Quatro® 4100

Driving the Digital Lifestyle

Programmable SOC Solution for Printing Appliances

Imaging | Software | Processors | Quatro SOCs | Solutions

Product Brief

Zoran Corporation
1390 Kifer Road
Sunnyvale, CA 94086-5305

www.zoran.com

The Quatro 4100 system-on-a-chip (SOC) is the most cost-effective platform available today on which to design and build low-cost, feature-rich printer appliances. Original equipment manufacturers (OEMs) seeking a platform for a wide range of products, will find the 4100 complements Zoran's high performance Quatro 4110 by providing a set of features and performance optimized for entry-level print appliances.

The 4100 incorporates two proven processors, the ARM7 RISC CPU core and Zoran's Quatro SIMD DSP core, providing OEMs with an easily programmable and inexpensive controller platform. The 4100 is ideal for applications that require one or more PC-independent functions such as color inkjet MFPs, monochrome and color laser MFPs, and direct-connect photo printers with USB or memory card interfaces.

Benefits

Cost-effective solution

Highly integrated system-on-a-chip with both PC and non-PC interfaces, enabling the lowest possible cost

Rapid time-to-market

Programmable platform for rapidly deploying innovative features and associated image processing pipelines

High performance

Specialized imaging DSP core paired with the industry-leading ARM7 CPU

Key Features

- 67 MHz ARM7 CPU core
- 133 MHz quad-processor SIMD DSP core
- USB 2.0 Hi-Speed device (480 Mbps)
- USB Full-Speed host for camera direct connect
- Memory card interface: CompactFlash (including Microdrive), Memory Stick, Memory Stick PRO, Secure Digital, xD-Picture Card, MultiMediaCard and SmartMedia
- 3 color-copies per minute performance for an 8.5" x 11" photograph at 600 dpi
- 15 color-copies per minute performance for color pages with white space at 600 dpi
- 18 monochrome-copies per minute performance for an 8.5" x 11" photograph at 600 dpi
- Complete development tool suite
- Complete reference design and use of code bases developed for the Quatro imaging SOC platform
- Extensive image processing library
- Programmable interfaces to control inkjet print heads, laser engines and scanner assemblies

Description

Entry-Level Print Appliances

The entry-level segments within the market for print appliances MFPs, direct-connect photo printers, and Internet TV printers are growing rapidly. Driving this growth are lower prices, innovative features, and the proliferation of image-rich content from digital cameras, scanned documents, and the Web. The 4100 SOC is designed to address the aggressive cost requirements of these entry-level segments. Through its full programmability, the 4100 allows OEMs to rapidly bring products to market and with more innovative features.

Programmable Platform

The 4100 is a highly integrated SOC solution for appliance printers that OEMs can program to implement the features and associated image processing required across a range of products. Because it is programmable, the 4100 offers OEMs both significant time-to-market advantages and differentiation over conventional ASIC solutions.

Quatro Architecture

The 4100 is based on Zoran's Quatro architecture. Quatro is a scalable, extensible architecture for constructing programmable SOC solutions for imaging and printing devices.

At the heart of the Quatro architecture are four key elements:

- ARM 32-bit RISC CPU core
- Quatro 4-datapath SIMD DSP core
- Industry-standard internal bus
- Easy-to-use C-based programming environment

Quatro 4100

Driving the Digital Lifestyle

Programmable SOC Solution for Printing Appliances

Product Brief

Description (continued)

By pairing the ARM CPU core with the Quatro DSP core, the Quatro architecture provides OEMs with a unique combination of high performance processing and easy-to-use programmability. The ARM CPU core, the established leader in embedded CPU cores, delivers high performance system and control processing with dense code size and a highly regarded software development tool suite.

The Quatro DSP core, the next generation of the parallel processing DSP core used in Zoran's PM-44i and PM-44ix discrete DSPs, delivers unmatched performance in image processing. The Quatro DSP core utilizes an advanced single instruction, multiple data (SIMD) parallel processing architecture to provide very high performance image processing—up to 530 million multiply-accumulates (MACs) per second at 133 MHz.

Programming Environment

The programming environment for 4100 is based on the ARM Developer Suite, widely recognized as one of the best embedded development tool sets available. To these proven ARM tools Zoran integrates a set of tools for programming the Quatro DSP—C compiler assembler, simulator, debugger, and libraries. Using the ARM CPU and Quatro DSP simulators, an OEM's complete system—both system functions and image processing pipelines—can be fully developed and simulated on a PC. Zoran's extensive library of optimized image processing algorithms makes developing image processing pipelines easy.

Reference Design

To further shorten time-to-market, Zoran provides OEMs with a reference design for an inkjet MFP. The reference design includes both a controller board and firmware. The reference controller board also serves as a development board that OEMs can use to prototype their own system code.

Processing Modules

The 4100 incorporates the following processing modules:

- 67 MHz ARM7 CPU core
- 133 MHz Quatro DSP core
- 133 MHz JBIG compression/decompression core

Interfaces Modules

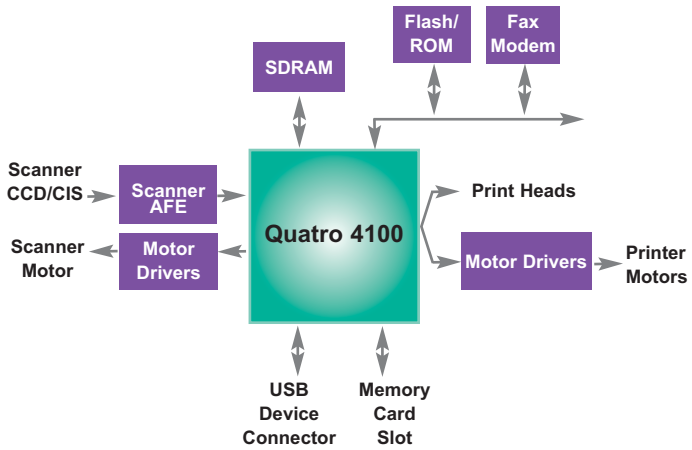
The 4100 provides all the interfaces required in an appliance-type printer:

- 133 MHz 8-bit SDRAM interface
- USB 2.0 Hi-Speed 480 Mbps device interface (including PHY)
- USB Full-Speed host
- Memory card interface: CompactFlash (including Microdrive), Memory Stick, Memory Stick PRO, Secure Digital, xD-Picture Card, MultiMediaCard and SmartMedia
- Scanner AFE and control interface (supporting CCD and CIS scanners)
- Powerful programmable printer and scanner mechanism control interface with dual 133 MHz flexRISC processors
- 14-channel, 2MHz 8-bit A/D
- System bus interface
- General-purpose I/O interface
- Serial port
- JTAG interface

Key Specifications

- 216-pin LQFP or 256-pin BGA package
- 0.18 micron process
- On-chip PLL with EMI reduction
- Full scan design and on-chip BIST for high production test coverage
- Core voltage 1.8V
- I/O voltage 3.3V (5V tolerant)
- Power dissipation <2W at maximum clock speed
- Sleep mode

Quatro 4100 Controller Block Diagram



Zoran Corporation **www.zoran.com**

imaging.usa@zoran.com • **imaging.japan@zoran.com** • **imaging.taiwan@zoran.com** • **imaging.korea@zoran.com**