re Development Tools

CodeWarrior™ Development Studio

MPC5xx Edition, v8.1

Building complex applications on the Freescale™ MPC5xx family of processors may have never been this easy. With powerful tools to simplify the development cycle, from board bring-up to code development and testing, the CodeWarrior™ Development Studio, MPC5xx Edition provides the essential tools for developing sophisticated applications. As an integral part of Freescale, our unique knowledge of silicon ensures that our tools help you take advantage of the powerful features of the MPC500 family of processors. CodeWarrior Development Studio tightly integrates powerful components such as hardware diagnostics tools, a sophisticated code editor and search engine, highly efficient C/C++ compiler and linker, feature-rich debugger, an instruction set simulator and more. Together, they provide maximum control to the embedded developer with the simplicity of an intuitive integrated development environment.

Highlights

> Highly efficient C/C++ compiler with cutting-edge optimization technology for fast, compact code
  - Complete control of code and data memory allocation
  - Options to pack or byte-swap structures to match existing data types
  - Supports position independent code (PIC) and position independent data (PID)
> Built-in software profiler for hot-spot analysis
> Industry-leading debugger with integrated logic analyzer interface
> Integrated hardware diagnostics for board-level testing
> Faster, more intuitive flash programming supporting the latest devices
> File I/O for bare board applications (no OS)
> RTOS kernel aware debugger
> Out-of-the-box code templates (stationery) for popular AMD™/AXIOM boards

Board Bring-Up

The CodeWarrior debugger provides complete control over all board settings, including initializing and saving register values and memory configuration. The debugger also includes a comprehensive set of hardware diagnostics and robust flash programming algorithms supporting an extensive list of flash devices.

Hardware Diagnostics

The CodeWarrior Development Studio comes with diagnostics tests that determine if the basic hardware is functional. These tests include:

> Memory read/write: Perform diagnostic tests by writing and reading memory through a connecting probe
> Scope loop: Repeat memory reads and writes through a connecting probe
> Memory tests: Perform different tests on the hardware including:
  - Walking ones test
  - Address test
  - Bus noise test

Specify any combination of the tests and the number of passes. Results are displayed in a log window after all passes are complete.

Flash Programming

Program on-chip and off-chip flash devices from within the same graphical user interface used to troubleshoot the application. No boot code is required to run on the target system in order to use the programming features of the CodeWarrior flash programmer. The leading flash devices for the MPC500 family of processors are supported out-of-the-box.

Search Engine and Text Editor

Industry observers estimate that software developers spend nearly half their time searching for basic information buried in application code. Not with CodeWarrior Development Studio. Fast, semantic code navigation makes it possible to find specific code structures among hundreds of directories and files quickly and easily. Seamless integration between the CodeWarrior search engine and the text editor allows code changes to reflect immediately in the browser without recompiling.

CodeWarrior Debugger

The CodeWarrior debugger packs a wide array of high-powered features designed to help the developer find and repair software defects quickly, while providing maximum control to debug complex hardware and software issues including:

> User-configurable workspaces: Focus on complex debugging tasks, each workspace contains just the set of views needed for the task at hand
> Hardware and unlimited software breakpoints
> Eventpoints: Perform a specified task when the program executes a specific line of source code or when an associated conditional expression evaluates to true. Set an eventpoint to perform a task (i.e., run a script, play a sound or collect trace data) for superior control over your code execution. Eventpoints can be:
  - Log Point–Logs a string or expression to a file and records messages to the Log window
  - Pause Point–Pauses execution to refresh debugger data–great for watching a variable change over time
  - Script Point–Runs a script or application
  - Skip Point–Skips execution of a line of source code
  - Sound Point–Plays a sound
  - Trace Collection Off–Stops collecting trace data for the Trace window
  - Trace Collection On–Starts collecting trace data for the Trace window

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Warrior Development Studio MPC5xx Edition, v8

> Watchpoints: Set a watchpoint at a location in memory to halt program execution when that point in memory changes value or, for some devices, when the memory location is accessed. Then examine the call chain, check register and variable values, and step through your code

> Special breakpoints: Halt program execution for specific reasons (for instance a C++ or Java™ exception).

> Single-stepping: Step Into, Step Over and Step Out of functions

> Variable view on mouse over: When in the debugger, you can mouse over a variable in the source display and get the current value of that variable

> Display stack trace: The "Call Stack" view provides an easy display of all procedures (functions) active in the calling chain and enables the developer to follow the progress of a program through its hierarchical call structure

> Local variables display: View the variables local to the current function

> Memory view: Display and modify the contents of the target's memory. Quickly find a value in memory, compare memory regions or upload and download memory to a file using this view

> Register view: View extensive information on CPU core and peripheral registers, as well as user-defined registers. The registers displayed can also include bit-level details for an English-language equivalent of register contents

> Object file format: The CodeWarrior debugger supports STABS and ELF/DWARF formats

> Mixed language debugging: The CodeWarrior debugger supports mixed language debugging in C, C++ and Assembly language by automatically analyzing the file in view and adjusting the expression evaluation and data display accordingly

> Profile window: Improve the performance of your code by using the built-in profiler to analyze function performance

> Command-line window: Use the command-line interface together with various scripting engines, such as the Microsoft® Visual Basic®, the Java, TCL, Python and Perl to automate testing, standardize data-logging or uncover that hard-to-find problem

> Seamless integration with target connection probes: The CodeWarrior debugger is fully integrated with several run-control probes from Abatron, P&E Microcomputer Systems and others, resulting in optimized run-control with fast downloads. A target connection wizard simplifies and automates the task of defining new connection definitions based on hardware and communication parameters

> Logic analyzer integration: Quickly and accurately determine the root cause of even the most difficult hardware, software and system integration problems by utilizing the CodeWarrior debugger in concert with a logic analyzer (Agilent Technologies). Seamlessly integrated into the debugger is logic analyzer communications with the ability to:

- Trace On/Off
- Trace Everything
- Trace History
- Start trace based on specified address
- Start trace on address range
- Trace all in address range
- Breakpoint on trigger
- Trigger tracing on breakpoint

CodeWarrior Build Tools (Compiler, Assembler, Linker)

CodeWarrior III compiler produces exceptionally fast, compact, EABI-compliant object code. Our proprietary optimization techniques enable the programmer to balance execution speed with code size while intelligent defaults can generate optimal code.

Key Features Include

> Compatibility with the latest ANSI C++ specs (ISO/IEC14882:1998E) and the ANSI C spec (X3.159-1989)

> Standards conformance (ANSI and EABI) for maximum tool interoperability

> Complete control of code and data memory allocation

> Options to pack or byte-swap structures to match existing data types

> Supports position independent code (PIC) and data (PID)

> Board support routines for bare board applications (no OS)

Assembler: full-featured macro assembler that is invoked automatically by the project manager or as a complete standalone assembler for generating object modules

Linker: offers precise control over the allocation, placement and alignment of code and data in memory

Libraries—the Standard Libraries are included

> Complete C++ library (STL)

> Complete, reentrant C libraries compliant with ANSI/ISO, POSIX® and SVID standards

> Multi-threading

> Full complement of math libraries, including IEEE-754 appendix functions

> Efficient floating-point libraries for fast execution of calculations

Profiler: profiling options contained in the compiler instrument application code, which when executed save profile information that can be viewed by the profiler utility. This profile data can also be automatically sent to the compiler for additional code optimization based on execution paths.

Third-Party Tools Support Through Plug-Ins

The CodeWarrior Development Studio provides out-of-the-box support for multiple third-party tools such as configuration management systems, code editors and more. Extend the IDE using the scripts to include new features or to upgrade/replace existing features. Users and third-parties can develop custom plug-ins to create a new preference panel or integrate custom operating system awareness into the environment.

CodeWarrior tools provide out-of-the-box support for popular configuration management systems such as ClearCase, CVS and more.

Supported hosts

> Windows® XP/2000/Windows NT® 4.0 + SP5 and above

Supported Targets

> All members of the MPC500 family of processors

Learn More: For more information about Freescale products, please visit **www.freescale.com/codewarrior**

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