TriCore™ Family

TriCore™ Development Tools

Green Hills Software provides a comprehensive set of development tools for TriCore based applications:

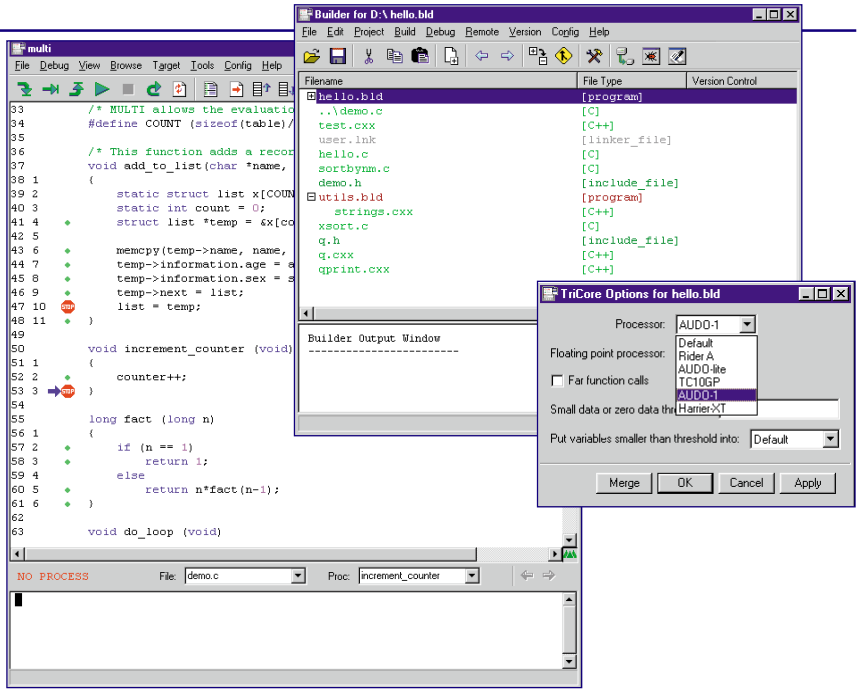
Green Hills™ Optimizing Compilers

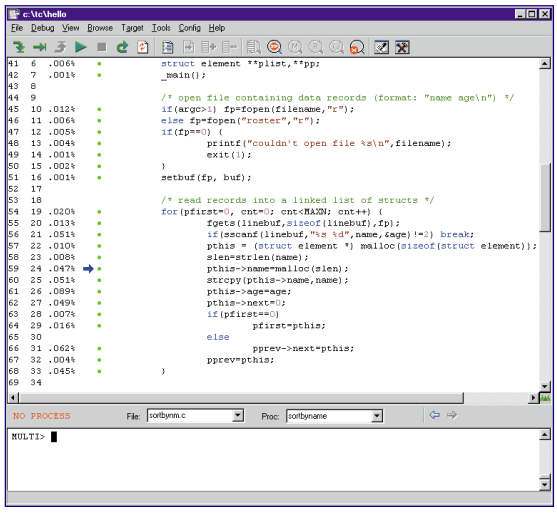
- C
- C++
- EC++
- Run-Time Libraries

MULTI® Integrated Development Environment

- Source Level Debugger
- Graphical Project Builder
- Text Editor
- Version Control System
- Graphical Browser
- Performance Profiler
- Run-Time Error Checking
- Remote Target Connection

For general information about each of these product offerings, please refer to Green Hills Software's "*Software Development Tools for Embedded Applications*" brochure. Following are aspects of these products that are specific to the TriCore architecture.





With the SimTri Instruction Accurate Simulator, MULTI provides a performance profile of your application.

TriCore Optimizing Compilers

The Green Hills Optimizing Compilers for TriCore all utilize a common code generator with architecture-specific optimizations. Each supported processor model has its own particular pipeline and instruction set characteristics. These are accommodated in the code generator to produce code best suited for the target processor. The following TriCore-specific features are supported:

- Processor Options - One option for each supported TriCore model. This setting determines the instructions permitted.
- Parameter Checking - Checks at link time that functions are called with the same number and types of parameters as their declarations.
- Small Data Area (SDA) - The TriCore processor requires two instructions to access data stored at an arbitrary 32-bit address. Green Hills Compilers allow the programmer to put frequently used variables in the SDA section, which is pointed to by a global register. This enables single instruction access to data within the block, saving code size and improving performance.
- Zero Data Area (ZDA) - The zero data area is similar in concept to the small data area. Green Hills Compilers allow the programmer to put frequently used variables in the ZDA section. This enables single instruction access to data within the block.

DSP Support

The Green Hills TriCore Compiler includes full support for automatically generating hardware DSP instructions. The compiler also performs many optimizations to enhance the performance of DSP code, including use of the following:

- Zero overhead loop
- Multiply-accumulate
- Special addressing modes
- Q15 load/store

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DSP Support cont'd

Built-in functions are provided to access the DSP instructions, and in C++ there are several DSP classes provided, including the following:

- Fixed point data types (saturated and unsaturated)
- Circular buffers
- Packed data types
- Bit data types

Run-Time Libraries

A comprehensive suite of run-time libraries for C, C++, and EC++ are included in the corresponding compiler distributions for each language. Full featured start-up code and libraries include automatic copy of data from ROM to RAM and system call emulation. Source code to the run-time libraries is available so that users can customize routines according to the special needs of their applications.

The MULTI Integrated Development Environment

MULTI Integrated Development Environment is a complete environment for embedded applications using C, C++, and EC++ languages. MULTI provides a direct graphical interface with all Green Hills Compilers, and supports multi-language development and debugging. MULTI contains all of the tools you need to complete a major programming project:

- Source Level Debugger
- Graphical Project Builder
- Text Editor
- Version Control System
- Graphical Browser
- Performance Profiler
- Run-Time Error Checking

MULTI provides a host-based (Windows 95/98/NT PC or UNIX workstation) graphical environment for TriCore target development. Host-target connectivity is provided through a variety of means, depending on the target environment. MULTI supports a variety of Infineon evaluation boards including the AUDO-1 TriBoard and TC10GP TriBoard. These boards can be accessed with a variety of interfaces:

- Bare Board Access (No RTOS or ROM Monitor) - MULTI supports On-Chip Debugging (OCD) interfaces, such as BDM or JTAG headers on the board. MULTI provides a complete software package that enables programmers to debug code without need for operating systems, kernels, or even ROM monitors.
- Custom RTOS Support - MULTI can be interfaced with a custom RTOS through integration of the Green Hills INDRT API. INDRT provides all the debug information needed by MULTI, and is easily integrated into user code.
- Instruction Set Simulator - The *SimTri* instruction set simulator interpretively executes TriCore programs on the host PC or workstation without the need for target hardware by simulating the execution of the target processor at the instruction level. *SimTri* provides full debug features, host I/O, command window, and extended profiling. *SimTri* also simulates target CPU cache for those processors which support it.

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TriCore MCU-DSP

TriCore Family

Infineon technologies

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