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## Introduction

Lattice Semiconductor has added a new line of SRAM-based field-programmable gate arrays (FPGAs) and field-programmable systems-on-a-chip (FPSCs) to its comprehensive line of in-system programmable logic solutions. The Optimized Reconfigurable Cell Array (ORCA) FPGAs and FPSCs offer designers unparalleled performance and density for today's demanding design challenges.

## ORCA Field-Programmable Gate Arrays

The ORCA FPGA line offers three generations of devices. Each is supported by industry-standard synthesis and simulations tools which are integrated into a seamless design flow with Lattice's ORCA Foundry design system, a powerful software system for the design of ORCA FPGAs.

### ORCA Series 4

This fourth-generation FPGA architecture from Lattice features a million programmable gates, high-speed I/O, embedded RAM, on-chip PLLs, and other system-level features. This FPGA serves as the platform for Lattice's latest FPSCs.

### ORCA Series 3

The industry's first FPGA to include built-in system-level features like a Programmable Clock Manager & Microprocessor Interface along with hundreds of thousands of programmable gates.

### ORCA Series 2

A real work-horse FPGA, this architecture offers medium density and high-performance. The OR2T-A devices were the industry's first FPGAs implemented in 0.3 $\mu$ m CMOS and optimized for 3.3 V operation to allow enhanced system speeds at less than half the power of 5 volt parts. The OR2T-B devices are implemented in 0.25 $\mu$ m technology for further power reduction while boosting performance.

## ORCA Field-Programmable System-on-a-Chip (FPSC)

Lattice Semiconductor pioneered the approach of putting ASIC macrocells and FPGA gates on the same silicon die. We call this a Field-Programmable System-on-a-Chip (FPSC). In contrast to ASICs with embedded FPGA gates, FPSCs have a broad range of uses. The embedded macrocells hold industry-standard intellectual property - PCI, line interface, and high-speed transceivers cores. When these macrocells are combined with hundreds or thousands of programmable gates they can be used in a variety of telecom and datacom networking applications. Each FPSC comes with a design kit that includes simulation models, a configuration utility, and scripts for seamlessly integrating the user's design flow with Lattice's ORCA Foundry design software.

### ORLI10G

#### 10Gbps Line Interface FPSC

This new FPSC combines an OIF standard-compliant XSBI 10 Gbps Transmit/Receive line interface with up to 720,000 programmable gates. It can be used as a line interface in a variety of emerging network applications, including 10 Gb Ethernet, 10 Gbps Optical Transport Networks (OTN) using digital wrapper & strong FEC, or 10 Gbps SONET/SDH (OC-192/STM-48).

**ORT8850****8 x 850Mbps Transceiver FPSC**

Built on the Series 4 reconfigurable embedded system-on-chip (SoC) architecture, the ORT8850 FPSC backplane transceiver contains eight channels, each operating at up to 850 Mbps/s (6.8 Gbps/s when all eight channels are used) full-duplex synchronous interface with built-in clock and data recovery (CDR) in standard-cell logic, along with up to 260K usable FPGA gates.

**ORT82G5****8 x 3.125Gbps Transceiver FPSC**

Also built on the Series 4 reconfigurable embedded system-on-chip (SoC) architecture, the ORT82G5 FPSC is made up of backplane transceivers containing eight channels, each operating at up to 3.125 Gbps/s (2.5 Gbps/s data rate), with a full-duplex synchronous interface with built-in clock and data recovery (CDR), along with up to 400K usable FPGA system gates. This chip offers unparalleled speed and reprogrammability for backplane applications.

**ORT4622****4 x 622Mbps Transceiver FPSC**

This is the last FPSC to be built on the Series 3 architecture. It offers 4 backplane transceivers, each operating at up to 622 Mbps (full duplex 2.5 Gbps when all 4 are used). Each transceiver also offers SONET scrambling/de-scrambling of data, and streamlined SONET framing, pointer moving, and transport overhead handling. For customization, the device has up to 120K Series 3 system gates.

**OR3LP26B****64-bit 66MHz PCI Interface**

Based on the Series 3 architecture, this device offers a 33/50/66 MHz, 32-/64-bit PCI interface plus 120K gates. Fully compliant with Rev 2.2 of the PCI Local Bus specification. The finest programmable PCI solution on the market.

**ORCA Foundry 2001 Design Software**

ORCA Foundry is an ASIC-quality tool for the design of ORCA FPGAs and FPSCs. Available in PC and workstation flavors, ORCA Foundry works seamlessly with leading EDA tools from companies like Synopsys, Cadence, Mentor Graphics and Synplicity. The toolset contains everything necessary to implement an ORCA FPGA or FPSC. Features include:

- SCUBA, a macrocell compiler
- Integrated graphical floorplanner
- Timing-driven map, place & route engines
- ASIC-quality static timing analysis
- Low-level interactive chip editor
- Bitstream generation
- Intuitive design manager
- Complete simulation libraries
- Thorough online documentation