

ZSP[®]400 Digital Signal Processor Core

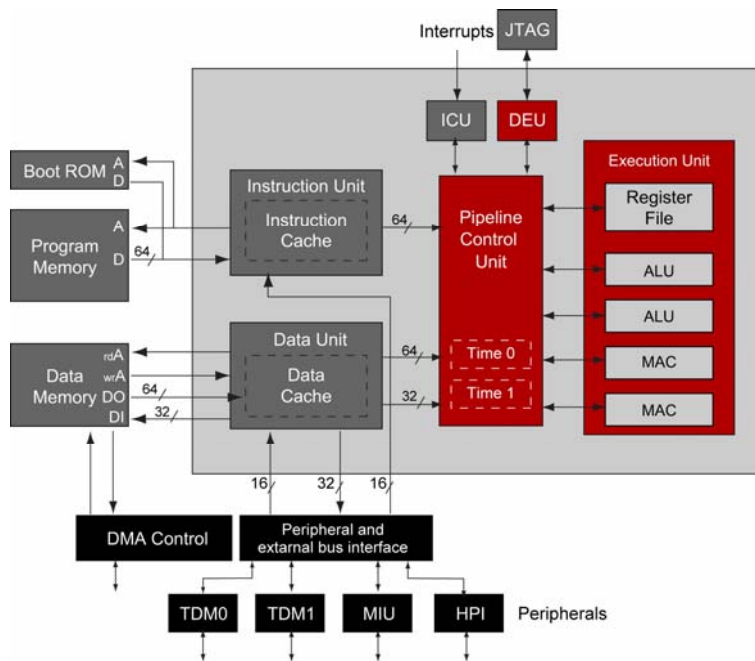
DSP Core with integrated Debug and Timer Capabilities



OVERVIEW

The ZSP400 is a synthesizable high-performance 16-bit fixed point Digital Signal Processor (DSP) based upon the ZSP[®] Architecture. The ZSP400 synthesizable core is designed for utilization in customer design flow environments. The ZSP400 provides an optimized superscalar DSP processor that can support both control and DSP algorithm functions efficiently with a peak of 800 MIPS operations.

The ZSP400 core has been characterized as a 200 MHz processor core that can issue and execute four instructions simultaneously while providing 400 million multiply-accumulate operations per second. The ZSP400 core can be embedded with ARM[®], MIPS[®], or other host processors on a single silicon device and complemented with memory, Ethernet, WAN, telecom, memory, and mixed signal cores to provide complete system-on-a-chip functionality with the highest levels of integration available in the industry today.



ZSP400 Core Block Diagram

DESCRIPTION

Existing customers of VeriSilicon's VSI401Z/402Z standard DSP product offerings can utilize the ZSP400. The ZSP allows designers to utilize off-the-shelf DSP processor solutions for their prototyping and low, volume product requirements while incorporating a ZSP400 core for integrated solutions. The on-chip memory can be expanded up to the 1M word memory addressing of the ZSP400 core.

FEATURES

- 4 issue superscalar 16-bit architecture
- Dual multiplier accumulators
- Dual ALUs
- Orthogonal instruction set
- Single-cycle execution of all instructions
- Synthesizable RTL
- 5 nsec cycle time at 1.8V(±5%) for 0.18 micron technology
- Fully static design
- Idle and sleep modes for low power
- Single cycle add-compare-select (ACS – Viterbi)
- JTAG interface port
- Complete software tool chain
 - Optimizing C compiler
 - Optimizing assembler
 - Liker/loader
 - Debugger
 - Evaluation board

BENEFITS

- High performance without VLIW programming difficulties
- Using C compiler – good code size/performance
- Latest-generation technology in industry
- 200 MHz operation in production
- Simple to integrate in SoC
- Suitable for mobile/low-power applications
- Suitable for communications ECC algorithms
- Data I/O in background does not limit performance
- Testability and debugging capabilities
- Ability to bring applications to market quickly



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The ZSP400 can communicate off-chip, while utilizing ROM for boot functions or preset DSP algorithms and tables. Several boot routines can be provided, including internal self-test, emulation code and JTAG port as well as boot-loader routines. The peripheral interface provides glueless interfaces to industry-standard 32-bit synchronous burst SRAM and 16-bit asynchronous SRAMs and ROM devices. The ZSP400 has integrated dual 16-bit on-board timers for real-time interrupt generation and an In-Circuit-Emulation (ICE) debug capability. The ZSP400 incorporates support of idle and sleep operating modes to reduce operating power dissipation. Features in the ZSP400 include loop registers (4), register shadowing and reverse carry addressing to enhance the performance of Fast Fourier Transform (FFT) algorithm execution.

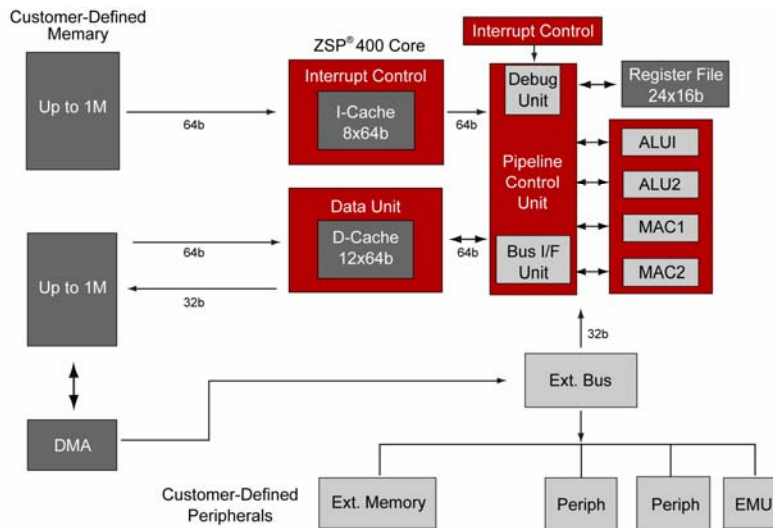


Figure 2. Integrating the ZSP400 with Customer Defined Memory and Peripherals

The ZSP processor family is fully supported with a complete set of software development tools, available for Windows 95/98/NT and Solaris 2 platforms. The ZSP architecture enables the C compiler to produce code unrivaled in code density and execution speed by any DSP in its class, offering fast time-to-market with minimal compromise on performance and cost. An integrated debug environment is available for PC platforms, including a JTAG control port.

About VeriSilicon

VeriSilicon Holdings Co., Ltd ("VeriSilicon") is a fast growing silicon solutions company providing products and services that enable customers to meet their chip design objectives, accelerate development programs and deliver market proven silicon products - on time and at lower cost. VeriSilicon specializes in providing expert design services, market leading ZSP[®] licensable cores and platforms, industry standard semiconductor IP and scalable ASIC turnkey services across a broad range of application markets, including multimedia, voice and wireless communications. VeriSilicon has design, operation and sales and support offices in Santa Clara, California, Dallas, Texas, Shanghai and Beijing, China, Taipei, Taiwan, Tokyo, Japan, Nice, France and Seoul, Korea. For more information, visit www.verisilicon.com.

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