peak aggregate bandwidth per interface
- 8/16-bit LVDS
  - 800MHz DDR - 1600 MT/s
- 32 -bit, 350MHz SDR HSTL
  - 1.5V or 1.8V Class I
- Independent transmit PLLs

DDR Memory Controller

- 250MHz DDR - 500 MT/s
- Support for RLDRAMII and DDRII SRAM

General Purpose I/O

- 2.5V, 3.3V tolerant
- Programmable clocking
- Up to 100MHz

NoGATES Development Tools

- No synthesis or timing closure
- Precoded library elements
- JTAG debugger
- Comprehensive evaluation board

Overview

The FilterBuilder™ series of products combine the MathStar FPOA™ (Field Programmable Object Array) with high speed I/O and memory interfaces to create a programmable image and signal processing platform. These devices have the performance to support the growing computational intensive communication applications. The programmability and 1GHz clock of the FPOA make the devices ideally suited for a wide variety of signal processing in 3G wireless basestation, image processing, machine vision and test and measurement applications. With MathStar's NoGATES™ tool flow and FilterBuilder library elements, custom solutions can be realized in a very short development that preserves your architecture and software.

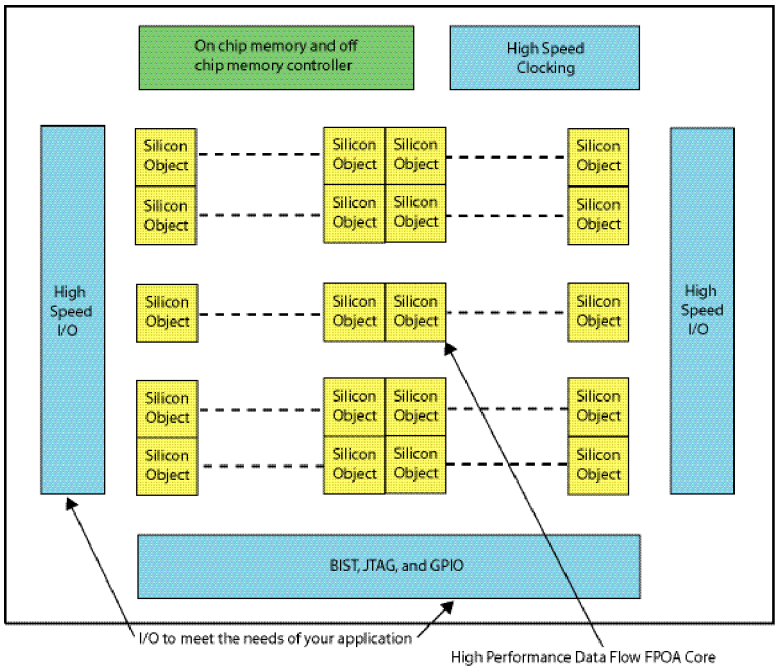


Figure 1. *Architecture Diagram*

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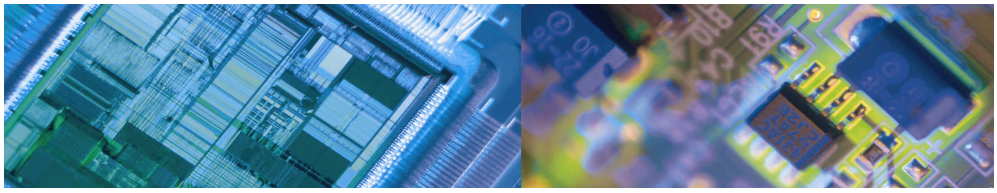

Applications

- FFT/IFFT
- Split-radix FFT
- FIR
- 32-bit filters
- Match filters
- Polyphase filter
- Beamforming
- Rake Receiver

FilterBuilder Application Library

The FilterBuilder application library provides production ready interfaces and packet processing elements. Since they are implemented in the FPOA, they are fully customizable enabling feature enhancement and product differentiation. All of the library elements support MathStar's *SOBus* (Silicon Object Bus) application interface allowing users to seamlessly mix and match FilterBuilder library elements and custom designed functions.

Builder Family Silicon

Device	Number of Silicon Objects	High Speed Parallel IO Interfaces	GPIO	36-bit Memory Controllers
SOA13D156	156	0-1	50-200	0-2
SOA13D40	400	0-2	50-200	0-2

FFT Table

Points	ALU	RF	MAC	Memory	Transformation
64	36	16	12	5RF or 1IRAM	64
256	48	16	16	4RF + 3IRAM	256
1K	60	20	20	16RF + 7IRAM	1024
4K	80	24	24	32RF + 11IRAM	4096

FIR Table

Tap	Frequency	ALU	RF	MAC	Memory	Throughput
8	125 MHz	3	1	1	0	8 Cyc/Sample
16	125 MHz	6	4	2	0	8 Cyc/Sample
32	125 MHz	12	8	4	0	8 Cyc/Sample
64	125 MHz	24	16	8	0	8 Cyc/Sample
128	125 MHz	128	64	16	1IRAM	8 Cyc/Sample

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