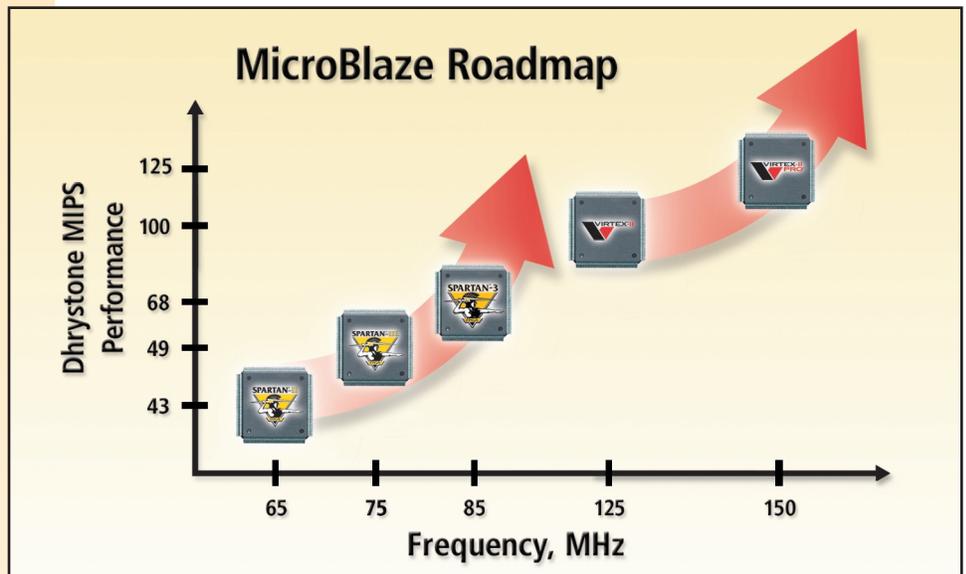# MicroBlaze
The Industry's Fastest
Soft Processor Solution for FPGAs

Developing high performance processor-based systems can be very challenging in today's competitive environment. Not only do you want a processor that is easy to use and very area efficient but also a solution that is optimized for cost- sensitive designs. That's why it's very important that you choose a technology that is flexible, advanced, and able to support you well into the future.

The MicroBlaze™ 32-bit RISC soft processor core gives you unprecedented performance for creating powerful systems, complete with peripherals, memory, high-speed I/O, and logic – all on a single programmable logic device. Our easy-to-use development tools make it simple for you to build your design and update it at any time – even after it's in your customer's hands.

MicroBlaze Roadmap — Dhrystone MIPS Performance (125, 100, 68, 49, 43) vs. Frequency, MHz (65, 75, 85, 125, 150)

The Advantages Are Overwhelming

The MicroBlaze core is fast, resource-efficient, cost-optimized, and completely hardware compatible with our PowerPC™ hard core and peripherals. Therefore, you can create highly complex, multi-processor systems that work together seamlessly to give you the highest possible system performance at the lowest possible cost on a single FPGA. The MicroBlaze core features:

- **Advanced Architecture –** This powerful 32-bit pipelined RISC architecture includes thirty-two 32-bit general-purpose registers, user-configurable instruction and data caches, hardware divider, barrel shifter, and a new direct processor interface called LocalLink. This high bandwidth, configurable depth FIFO interface to the CPU offers point-to-point connection for custom functions and hardware which is ideal for streaming applications.

- **High Performance –** MicroBlaze operates up to 125 Dhrystone MIPS (D-MIPS) on Virtex-II Pro™ FPGAs running at 150 MHz.

- **Hardware Compatible –** MicroBlaze peripherals are hardware compatible with PowerPC peripherals used in Virtex-II Pro FPGAs through the IBM CoreConnect™ bus.

- **Minimal Logic Requirements –** Requires only 950 logic cells in Virtex-II Pro FPGAs.

- **Easy-to-Use Development Tools –** We offer a complete set of hardware and software development and debug tools that make it easy to build your MicroBlaze system.

- **Global Support –** We provide a full line of support services, including a Hotline, Design Services (Xilinx and Distribution), FAEs (Xilinx and Distribution), and training.

XILINX®

Embedded Development Kit (EDK)

The MicroBlaze soft processor core is included in the Embedded Development Kit (EDK). The EDK also provides a standard set of infrastructure, interface, and peripheral IP for both MicroBlaze and the Virtex-II Pro PowerPC and the Embedded System Tools. The kit includes an evaluation version of ISE 5.1i software. Variations of this kit include development boards that support the Virtex™ and Spartan™ series of FPGAs from Xilinx and distribution partners.

Embedded System Tools

As part of the EDK, the Embedded System Tools includes the Xilinx Platform Studio (XPS) – an integrated environment for creating MicroBlaze and PowerPC designs. EDK includes:

- Common processor IP (Standard and Evaluation cores)
- Automated system generation based on the IBM CoreConnect Bus
- Software development tools (Complete Standard GNU tool chain)
- Xilinx libraries (Compatible between MicroBlaze and PowerPC)
- Hardware verification tools (Simulation Tools)
- Software debug tools (GDB debugger over JTAG or UART)

Complete Processor IP

MicroBlaze peripherals are hardware compatible with PowerPC peripherals used in Virtex-II Pro FPGAs through the IBM CoreConnect bus technology, which includes the On-Chip Peripheral Bus (OPB), the Processor Local Bus (PLB), and the Device Control Register (DCR) bus. Xilinx has over thirty processor IP cores to support MicroBlaze based embedded designs in its FPGAs.

Infrastructure Cores (Included in EDK)	Peripheral Cores (Included in EDK)
OPB Arbiter and Bus Structure	OPB SPI Master and Slave Bus Controller
DCR Bus Structure	OPB Interrupt Controller (IntC)
OPB2OPB Bridge – Lite	DCR Interrupt Controller (IntC)
System Reset Module	OPB UART – Lite
OPB Byte Enable Interface (BEIF)	OPB JTAG UART
OPB2DCR Bridge	OPB Timer/Counter
	OPB TimeBase/WatchDog Timer (WDT)
	OPB GPIO
Memory Controller Cores (Included in EDK)	**Optional Cores (At extra cost)**
OPB DDR SDRAM Controller	OPB 10/100 EMAC Controller
OPB SDRAM Controller	OPB 10/100 EMAC Controller – Lite
OPB BRAM Controller	OPB UART – 16550 Controller
OPB External Memory Controller (EMC) Includes support for: Flash, SRAM, ZBT, SystemACE	OPB UART – 16450 Controller
	OPB to PCI Full Bridge (32/33)
IP Interface Cores (Included in EDK)	OPB ATM Utopia Level 2 Master and Slave
OPB IP InterFace (IPIF)	OPB Single Channel HDLC Controller
	OPB I2C Master and Slave Bus Controller

MicroBlaze Performance Across Xilinx Devices

Device Family	Speed	Performance	Logic Cells
Virtex-II Pro (-7)	150 MHz	125 D-MIPS	950
Virtex-II (-5)	125 MHz	100 D-MIPS	950
Spartan-3 (-4)	85 MHz	68 D-MIPS	1,050
Spartan-IIE (-7)	75 MHz	49 D-MIPS	1,050
Spartan-II (-6)	65 MHz	43 D-MIPS	1,050

MicroBlaze Block Diagram
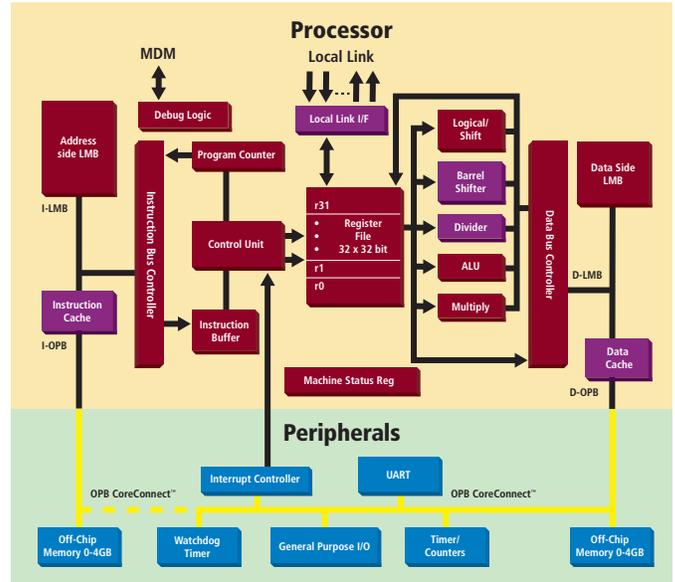
Ordering Information

Part Number	Description	Pricing
DO-EDK	Embedded Development Kit	Contact your local Xilinx representative for pricing and availability

For the latest information on the MicroBlaze Soft Processor Solution, visit: **www.xilinx.com/microblaze**

For the latest information on the Xilinx Processor Solutions, visit: **www.xilinx.com/processor**

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