



## Program Development Tools

Software Development Tools Technology for DSP, SIMD and RISC Hardware Architectures

 *An integrated family of language development tools*

 *Support for DSP, pipelined, SIMD, superscalar, and VLIW horizontal architectures, including optimizations*

 *A complete base technology package plus customization service to quickly create a full-featured tool suite for your high performance architecture*

### **We Develop Tools That Suit Your Needs**

Endeavor Intertech's staff has been designing development tools for decades. This vast experience covers over 40 high performance architectures as simple as 8-bit embedded controllers to 256-bit (and higher) VLIW parallel processing systems. Endeavor Intertech brings you unmatched real-world expertise in assembly language optimization techniques, as well as a unique perspective as both a builder and a user of powerful development tools.

Because of this, we know that when it comes to tools, one size does *not* fit all! We know that each architecture places specific requirements on the tools. For example, some processor designs contain resources that can be accessed by more than one instruction, for multiple cycles. This complexity requires that the entire tool chain know how to handle these resources, including providing understandable errors when they are used incorrectly. However, for many architectures such complexity is unnecessary.

Understanding the requirements of your specific architecture, as well as your customer prerequisites is critical to producing a tool that satisfies everyone's needs.

### **We Develop Tools From a Base Technology Framework**

We have developed a basic framework for each tool we develop. In addition, we use the latest in class libraries—those created internally and others like STL and MFC—to ensure that our time is productive, spent on creating and testing architecture-specific software.

This method for developing tools is important because it allows our engineering staff to focus on the unique aspects of your architecture, not the software components which are common in all development tools. This focus provides a number of benefits.

### **Our Experience Translates Into Measurable Benefits**

**Helping to meet schedules.** The time to develop your custom tools is productive, spent on creating and testing architecture-specific software.

**Helping to reduce overall cost.** The less time it takes to develop the tools, the lower the initial cost. Ongoing costs are reduced by complete and thorough testing.

**Helping to reduce bugs and errors.** Oft used, well-tested framework code, simplifies the task of finding and fixing new bugs.

## Support for Advanced Architectures

Our tools are written to handle the advanced chips being designed today. Whether your architecture takes advantage of parallel functional units, multiple data memories, superscalar or pipelined design, our tools will handle them.

## Tools That Run on Many Hosts

All of our tool frameworks have been developed for portability. Whether you want tools to run under the latest Microsoft Windows technology—including NT—Unix or various real-time O/Ss, we can provide the solution.

## How to Work With Us

Endeavor Intertech's business arrangements are flexible to satisfy the needs of our customers. A typical tools project includes all necessary custom adaptations for your hardware architecture, and our exclusive three month bug fix warranty. Source code is also available.

The tools consists of:

### Simulator

Our simulator can be built from specifications, schematics, or HDL, utilizing our instruction simulation framework. With our base simulation kernel, we can construct micro-architecture, sub-cycle accurate simulators that will execute instructions at up to 50,000 instructions per second. A unique feature of our simulator core technology is user extensibility. Using Microsoft's Component Object Model (COM), you or your customer can extend the simulator to include external memory modules, I/O devices, or special functional units, which in turn are automatically visible from the user interface. Further, the simulator is designed to be a plug-in to a larger system wherein the user may wish to switch between the simulator, the actual hardware, or an ICE all with the same debugger front end for a consistent look and feel.

### Assembler/Linker/Librarian

The assembler converts assembly language source code into relocatable object modules, which can be combined with the librarian and/or linked into a load module by the linker. These tools can be adapted to any existing language syntax and instruction encoding, or we can design them for you. The assembler includes features which help the user program architectures with parallel functional units whether they be in superscalar, SIMD, or pipelined form. These features can include tracking functional unit utilization, overlapping object fields, and even complete assembly language instruction scheduling.

## C compiler

Our C compiler technology converts the C language source code into assembly relocatable object modules. It can be adapted to various embedded environments by either extending or simplifying the language. C subset compilers are of particular use in an embedded environment where the entire scope of the C language is neither necessary nor useful, such as when no floating point functionality exists on the processor. Our C compiler can also be extended through the use of "pragmas" to handle hardware constructs like multiple data memories. It can be developed to contain any set of optimizations which are appropriate to the architecture, including basic optimizations plus instruction scheduling like compaction and software pipelining. Symbolic debug information can be generated, as well.

## Debugger

The debugger is used to debug either assembly language or C language modules. The debugger implements breakpoints, watchpoints, single step execution, symbolic data access, and more. The debugger has a command line and/or windowed interface which can be adapted to the look and feel of the rest of the development environment. The debugger can be made to communicate both with the real hardware and with our simulator.

## Architectural Consulting

Using these and other specialized tools, our staff can provide the service of analyzing an architecture for programmability, applicability to its target market, performance, and specification completeness. We can start with schematics, HDL, specs or even drawings on napkins in an effort to help you tune your design to your customer's needs.

## For More Information, Contact:

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