DRAFT

CodeWarrior™ Development Studio for Microcontrollers V10.x

Targeting Manual

Revised: January 21, 2010

freescale semiconductor

How to Contact Us

Corporate Headquarters	Freescale Semiconductor, Inc. 6501 William Cannon Drive West Austin, Texas 78735 U.S.A.
World Wide Web	`http://www.freescale.com/codewarrior`
Technical Support	`http://www.freescale.com/support`

Table of Contents

1 Introduction

This manual explains how to use the CodeWarrior™ Development Studio for Microcontrollers V10.x product. This chapter presents an overview of this manual and introduces you to the CodeWarrior development tools and development process.

The topics in this chapter are:

- Release Notes — Lists about new features, bug fixes, and incompatibilities
- About this Manual — Describes the contents of this manual
- Related Documentation — Describes supplementary CodeWarrior documentation, third-party documentation, and references to helpful code examples and Web sites
- CodeWarrior Microcontrollers Development Tools — Describes the steps you take to write and debug programs with the CodeWarrior IDE
- CodeWarrior Development Process — Describes the CodeWarrior development process

Release Notes

Before using the CodeWarrior IDE, read the developer notes. These notes contain important information about last-minute changes, bug fixes, incompatible elements, or other topics that may not be included in this manual.

NOTE The release notes for specific components of the CodeWarrior IDE are located in the `Release_Notes` folder in the CodeWarrior installation directory.

If you are new to the CodeWarrior IDE, read this chapter and the Getting Started chapter. This chapter provides references to resources of interest to new users; the Getting Started chapter helps you become familiar with the software features.

NOTE Some of the text and screenshots in this document might not match with the build you are working on, as this document was last updated for the **B091211** build.

About this Manual

Each chapter of this manual describes a different area of software development. Table 1.1 lists the contents of this manual.

Table 1.1 Manual Contents

Chapter / Appendix	Description
Introduction	This chapter.
Working with Projects	Explains how to use the CodeWarrior tools to create and work with projects.
Build Properties for Bareboard Projects	Explains build properties for Microcontrollers bareboard project.
Working with Debugger	Explains how to use the CodeWarrior™ development tools to debug a program executing on the simulator or microcontroller.
Scripting	Explains how to use CodeWarrior supports a command-line interface.
Connections — HCS08	Describes the features and settings of the connections that interface the CodeWarrior debugger with the HCS08-based bare board target, and allow it to debug program code on the target.
Connections — RS08	Describes the features and settings of the connections that interface the CodeWarrior debugger with the RS08-based bare board target, and allow it to debug program code on the target.
Connections — ColdFire V1	Describes the features and settings of the connections that interface the CodeWarrior debugger with the ColdFire V1-based bare board target, and allow it to debug program code on the target.
Connections — ColdFire V2/3/4	Describes the features and settings of the connections that interface the CodeWarrior debugger with the ColdFire V2/3/4-based bare board target, and allow it to debug program code on the target.
Common Connection Features	Explains how to use the CodeWarrior hardware tools for board bring-up, test, and analysis. Also, explains how to manipulate target memory.

Related Documentation

This topic provides information about documentation related to the CodeWarrior IDE and Freescale Microcontrollers development.

- Additional Information Sources
- CodeWarrior Microcontrollers Development Tools
- CodeWarrior Development Process

Additional Information Sources

- To view the online help for the CodeWarrior tools, first select **Help > Help Contents** from the IDE's menu bar. Next, select **Microcontrollers V10.x Targeting Manual** from the **Contents** list.
- For late-breaking information about new features, bug fixes, known problems, and incompatibilities, read the release notes in this folder:

  `CWInstallDir\<Microcontrollers_version>\`

  where *CWInstallDir* is the directory that CodeWarrior was installed into

  `Microcontrollers_version` is the CodeWarrior version number
- For general information about the CodeWarrior IDE and debugger, see the *Freescale Eclipse Extension Guide in this folder:*

  `CWInstallDir\<MCU_version>\Help\PDF`

NOTE The *Freescale Eclipse Extension Guide* is a general guide that is also part of other CodeWarrior Eclipse-based products. Therefore, it describes the following features that are not available in Microcontrollers v10.0 : Cache, Memory ManagementUnit (MMU) Configurator, and Multicores. Also, it shows figures that are not just specific to Microcontrollers v10.0, that is sometimes the screenshots are of other CodeWarrior products, like StarCore v10.0 or Power Architectures v10.0.

Table 1.2 lists additional CodeWarrior documentation.

Table 1.2 Related Documentation

Document	Description	Location
Eclipse Quick Reference Card	Introduces you to the interface of CodeWarrior for Microcontrollers V10.0 Eclipse-based IDE and provides a quick reference to the key bindings.	*CWInstallDir\\<Microcontrollers _version>*
CodeWarrior Project Importer Quick Start	Explains the steps to convert a classic CodeWarrior project into an Eclipse IDE project.	*CWInstallDir\\<Microcontrollers _version>*
Freescale Eclipse Extensions Guide	Explains extensions to the CodeWarrior Eclipse IDE across all CodeWarrior products.	*CWInstallDir\\<Microcontrollers _version>*`\Help\PDF`
Microcontrollers V10.x Quick Start	Explains the steps to install Microcontrollers V10.x, and create and debug a project.	*<CWInstallDir>\\<Microcontrolle rs_version>*
Microcontrollers V10.x Getting Started Guide	Introduces you to the interface of CodeWarrior™ for Microcontrollers V10.0 and describes the basic components of the Microcontrollers 10.0 Eclipse IDE and CodeWarrior development process. This manual also describes how to work with projects in Microcontrollers 10.0 and lists frequently asked questions.	*CWInstallDir\\<Microcontrollers _version>*`\Help\PDF`
Microcontrollers V10.x ColdFire Build Tools Reference Manual	Describes the compiler used for the Freescale 8-bit Microcontroller Unit (MCU) chip series	*CWInstallDir\\<Microcontrollers _version>*`\Help\PDF`
Microcontrollers V10.x RS08 Build Tools Reference Manual	Describes the ANSI-C/C++ Compiler used for the Freescale 8-bit Microcontroller Unit (MCU) chip series	*CWInstallDir\\<Microcontrollers _version>*`\Help\PDF`

Table 1.2 Related Documentation (*continued*)

Document	Description	Location
Microcontrollers V10.x HC08 Build Tools Reference Manual	Describes the compiler used for the Freescale 8-bit Microcontroller Unit (MCU) chip series	*CWInstallDir*\<*Microcontrollers_version*>\Help\PDF
Microcontrollers V10.x HC(S)08/ RS08 Assembler Manual	Explains how to use the HC(S)08/RS08 Macro Assembler	*CWInstallDir*\<*Microcontrollers_version*>\Help\PDF
Microcontrollers V10.x ColdFire Assembler Manual	Explains the assembly-language syntax and IDE settings for the ColdFire assemblers	*CWInstallDir*\<*Microcontrollers_version*>\Help\PDF
Ethernet TAP Users Guide	Explains the steps to develop and debug a number of processors and microcontroller using CodeWarrior Ethernet TAP probe.	*CWInstallDir*\<*Microcontrollers_version*>\Help\PDF
USB TAP Users Guide	Explains the steps to develop and debug a number of processors and microcontroller using CodeWarrior USB TAP probe.	*CWInstallDir*\<*Microcontrollers_version*>\Help\PDF
Microcontrollers V10.x Profiling and Analysis Users Guide	Explains the CodeWarrior Profiling and Analysis tools. These tools provide visibility into an application as it runs on the simulator and hardware. Developers can use these tools to understand how an application runs, as well as identify operational problems.	*CWInstallDir*\<*Microcontrollers_version*>\Help\PDF

Table 1.2 Related Documentation (*continued*)

Document	Description	Location
Adding Device(s) to the CodeWarrior Flash Programmer for Microcontrollers V10.x	Explains how to use the Flash Tool Kit to support additional flash devices on the Flash Programmer for CodeWarrior™ Development Studio for Microcontrollers V10.0.	*CWInstallDir*\\<*Microcontrollers _version*>`\Help\PDF`
Processor Expert Users Manual	Provides information about Processor Expert plug-in, which generates code from the Embedded Beans.	*CWInstallDir*\\<*Microcontrollers _version*>`\Help\PDF`
Device Initialization Users Manual	Provides information about the user interface, creating a simple design, configuring a device, generating initialization code, and using it in your application.	*CWInstallDir*\\<*Microcontrollers _version*>`\Help\PDF`
Open Source BDM-JM60 Users Guide	Describes an Open Source programming and debugging development tool designed to work with Freescale HCS08, RS08, Coldfire V1,V2, V3 and V4, and DSC56800E microcontrollers.	*CWInstallDir*\\<*Microcontrollers _version*>`\Help\PDF`
How to Write Flash Programming Applets	Provides information on creating Flash configuration files for the Flash Programming interface.	*CWInstallDir*\\<*Microcontrollers _version*>`\Help\PDF`
Microcontrollers V10.0 MISRA-C:2004 Compliance Exceptions for the HC(S)08 and RS08 Libraries Reference Manual	Describes the MISRA-C:2004 compliance exceptions for the HC(S)08 and RS08 libraries.	*CWInstallDir*\\<*Microcontrollers _version*>`\Help\PDF`

Table 1.2 Related Documentation (*continued*)

Document	Description	Location
EWL C Reference	Describes the contents of the Embedded Warrior Library for C. This document is available only in ColdFire Architecture.	*CWInstallDir*\\<*Microcontrollers_version*>`\Help\PDF`
EWL C++ Reference	Describes the contents of the Embedded Warrior Library for C++. This document is available only in ColdFire Architecture.	*CWInstallDir*\\<*Microcontrollers_version*>`\Help\PDF`

CodeWarrior Microcontrollers Development Tools

Programming for Microcontroller processors is much like programming for any other CodeWarrior platform target. If you have not used CodeWarrior tools before, start by studying the Eclipse IDE, which is used to host the tools. Information on the Eclipse IDE is available in the next topic.

If you are an experienced CodeWarrior user, note that the CodeWarrior Microcontrollers V10.x environment uses the Eclipse IDE, whose user interface is substantially different from the classic CodeWarrior IDE.

NOTE For information on the interface differences, refer the Freescale Eclipse Extensions Guide.

The following topics explain the CodeWarrior tools:

- Eclipse IDE
- Compiler
- Assembler
- Linker
- CodeWarrior Debugger
- CodeWarrior Profiling and Analysis

Eclipse IDE

The Eclipse IDE (Integrated Development Environment) is an open-source development environment that lets you develop and debug your software. It controls the project manager, the source code editor, the class browser, the compilers and linkers, and the debugger.

Those who are more familiar with command-line development tools may find the concept of a CodeWarrior project new. The Eclipse Workspace organizes all files related to your project. This lets you see your project at a glance and eases the organization and navigation between source code files.

The Eclipse IDE has an extensible architecture that uses plug-in compilers and linkers to target various operating systems and microprocessors. The IDE is hosted on Microsoft Windows and other platforms. There are many development tools available for the IDE, including C, C++, and Java compilers for desktop and embedded processors

For more information about the Eclipse IDE, read the Eclipse documentation at:

http://www.eclipse.org/documentation/.

Compiler

The Microcontrollers C Compiler:

- conforms to the American National Standards Institute (ANSI) C standards.
- conforms to version 1 of the Microcontrollers Application Binary Interface (ABI) standards.
- supports a set of Digital Signal Processor (DSP) extensions.
- supports International Telecommunications Union (ITU)/European Telecommunications Standards Institute (ETSI) primitives for saturating arithmetic. Additional parameters are available for non-saturating arithmetic and double-precision arithmetic.
- allows standard C constructs for representing special addressing modes.
- supports a wide range of runtime libraries and runtime environments.
- optimizes for size, speed, or a combination of both, depending on options that you select.

The compiler can link all application modules before optimizing. By examining the entire linked application before optimizing, the compiler produces highly optimized code. The compiler performs many optimizations, such as:

- software pipelining
- instruction paralleling and scheduling
- data and address register allocation

- aggressive loop transformations, including automatic unrolling

NOTE For more information, refer to the *Microcontrollers Compiler User Guide*.

Assembler

The assembler translates assembly-language source code to machine-language object files or executable programs. You can provide the assembly-language source code, or the compiler can generate it.

For each assembly-language module in a build target, the Microcontrollers assembler can generate a file that lists the generated code side-by-side with the assembly-language source code.

NOTE For more information, refer to the *Microcontrollers Assembler User Guide*.

Linker

The Linker combines object files into a single executable file. You specify the link mappings of your program in a Linker Command File (LCF).

NOTE For more information, refer to the *Microcontrollers Linker User Guide.*

CodeWarrior Debugger

The CodeWarrior debugger lets you debug your software on both simulator and hardware targets.

NOTE The CodeWarrior debugger is also validated on the host machine running Microsoft® Vista® Business Edition.

CodeWarrior Profiling and Analysis

CodeWarrior Profiling and Analysis tools provide visibility into an application as it runs on the simulator and hardware. This visibility can help you understand how your application runs, as well as identify operational problems. The tools also provide user friendly data viewing features:

- Simultaneously step through trace data and the corresponding source and assembly code of that trace data

- Export source line information of the performance data generated by the simulator into an Excel file
- Export the trace and function data generated by simulator and target hardware into an Excel file
- Apply multi-level filters to isolate data
- Apply multi-level searches to find specific data
- Display results in an intuitive, user friendly manner in the trace, critical code, and performance views
- Show or hide columns and also reorder the columns
- Copy and paste a cell or a line of the trace, alu-agu and performance data generated by simulator and target hardware
- Control trace collection by using start and stop tracepoints to reduce the amount of unwanted trace events in the trace buffer making the trace data easier to read
- View the value of the DPU counters in form of graphs (pie charts and bar charts) while the application is in debug mode
- Display real time cycle count for simulated targets to allow quick monitoring of evolution of application in time

NOTE For more information, refer the *Profiling and Analysis User Guide*.

CodeWarrior Development Process

While working with the CodeWarrior IDE, you will proceed through the development stages familiar to all programmers: writing code, compiling and linking, and debugging. Refer to the *Freescale Eclipse Extension Guide* for:

- Complete information on tasks such as editing, compiling, and linking
- Basic information on debugging

The difference between the CodeWarrior environment and traditional command-line environments is how the software, in this case the Eclipse IDE, helps you manage your work more effectively.

If you are unfamiliar with an integrated environment in general, or with the Eclipse IDE in particular, you may find the topics in this topic helpful. Each topic explains how one component of the CodeWarrior tools relates to a traditional command-line environment.

- Project Files
- Editing Code
- Compiling
- Linking

- Debugging

Project Files

A CodeWarrior project is analogous to a set of make files, because a project can have multiple settings that are applied when building the project. For example, you can have one project that has both a debug version and a release version of your program. You can build one or the other, or both as you wish. The different settings used to launch your program within a single project are called *launch configurations*.

The IDE uses the **CodeWarrior Projects** view to list all the files in a project. The files listed in the **CodeWarrior Projects** view include source code files and libraries.

You can add or remove files easily. You can also assign files to one or more different build configurations within the project, therefore files common to multiple build configurations can be managed simply.

The IDE automatically manages all the interdependencies between files and tracks which files have changed since the last build. This speeds the build process because the IDE only compiles those files that have changed since the last build.

In addition, the IDE stores the settings for compiler and linker options for each build configuration. You can modify these settings using the IDE, or with `#pragma` statements in your code.

Editing Code

The Eclipse IDE has an integral text editor designed for programmers. It handles text files in MS-DOS/Windows® and UNIX® formats.

To edit a source code file or any other editable file in a project, double-click the filename in the **CodeWarrior Projects** view to open the file.

The navigational features of the Editor window lets you switch between related files, locate a particular function, mark a location within a file, or go to a specific line of code.

Compiling

To compile a source code file, ensure that the file is a part of the current launch configuration. If the file is in the configuration, select it in the project window and select **Project > Build Project** from the IDE menu bar.

To automatically compile all the files in the current launch configuration after you modify them, select **Project > Build Automatically** from the IDE menu bar.

Linking

Select **Project > Build Project** from the IDE menu bar to link object code into a final binary file. The **Build Project** command brings the active project up-to-date and then links the resulting object code into a final output file.

You control the linker through the IDE. There is no need to specify a list of object files. The Workspace tracks all the object files automatically.

You can modify the build configuration settings to select the name of the final output file.

Debugging

Select **Run > Debug** from the IDE menu bar to debug your project. This command downloads the current project's executable to the target board and starts a debug session.

NOTE You must have previously entered debugger settings for the launch configuration by choosing **Run > Debug Configurations**. The IDE uses the settings in the launch configuration to generate debugging information and initiate communications with the target board.

You can now use the debugger to step through the program's code, view and change the value of variables, set breakpoints, and much more. See the *Freescale Eclipse Extensions Guide* and the Working with Debugger chapter of this manual for instructions that explain how to use the debugger.

2

Working with Projects

This chapter explains how to use the CodeWarrior tools to create and work with projects.

NOTE The scope of this chapter is limited to the use of the CodeWarrior IDE to write and debug applications for the target platform.

The topics in this chapter are:

- New Bareboard Project Wizard
- New Linux/uClinux Application Project Wizard
- Creating Projects
- Building Projects
- Debugging Projects
- Deleting Projects
- Importing Classic CodeWarrior Projects
- Tutorials — Importing Connection-Specific Projects

New Bareboard Project Wizard

When you start the Microcontrollers **New Bareboard Project** wizard, it presents you with a sequence of pages that prompt you for the features and settings to be used when making your program. For example, the device and connection options lets you select the derivative or board you would like to use.

Other options let you to specify other settings, such as whether the program executes on an emulator or simulator rather than actual hardware, and the characteristics of the connection that communicates with a hardware target.

This topic describes the various pages that the wizard displays as it assists you in creating a bareboard project. The pages that the wizard presents can differ based upon the option of project type or execution target.

The following topic, explain the pages of the **New Bareboard Project** wizard.

- Create an MCU Bareboard Project Page
- Device and Connection Page
- Add Files Page

- Languages Page
- C/C++ Options Page
- ColdFire Build Options Page for ColdFire V1
- ColdFire Build Options Page for ColdFire V2/3/4
- Connections Page
- Rapid Application Development Page

NOTE Based on the your selection, the pages of the **New Bareboard Project** wizard may differ.

Create an MCU Bareboard Project Page

Use this page to name your project, and specify the directory where its files are located.

Figure 2.1 Create an MCU Bareboard Project Page

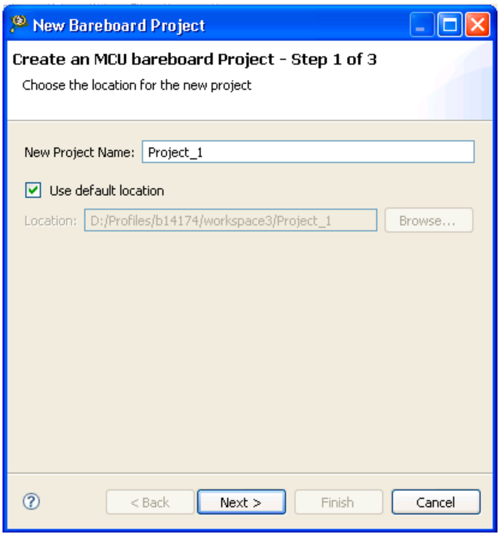


Table 2.1 describes the purpose of the various options.

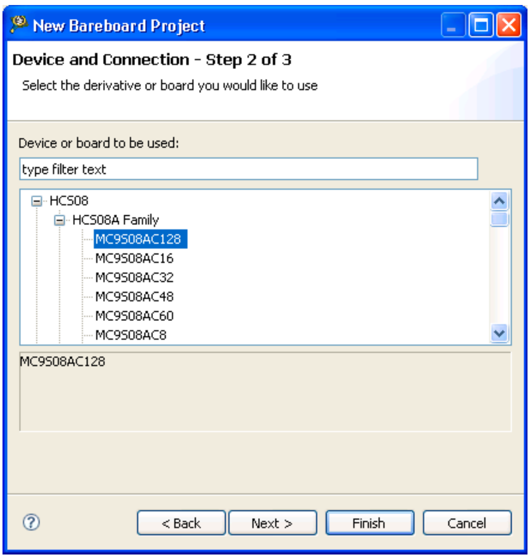
Table 2.1 Create an MCU Bareboard Project Page Settings

Option	Description
New Project Name	Enter the name for the new project in this text box.
Use default location	Stores the files required to build the program in the Workbench's current workspace directory. The project files are located in the directory you specify. Use the **Location** option to select the directory.
Location	Specifies the directory that contains the project files. Click **Browse** to navigate to the desired directory. This option is only available when **Use default location** is clear.

Device and Connection Page

Use this page to select the derivative or board you would like to use.

Figure 2.2 Device and Connection Page



NOTE The pages of wizard change depending on the selected derivative or board. If a ColdFire derivative or board is selected then the wizard will display the **ColdFire Build Options** page (Figure 2.6 and Figure 2.7).

Add Files Page

Use this page to select files that you want to add to the project. Depending on the selection, you can either copy or link the files in the new project.

Figure 2.3 Add Files Page

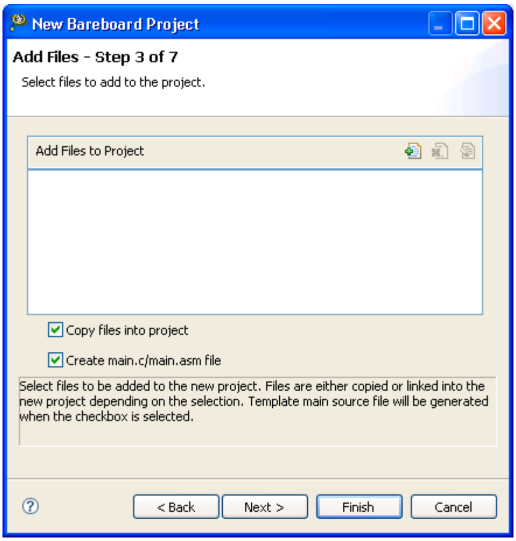


Table 2.2 describes the purpose of the various options.

Table 2.2 Add Files Page Settings

Option	Description
	**Add —** Click to open the **Add file path** dialog box and specify the location of the file you want to add.
	**Delete —** Click to delete the selected file path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.

Table 2.2 Add Files Page Settings (*continued*) (*continued*)

Option	Description
	**Edit — Click to open the Edit file path** dialog box and update the selected path.
Copy files into project	Check to add any existing files to your project. Clear if no files are to be added to your project,
Create main.c/main.asm file	Check to enable the IDE to create template files, including a Sources folder, in the project directory, along with some sample source-code files.

Languages Page

Use this page to select the programming language that you want to use when writing the program's source code. You can make multiple selections, creating the code in multiple formats.

Figure 2.4 Languages Page

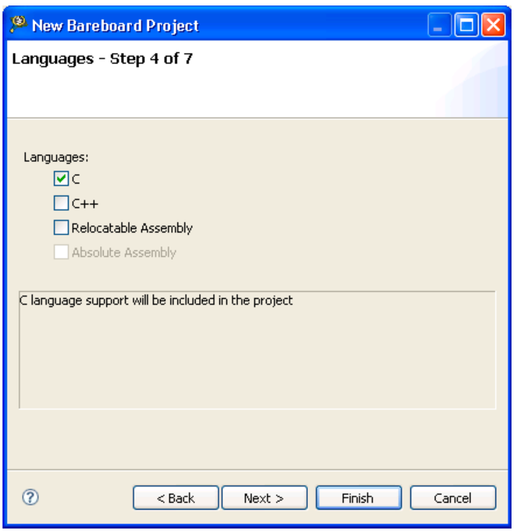


Table 2.3 explains the options available on this page.

Table 2.3 Languages Page Settings

Group / Option	Description
C	Checking the **C** checkbox sets up your application with ANSI C-compliant startup code, and initializes global variables.
C++	Checking the **C++** checkbox sets up your application with ANSI C++ startup code, and performs global class object initialization.
Relocatable Assembly	Checking the **Relocatable** checkbox enables you to split up the application into multiple assembly source files. The source files are linked together using the linker.
Absolute Assembly	Checking the **Absolute Assembly** checkbox enables you to use only one single assembly source file with absolute assembly. There is no support for relocatable assembly or linker.

NOTE The option you select also sets up default compiler/linker options for the toolchain. For example, if you plan to use the C language in your source code files, check the **C** checkbox. If you plan to write the program using C++, check the **C++** checkbox.

C/C++ Options Page

Use this page to select the level of startup code you want to produce, the memory model, and the appropriate floating point format support.

Figure 2.5 C/C++ Options Page

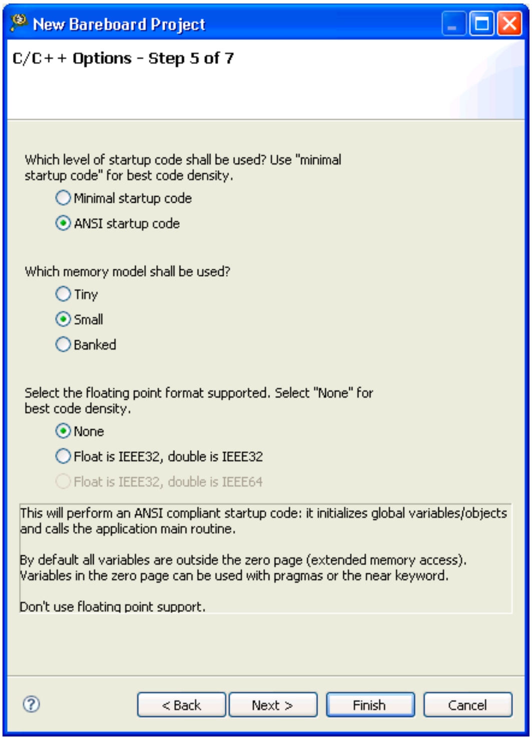


Table 2.4 explains the options available on this page.

Table 2.4 C/C++ Options Page Settings

Option	Description
Minimal startup code	This option produces the best code density. The startup code initializes the stack pointer and calls the main function. No initialization of global variables is done, giving you the best speed/code density and a fast startup time. The application code must address variable initialization. ANSI requires variable initialization and therefore this option is not ANSI compliant.
ANSI startup code	This ANSI-compliant startup code initializes global variables/objects and calls the application main routine.
Tiny	Assumes that data pointers have 8-bit addresses unless explicitly specified with the keyword __far.
Small	Use the Small memory model if both the code and the data fit into the 64-kilobyte address space. By default all variables and functions are accessed with 16-bit addresses. The compiler supports banked functions or paged variables in this memory model, but all accesses must be explicitly handled.
Banked	Banked memory model uses banked function calls by default, but the default data access is still 16-bit. Because the overhead of the far function call is not very large, this memory model suits all applications with more than 64-kilobytes of code. Data paging can be used, however all far objects and pointers to them must be specially declared.
None	Select for the best code intensity.
Float is IEEE32, double is IEEE32	All float and double variables are 32-bit IEEE32.
Float is IEEE32, double is IEEE64	Float variables are 32-bit IEEE32. Double variables are 64-bit IEEE64.

ColdFire Build Options Page for ColdFire V1

Use this page to enable C++, porting processor macro, console, floating point support, and optimization level for ColdFire V1 derivatives.

NOTE This page will appear only a ColdFire V1 derivative or board is selected in the **Device and Connection** page (Figure 2.2). To enable the **Absolute Assembly** checkbox, you must uncheck the C and C++ options.

Figure 2.6 ColdFire Build Options Page — ColdFire V1

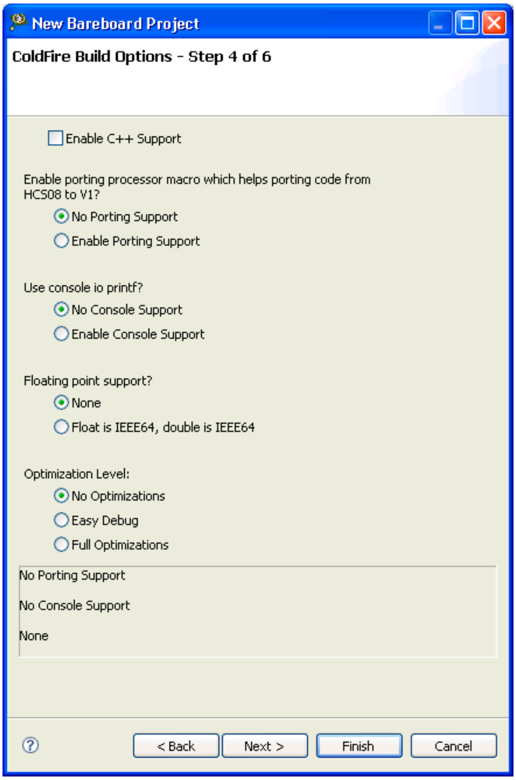


Table 2.5 explains the options available on this page.

Table 2.5 ColdFire V1 Build Options Page Settings

Option	Description
Option	**Description**
Enable C++ Support	Check to enable C++ support
No Porting Support	Select to disable the porting processor macro that helps porting code from HCS08 to V1
Enable Porting Support	Select to enable the porting processor macro that helps porting code from HCS08 to V1
None	Select to disable floating point support
Float is IEEE64, double is IEEE64	Select to enable floating point support
No Optimizations	Select to disable optimization level
Easy Debug	Select to enable Level 1 code size optimizations plus register coloring and peephole
Full Optimizations	Select to enable full optimizations

ColdFire Build Options Page for ColdFire V2/3/4

Use this page to enable C++, porting processor macro, hardware startup, and optimization level for ColdFire V2/3/4 derivatives.

NOTE This page will appear only a ColdFire V2/3/4 derivative or board is selected in the **Device and Connection** page (Figure 2.2).

Figure 2.7 ColdFire Build Options Page — ColdFire V2/3/4

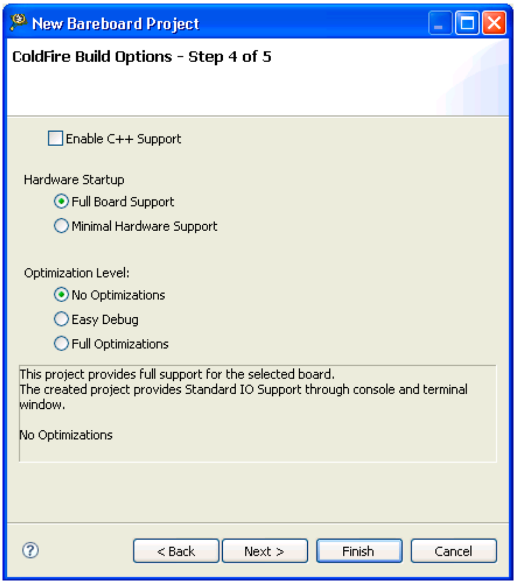


Table 2.6 explains the options available on this page.

Table 2.6 ColdFire 2/3/4 Build Options Page Settings

Option	Description
Enable C++ Support	Check to enable C++ support
Full Board Support	Select to provide full support for the selected board. The created project provides standard input output support through console and terminal window.
Minimal Hardware Support	Select if you do not want to provide board initialization support. The project can be customized or used with the Instruction Set Simulator. The standard input output support is enables for the Console build target. However, you need to enable UART support for standard input output support through UART, by providing the correct system clock.
None	Select to disable floating point support

Table 2.6 ColdFire 2/3/4 Build Options Page Settings (*continued*)

Option	Description
Float is IEEE64, double is IEEE64	Select to enable floating point support
No Optimizations	Select to disable optimization level
Easy Debug	Select to enable Level 1 code size optimizations plus register coloring and peephole
Full Optimizations	Select to enable full optimizations

Connections Page

Use this page to select a connection to use for the project. Depending on the selected derivative or board, the connections will appear enabled or grayed out.

Figure 2.8 Connections Page - HCS08/RS08 Derivative

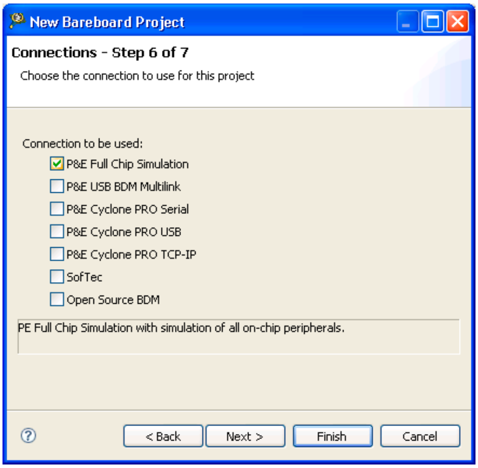


Figure 2.9 Connections Page - ColdFire V1 Derivative

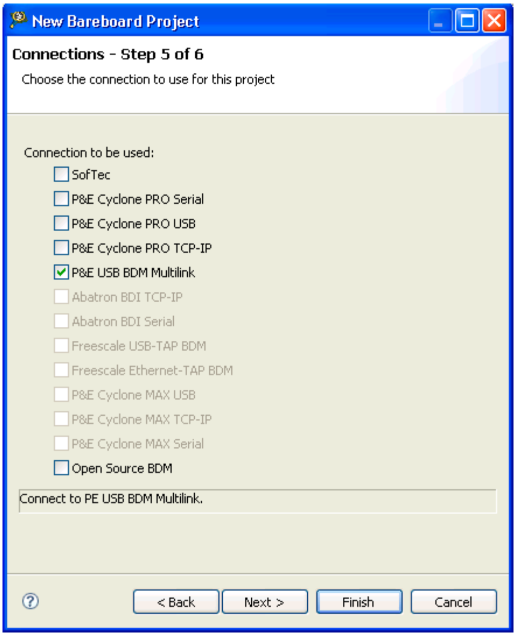


Figure 2.10 Connections Page - ColdFire V2-4 Derivative

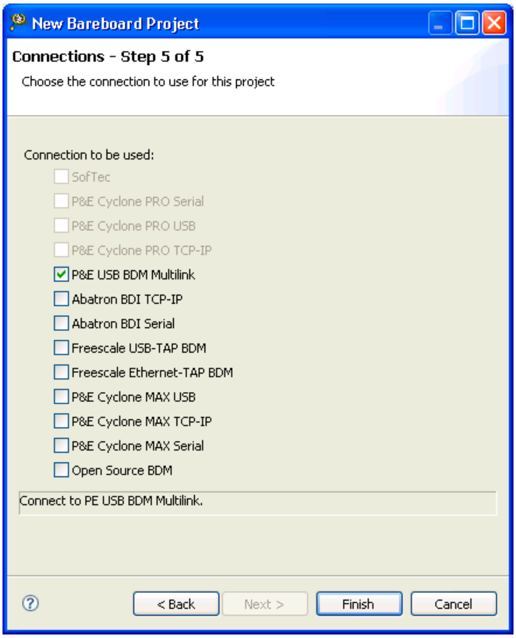


Table 2.7 explains the connections available on this page.

Table 2.7 Connections Page Settings

Option	Description
SofTec	Connect to any of the USB-based SofTec Microsystems tools (inDart-HC08, etc...)
P&E Cyclone PRO Serial	Connect to PE Cyclone Pro Serial
P&E Cyclone PRO USB	Connect to PE Cyclone Pro USB
P&E Cyclone PRO TCP-IP	Connect to PE Cyclone Pro TCP/IP
P&E USB BDM Multilink	Connect to PE USB BSM Multilink
Abatron BDI TCP-IP	Connect to Abatron BDI1000 or BDI 2000 through TCP/IP; is only available with the CodeWarrior ColdFire Professional Edition

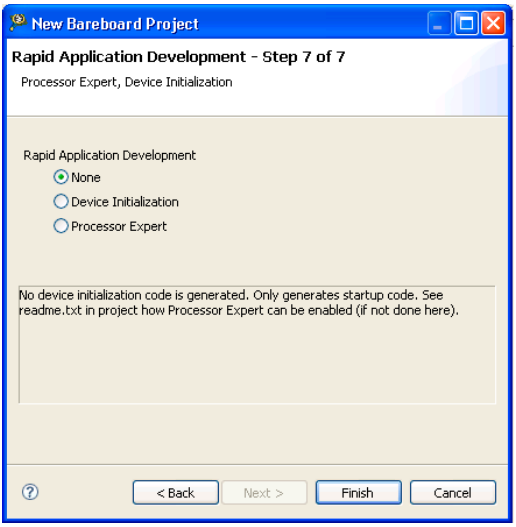
Table 2.7 Connections Page Settings (*continued*)

Option	Description
Abatron BDI Serial	Connect to Abatron BDI1000 or BDI 2000 through host Serial Port; is only available with the CodeWarrior ColdFire Professional Edition
Freescale USB-TAP BDM	Connect to Freescale USB-TAP BDM
Freescale Ethernet-TAP BDM	Connect to Freescale Ethernet-TAP BDM
P&E Cyclone Max USB	Connect to PE Cyclone Max through host USB port
P&E Cyclone Max TCP-IP	Connect to PE Cyclone Max through TCP/IP
P&E Cyclone Max Serial	Connect to PE Cyclone Max through host serial port

Rapid Application Development Page

Use this page to provide rapid application development (RAD) support when writing your program.

Figure 2.11 Rapid Application Development Page



Select one of the available RAD options to set up special views in the IDE where you can rapidly configure peripheral devices on the MCU, or pick from a library of field-tested code modules that can implement various device services such as timer interrupts, or a high speed serial interface.

NOTE For more information on how to use the features of the Peripheral Initialization or Processor Expert refer to the *Processor Expert Users Manua*l and the *Device Initialization Users Manual*.

Table 2.8 shows the various RAD options available and their purpose.

Table 2.8 RAD Page Settings

Option	Description
None	No RAD support provided. The wizard's default `startxx.c` file sets up the MCU's stack, its memory management unit (if any) and the C/C++ language's runtime.
Device Initialization	The wizard provides views in the C/C++ Perspective that let you set up the MCU's interrupts and its interrupt vector table. Drivers for the MCU's peripherals are also available.
Processor Expert	The wizard provides views in the C/C++ Perspective that lets you set up the MCU's interrupts, vector table and device initialization. It also provides you with a choice of configurable support modules that implement software services on various MCU peripherals.

NOTE If you select a RAD option other than `None`, the specialized views appear in the C/C++ Perspective after the **New MCU Project** wizard exits.

New Linux/uClinux Application Project Wizard

When you start the Microcontrollers **New Linux/uClinux Application Project** wizard, it presents you with a sequence of pages that prompt you for the features and settings to be used when making your program. For example, the device and connection options lets you select the ColdFire derivative or board you would like to use.

Other options let you to specify other settings, such as whether the program executes on an emulator or simulator rather than actual hardware, and the characteristics of the connection that communicates with a hardware target.

This topic describes the various pages that the wizard displays as it assists you in creating a bareboard project. The pages that the wizard presents can differ based upon the option of project type or execution target.

The following topic, explain the pages of the **New Linux/uClinux Application Project** wizard.

- Create a Linux/uClinux Application Project Page
- Device used for Linux Application Debug Page
- Project Language and Output Page
- Connections Page
- Application Debug Options Page

Create a Linux/uClinux Application Project Page

Use this page to name your project, and specify the directory where its files are located.

Figure 2.12 Create a Linux/uClinux Application Project Page

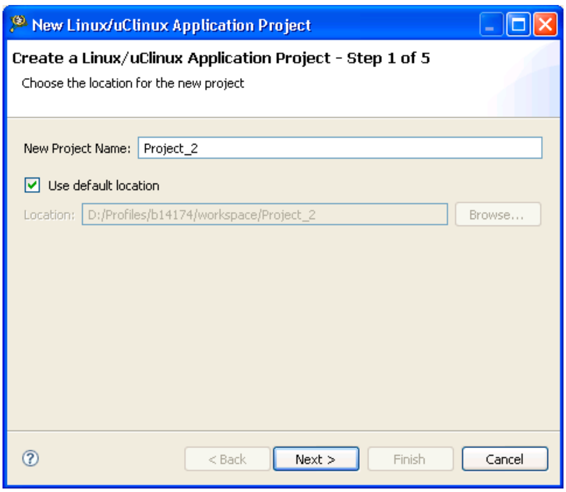


Table 2.9 describes the purpose of the various options.

Table 2.9 Create a Linux/uClinux Application Project Page Settings

Option	Description
New Project Name	Enter the name for the new project in this text box.
Use default location	Stores the files required to build the program in the Workbench's current workspace directory. The project files are located in the directory you specify. Use the **Location** option to select the directory.
Location	Specifies the directory that contains the project files. Click **Browse** to navigate to the desired directory. This option is only available when **Use default location** is clear.

Device used for Linux Application Debug Page

Use this page to select the derivative or board you would like to use.

Figure 2.13 Device used for Linux Application Debug Page

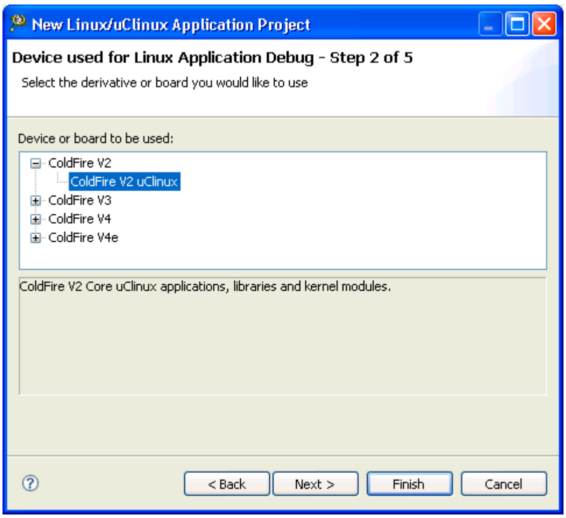


Table 2.10 describes the purpose of the various options.

Table 2.10 Device used for Linux Application Debug Page

Option	Description
ColdFire V2 > ColdFire V2 uClinux	Select to create ColdFire V2 Core uClinux applications, libraries, and kernel modules.
ColdFire V3 > ColdFire V3 uClinux	Select to create ColdFire V3 Core uClinux applications, libraries, and kernel modules.
ColdFire V4 > ColdFire V4 GNU Linux	Select to create ColdFire V2 Core GNU Linux applications, libraries, and kernel modules.
ColdFire V4e > ColdFire V4e GNU Linux	Select to create ColdFire V4e Core GNU Linux applications, libraries, and kernel modules.

Project Language and Output Page

Use this page to select the programming language that you want to use when writing the program's source code. You can make multiple selections, creating the code in multiple formats.

Figure 2.14 Project Language and Output Page

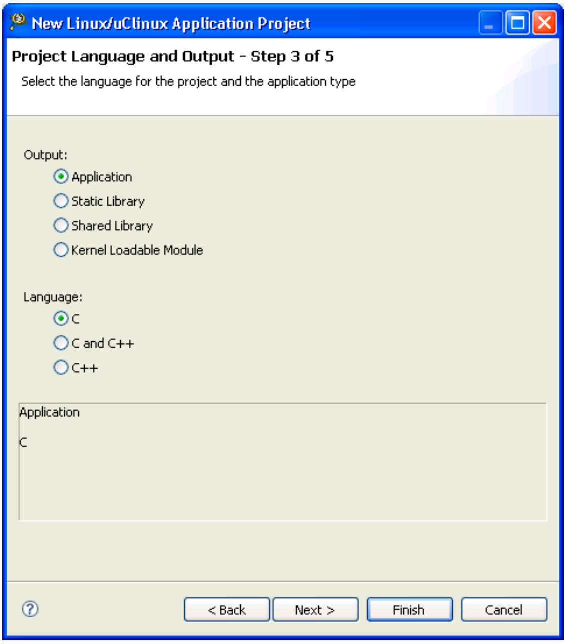


Table 2.11 describes the purpose of the various options.

NOTE Based on your selection, the IDE may show or hide some options.

Table 2.11 Project Language and Output Page Settings

Option	Description
Application	Select if you want the output to be an application. By default, the extension of a loadable module is `.elf`.
Static Library	Select if you want the output to be a static library. By default, the extension of a static library is `.a`.
Shared Library	Select if you want the output to be a shared library. By default, the extension of a shared library is `.so`.

Table 2.11 Project Language and Output Page Settings (*continued*)

Option	Description
Kernel Loadable Module	Select if you want the output to be a kernel loadable module. By default, the extension of a loadable module is `.o`.
C	Select to add C language support.
C and C++	Select to add C and C++ language support. Available for Application and Static options only.
C++	Select to add C++ language support. Available for Application and Static options only.

Connections Page

Use this page to select a connection to use for the project. Depending on the selected derivative or board, the connections will appear enabled or grayed out.

Figure 2.15 Connections Page

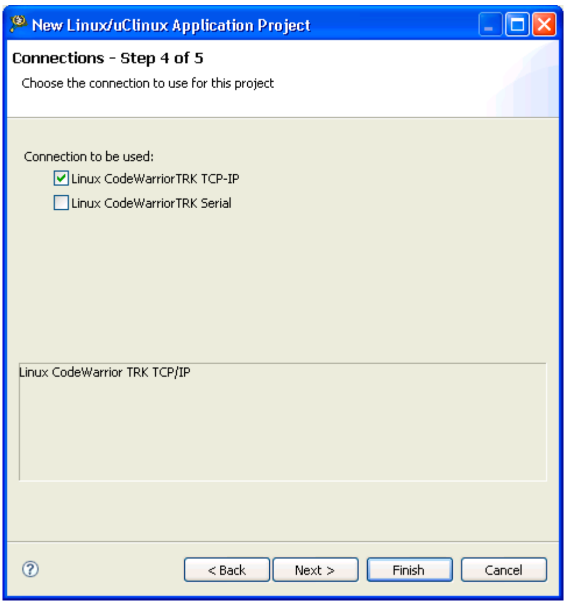


Table 2.12 describes the purpose of the various options.

Table 2.12 Connections Page Settings

Option	Description
Linux CodeWarrior TRK TCP-IP	Available only if the Application option is selected on the Project Language and Output page.
Linux CodeWarrior TRK Serial	Available only if the Application option is selected on the Project Language and Output page.

Application Debug Options Page

Use this page to specify the application debug options for a project.

Figure 2.16 Application Debug Options Page

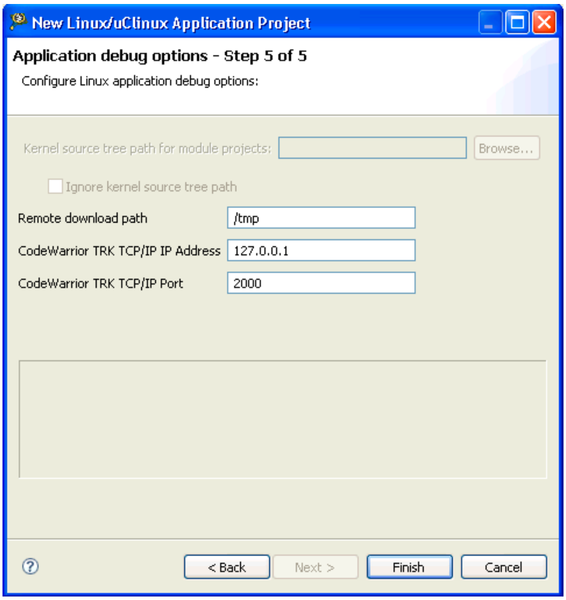


Table 2.13 describes the purpose of the various options.

Table 2.13 Application debug options Settings

Option	Description
Kernel source tree path for module projects	Click **Browse** to specify or enter the kernel source tree path for module projects.
Ignore kernel source tree path	Select to ignore the kernel source tree path.
Remote download path	Specify the remote download path.
CodeWarrior TRK TCP-IP IP Address	Specify the CodeWarrior TRK TCP/IP Address.
CodeWarrior TRK TCP/IP Port	Specify the CodeWarrior CodeWarrior TRK TCP/IP port number.

Creating Projects

The **New Bareboard Project** and **New Linux/uClinux Application Project** wizards help you to quickly create new projects. The wizard generates a project with placeholder files and default settings (build and launch configurations) specific targets. After the project has been created, you can easily change any default setting to suit your needs.

The following topics explain the steps to create Bareboard and Linux/uClinux Application projects for HCS08, RS08, Flexis, ColdFire V1, and ColdFire V2-4e derivatives.

- Creating Bareboard Projects
- Creating Linux/uClinux Application Project

Creating Bareboard Projects

The following topics explain the steps to create bareboard projects for HCS08, RS08, and ColdFire architectures.

- Creating Simulator Projects for HCS08
- Creating Simulator Projects for RS08
- Creating Target Board Project for ColdFire V1
- Creating Target Board Project for ColdFire V2-4e

NOTE The ColdFire V1, ColdFire V2, ColdFire V3 ColdFire V4, ColdFire V4e, and ColdFire Evaluation Boards architectures do not support Full Chip Simulation.

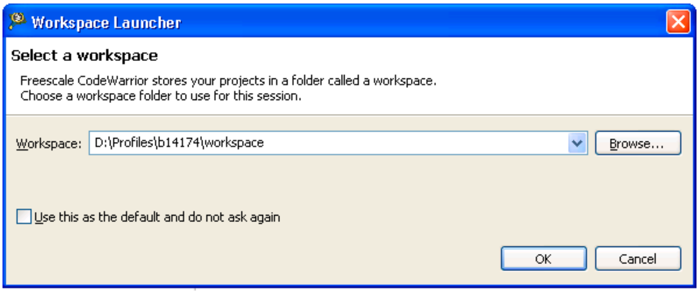
Creating Simulator Projects for HCS08

To create a simulator project for HCS08 using the **New Bareboard Project** wizard**,** perform these steps.

1. Select **Start > Programs > Freescale CodeWarrior > CW for Microcontrollers V *number* > CodeWarrior,** where *number* is the version number of your product.

   The IDE launches and the **WorkSpace Launcher** dialog box prompts you to select a workspace to use.

Figure 2.17 WorkSpace Launcher Dialog Box

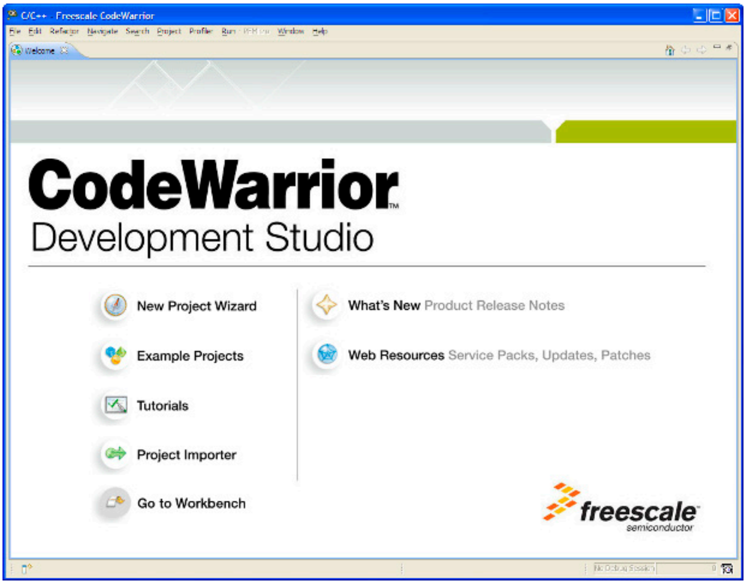


2. Click **OK** to accept the default workspace. To use a workspace different from the default, click **Browse** and specify the desired workspace.

   The IDE starts and displays the **Welcome** page.

NOTE You can also select the **Use this as the default and do not ask again** checkbox to set default/selected path as a default location for storing all your projects.

Figure 2.18 Welcome Page



3. Click the **Go to Workbench** link.

   The **Workbench** window opens.

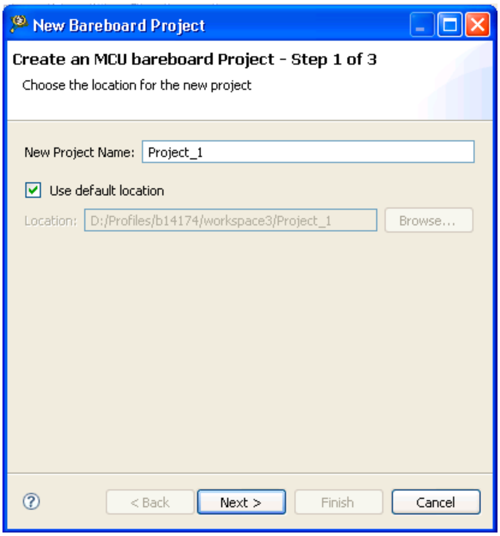
4. Select **File > New > Bareboard Project**, from the IDE menu bar.

   The **Create an MCU bareboard Project** page of the **New Bareboard Project** wizard appears (Figure 2.19).

5. Specify a name for the new project. For example, enter the project name as `Project_1`.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify different location for the new project. By default, the **Use default location** checkbox is checked.

Figure 2.19 New Bareboard Project Wizard — Create an MCU Bareboard Project Page

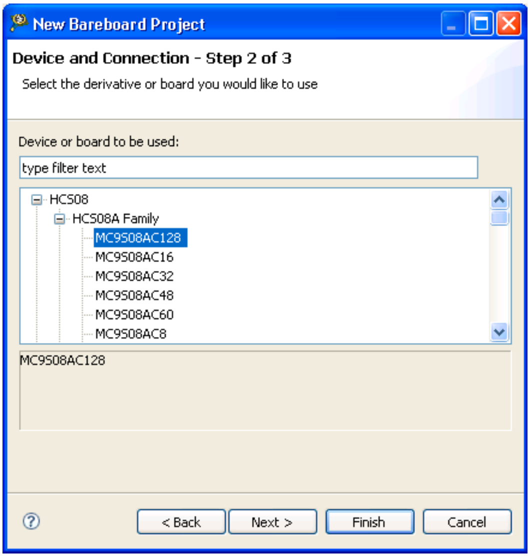


6. Click **Next**.

   The **Device and Connection** page appears (Figure 2.20).

7. Expand the tree control and select the derivative or board you would like to use. For example, select `HCS08 > HCS08A Family > MC9S08AC128`.

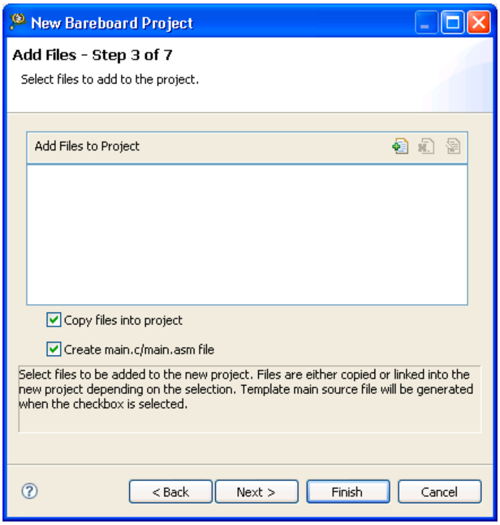
Figure 2.20 New Bareboard Project Wizard — Device and Connection Page



8. Click **Next**.

   The **Add Files** page appears.

Figure 2.21 New Bareboard Project Wizard — Add Files Page



9. If you want to add a file to the project, click  .

   The **Add File Path** dialog box appears.

   a. Type the path of the file you want to add or browse the file by clicking the **File system** button.

   b. Click **OK** to close the **Add File Path** dialog box.

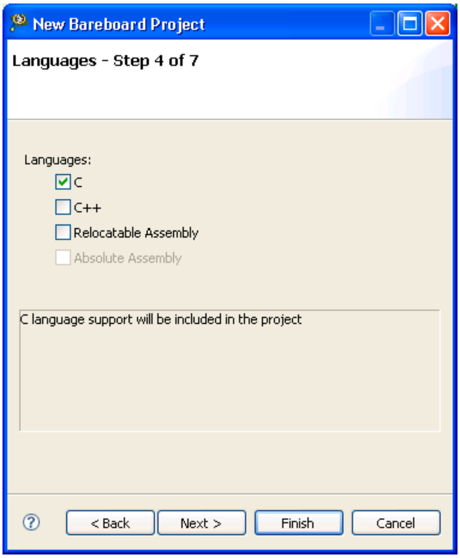
   c. Check the **Copy files into project** checkbox if you want to add the selected file in the project. If you clear the **Copy files into project** checkbox, the file is linked into the project and not copied.

   d. Clear the **Create main.c/main.asm file** checkbox if you do not want to create the main source file in the project.

10. Click **Next**.

    The **Languages** page appears.

Figure 2.22 New Bareboard Project Wizard — Languages Page

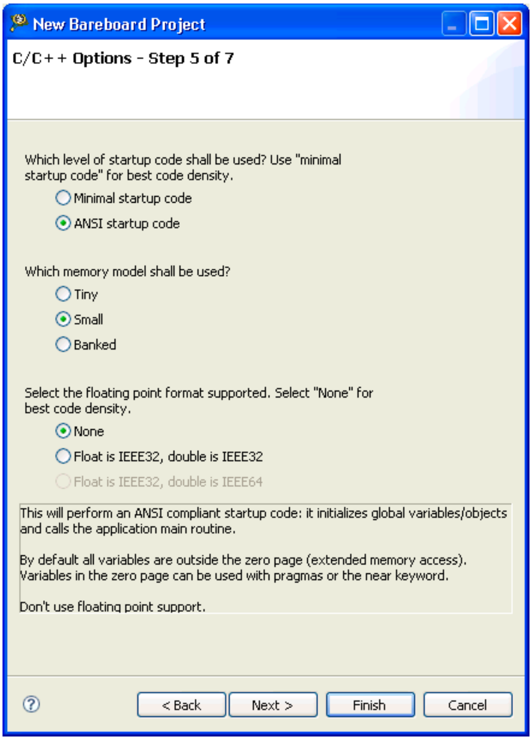


11. Select the programming language you want to use. For example, check the **C** checkbox.
12. Click **Next**.

    The **C/C++ Options** page appears.

NOTE If you check only the **Relocatable Assembly** or **Absolute Assembly** checkbox, clicking **Next** will display the **Connections** page instead (Figure 2.24).

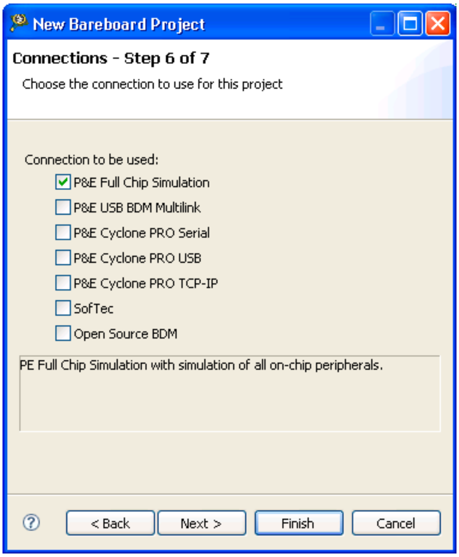
Figure 2.23 New Bareboard Project Wizard — C/C++ Options Page



13. Select the appropriate level of startup code, memory model, and floating point format.
14. Click **Next**.

    The **Connections** page appears.

Figure 2.24 New Bareboard Project Wizard — Connections Page



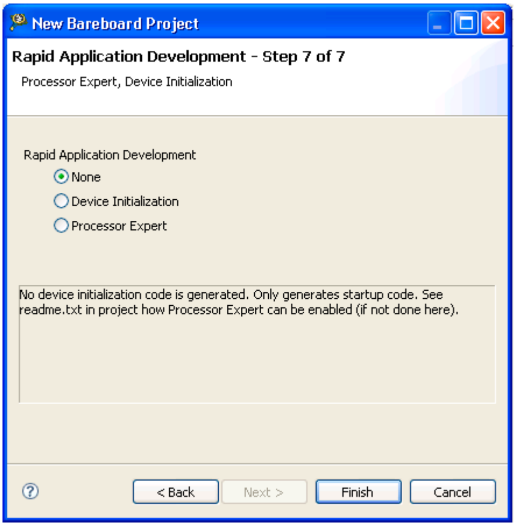
15. Check the **P&E Full Chip Simulation** checkbox.

NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

16. Click **Next**.

    The **Rapid Application Development** page appears.

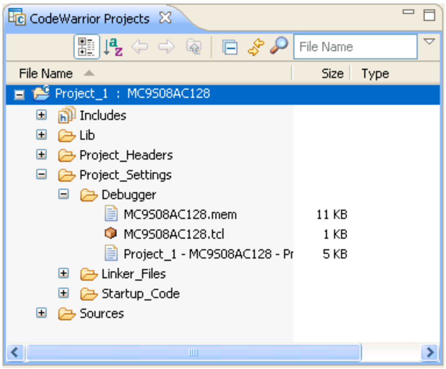
Figure 2.25 New Bareboard Project Wizard — Rapid Application Development Page



17. Select the appropriate option to support rapid application development.
    - **None** — Select to generate only startup code.
    - **Device Initialization** — Select to generate the initialization code for on-chip peripherals, interrupt vector table, and template for interrupt vector service routines.
    - **Processor Expert** — Select to generate the device initialization code, including low-level drivers.
18. Click **Finish**.

    The wizard creates a simulator project for the HCS08 architecture. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

Figure 2.26 CodeWarrior Projects View



The new project is ready for use. You can now customize it by adding your own source code files, changing debugger settings, or adding libraries.

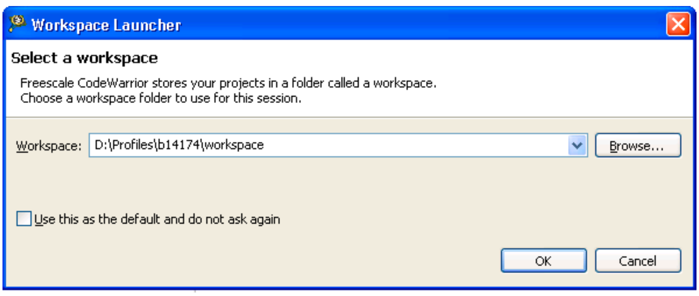
Creating Simulator Projects for RS08

To create a simulator project for RS08 using the **New Bareboard Project** wizard**,** perform these steps.

1. Select **Start > Programs > Freescale CodeWarrior > CW for Microcontrollers V** ***number*** **> CodeWarrior,** where *number* is the version number of your product.

   The IDE launches and the **WorkSpace Launcher** dialog box prompts you to select a workspace to use.

Figure 2.27 WorkSpace Launcher Dialog Box

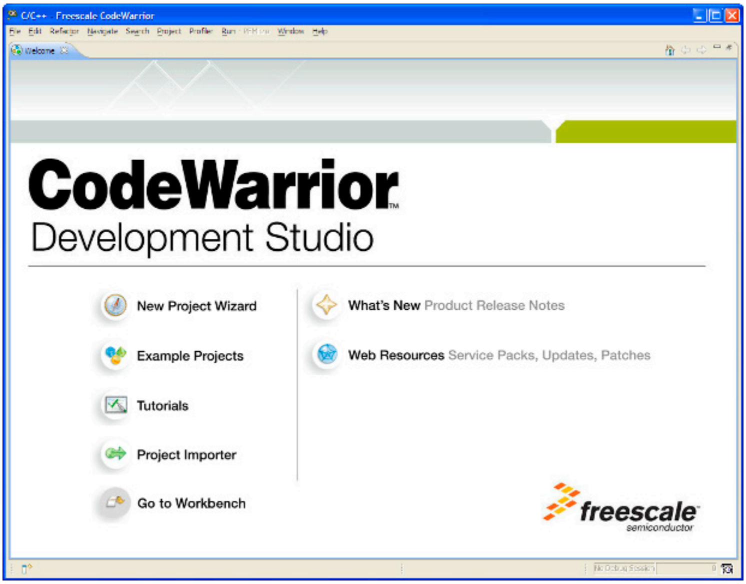


2. Click **OK** to accept the default workspace. To use a workspace different from the default, click **Browse** and specify the desired workspace.

   The IDE starts and displays the **Welcome** page.

> **NOTE** You can also select the **Use this as the default and do not ask again** checkbox to set default/selected path as a default location for storing all your projects.

Figure 2.28 Welcome Page



3. Click the **Go to Workbench** link.

   The **Workbench** window opens.

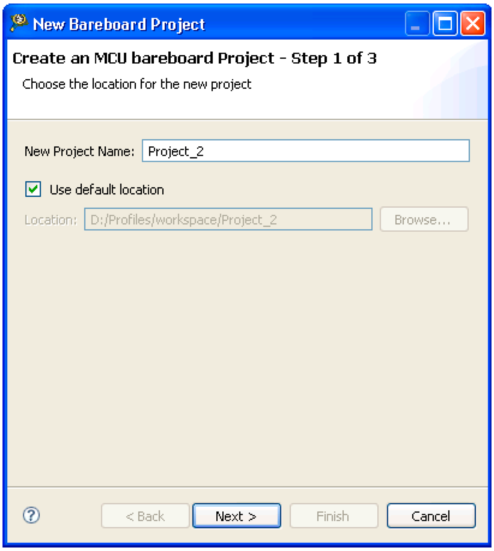
4. Select **File > New > Bareboard Project**, from the IDE menu bar.

   The **Create an MCU bareboard Project page** of the **New Bareboard Project** wizard appears.

5. Specify a name for the new project. For example, enter the project name as `Project_2`.

> **NOTE** Clear the **Use default location** checkbox and click **Browse** to specify different location for the new project. By default, the **Use default location** checkbox is checked.

Figure 2.29 New Bareboard Project Wizard — Create an MCU Bareboard Project Page

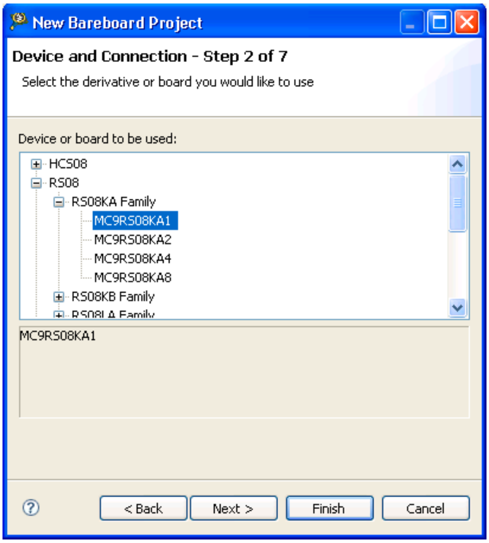


6. Click **Next**.

   The **Device and Connection** page appears.

7. Expand the tree control and select the derivative or board you would like to use. For example, select `RS08 > RS08KA Family > MC9RS08KA1`.

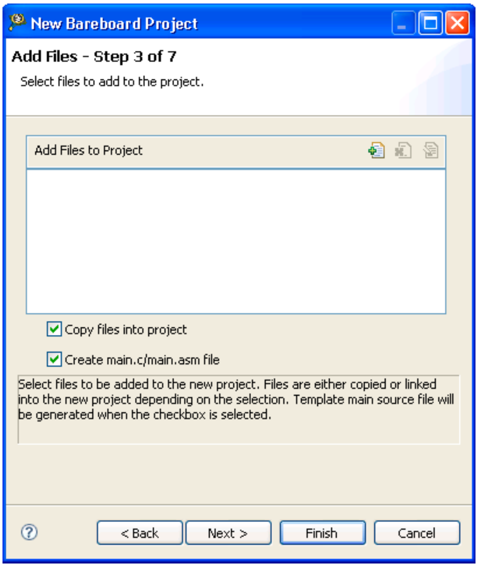
Figure 2.30 New Bareboard Project Wizard — Device and Connection Page



8. Click **Next**.

   The **Add Files** page appears.

Figure 2.31 New Bareboard Project Wizard — Add Files Page



9. If you want to add a file to the project, click  .

   The **Add File Path** dialog box appears.

   a. Type the path of the file you want to add or browse the file by clicking the **File system** button.

   b. Click **OK** to close the **Add File Path** dialog box.

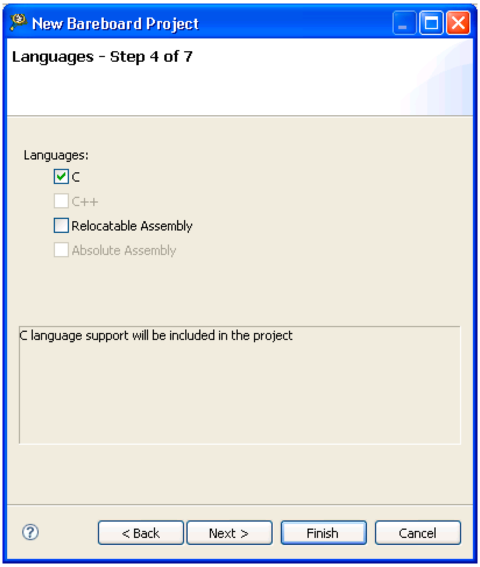
   c. Check the **Copy files into project** checkbox if you want to add the selected file in the project. If you clear the **Copy files into project** checkbox, the file is linked into the project and not copied.

   d. Clear the **Create main.c/main.asm file** checkbox if you do not want to create the main source file in the project.

10. Click **Next**.

    The **Languages** page appears.

Figure 2.32 New Bareboard Project Wizard — Languages Page

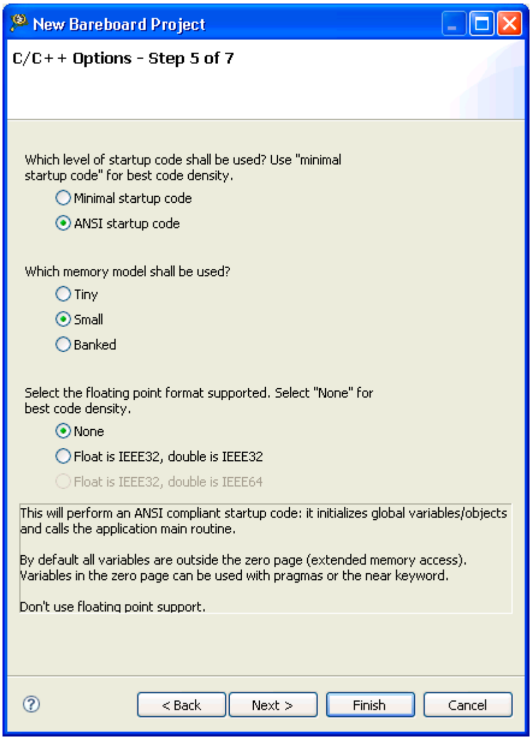


11. Select the programming language you want to use. For example, check the **C** checkbox.
12. Click **Next**.

    The **C/C++ Options** page appears.

NOTE If you check only the **Relocatable Assembly** or **Absolute Assembly** checkbox, clicking **Next** will display the **Connections** page instead (Figure 2.34).

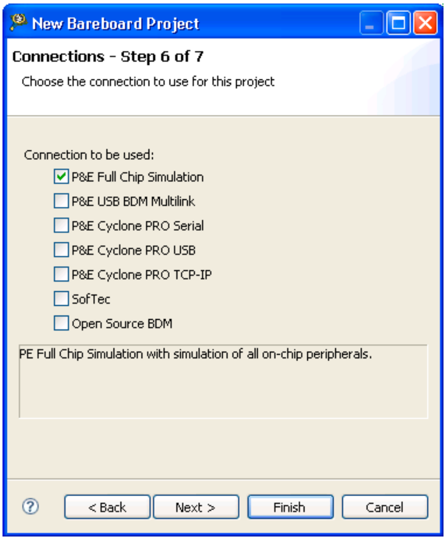
Figure 2.33 New Bareboard Project Wizard — C/C++ Options Page



13. Select the appropriate level of startup code, memory model, and floating point format.
14. Click **Next**.

    The **Connections** page appears.

Figure 2.34 New Bareboard Project Wizard — Connections Page



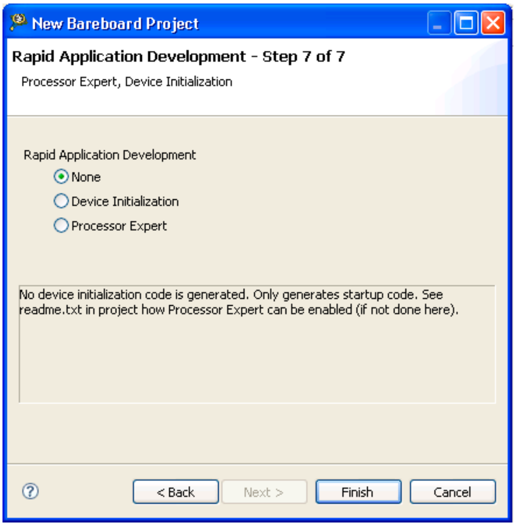
15. Check the **P&E Full Chip Simulation** checkbox.

NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

16. Click **Next**.

    The **Rapid Application Development** page appears.

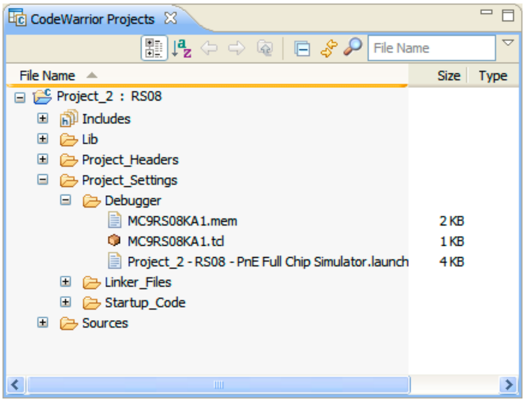
Figure 2.35 New Bareboard Project Wizard — Rapid Application Development Page



17. Select the appropriate option to support rapid application development.
    - **None** — Select to generate only startup code.
    - **Device Initialization** — Select to generate the initialization code for on-chip peripherals, interrupt vector table, and template for interrupt vector service routines.
    - **Processor Expert** — Select to generate the device initialization code, including low-level drivers.
18. Click **Finish**.

    The wizard creates a simulator project for the RS08 architecture according to your specifications. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

Figure 2.36 CodeWarrior Projects View



The new project is ready for use. You can now customize it by adding your own source code files, changing debugger settings, or adding libraries.

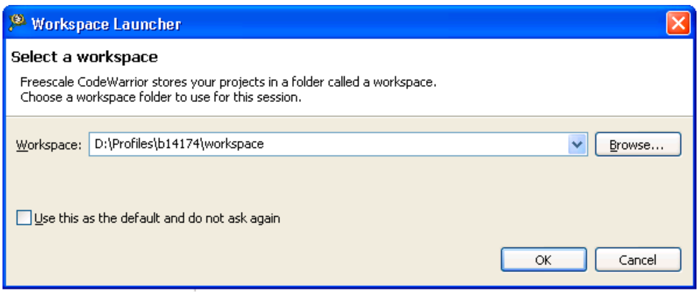
Creating Target Board Project for ColdFire V1

To create a target board project for ColdFire V1 using the **New Bareboard Project** wizard**,** perform these steps.

1. Select **Start > Programs > Freescale CodeWarrior > CW for Microcontrollers V *number* > CodeWarrior,** where *number* is the version number of your product.

   The IDE launches and the **WorkSpace Launcher** dialog box prompts you to select a workspace to use.

Figure 2.37 WorkSpace Launcher Dialog Box

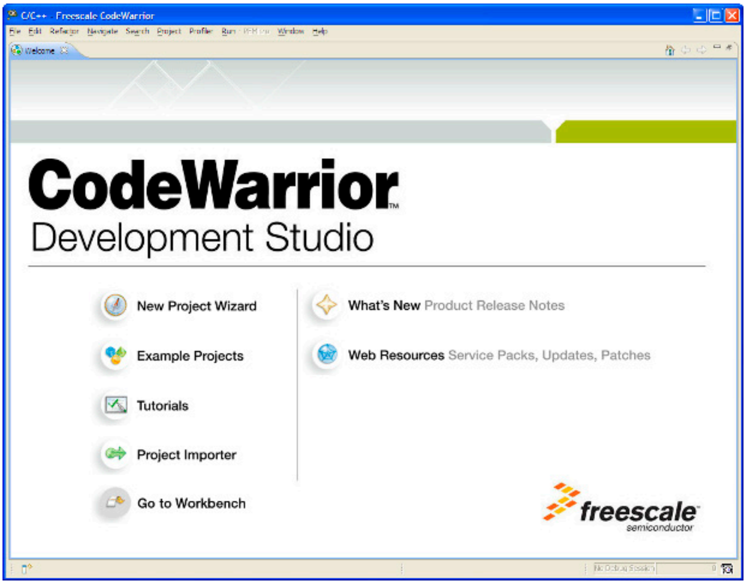


2. Click **OK** to accept the default workspace. To use a workspace different from the default, click **Browse** and specify the desired workspace.

   The IDE starts and displays the **Welcome** page.

NOTE You can also select the **Use this as the default and do not ask again** checkbox to set default/selected path as a default location for storing all your projects.

Figure 2.38 Welcome Page



3. Click the **Go to Workbench** link.

   The **Workbench** window opens.

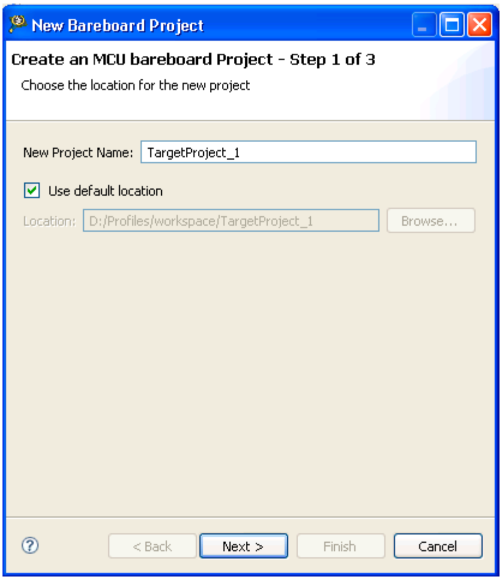
4. Select **File > New > Bareboard Project**, from the IDE menu bar.

   The **Create an MCU bareboard Project** page of the **New Bareboard Project** wizard appears.

5. Specify a name for the new project. For example, enter the project name as `TargetProject_1`.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify different location for the new project. By default, the **Use default location** checkbox is checked.

Figure 2.39 New Bareboard Project Wizard — Create an MCU Bareboard Project Page

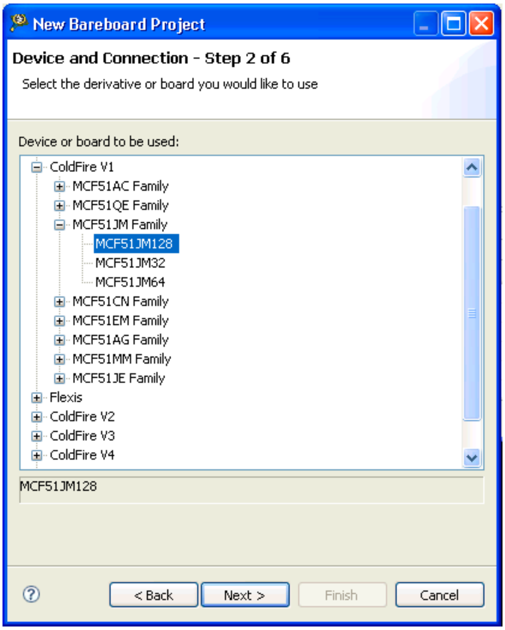


6. Click **Next**.

   The **Device and Connection** page appears.

7. Expand the tree control and select the derivative or board you would like to use. For example, select `ColdFire V1 > MCF51JM Family > MCF51JM128`.

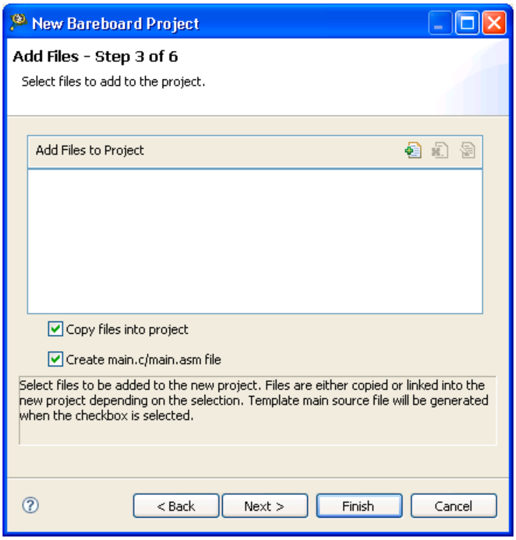
Figure 2.40 New Bareboard Project Wizard — Device and Connection Page



8. Click **Next**.

   The **Add Files** page appears.

Figure 2.41 New Bareboard Project Wizard — Add Files Page



9. If you want to add a file to the project, click  .

   The **Add File Path** dialog box appears.

   a. Type the path of the file you want to add or browse the file by clicking the **File system** button.

   b. Click **OK** to close the **Add File Path** dialog box.

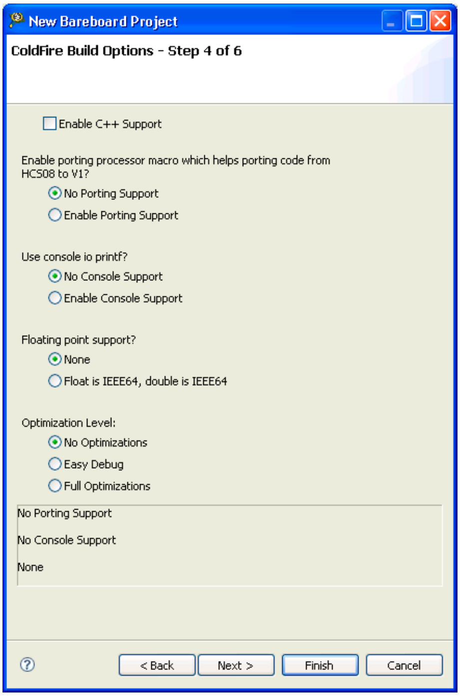
   c. Check the **Copy files into project** checkbox if you want to add the selected file in the project. If you clear the **Copy files into project** checkbox, the file is linked into the project and not copied.

   d. Clear the **Create main.c/main.asm file** checkbox if you do not want to create the main source file in the project.

10. Click **Next**.

    The **ColdFire Build Options** page appears.

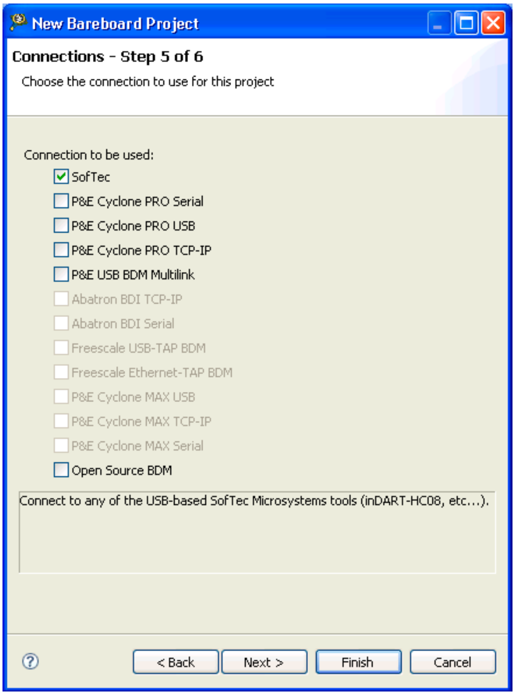
Figure 2.42 New Bareboard Project Wizard — ColdFire Build Options Page



11. Select the appropriate options to enable C++, porting processor macro, console, and floating point supports.
12. Click **Next**.

    The **Connections** page appears.
13. Check the appropriate connection. For example, check the **P&E Cyclone PRO TCP-IP** checkbox.

Figure 2.43 New Bareboard Project Wizard — Connections Page

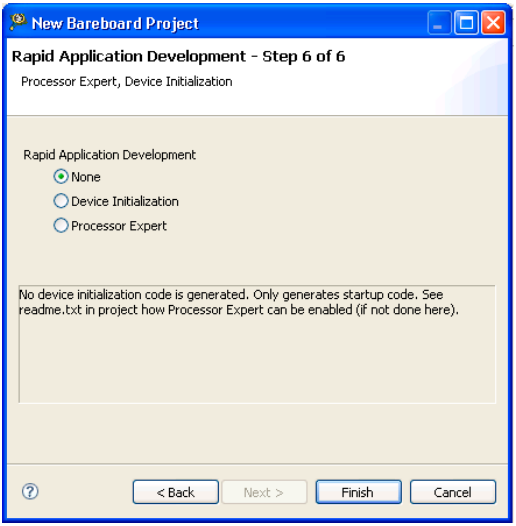


NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

14. Click **Next**.

 The **Rapid Application Development** page appears.

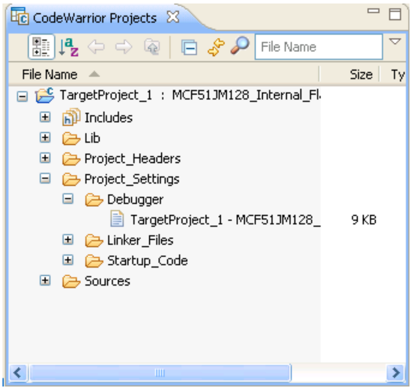
Figure 2.44 New Bareboard Project Wizard — Rapid Application Development Page



15. Select the appropriate option to support rapid application development.
    - **None** — Select to generate only startup code.
    - **Device Initialization** — Select to generate the initialization code for on-chip peripherals, interrupt vector table, and template for interrupt vector service routines.
    - **Processor Expert** — Select to generate the device initialization code, including low-level drivers.
16. Click **Finish**.

    The wizard creates a project for the ColdFire V1 architecture. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

Figure 2.45 CodeWarrior Projects View



The new project is ready for use. You can now customize it by adding your own source code files, changing debugger settings, or adding libraries.

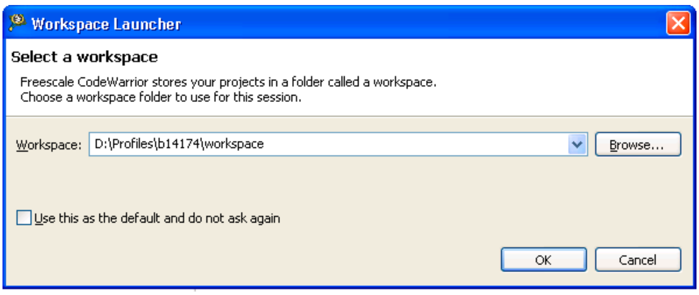
Creating Target Board Project for ColdFire V2-4e

To create a project for ColdFire V2-4e using the **New Bareboard Project** wizard**,** perform these steps.

1. Select **Start > Programs > Freescale CodeWarrior > CW for Microcontrollers V *number* > CodeWarrior,** where *number* is the version number of your product.

   The IDE launches and the **WorkSpace Launcher** dialog box prompts you to select a workspace to use.

Figure 2.46 WorkSpace Launcher Dialog Box

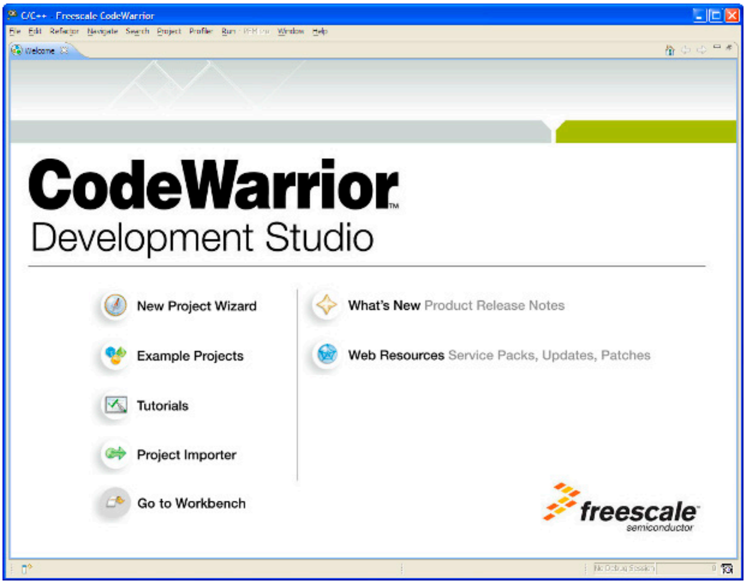


2. Click **OK** to accept the default workspace. To use a workspace different from the default, click **Browse** and specify the desired workspace.

   The IDE starts and displays the **Welcome** page.

NOTE You can also select the **Use this as the default and do not ask again** checkbox to set default/selected path as a default location for storing all your projects.

Figure 2.47 Welcome Page



3. Click the **Go to Workbench** link.

   The **Workbench** window opens.

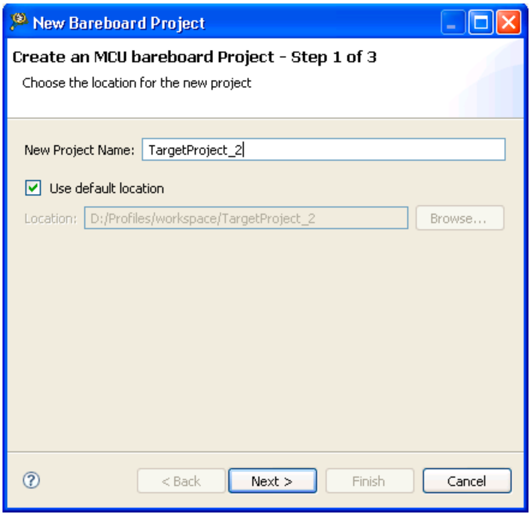
4. Select **File > New > Bareboard Project**, from the IDE menu bar.

   The **Create an MCU bareboard Project** page of the **New Bareboard Project** wizard appears.

5. Specify a name for the new project. For example, enter the project name as `TargetProject_2`.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify different location for the new project. By default, the **Use default location** checkbox is checked.

Figure 2.48 New Bareboard Project Wizard — Create an MCU Bareboard Project Page

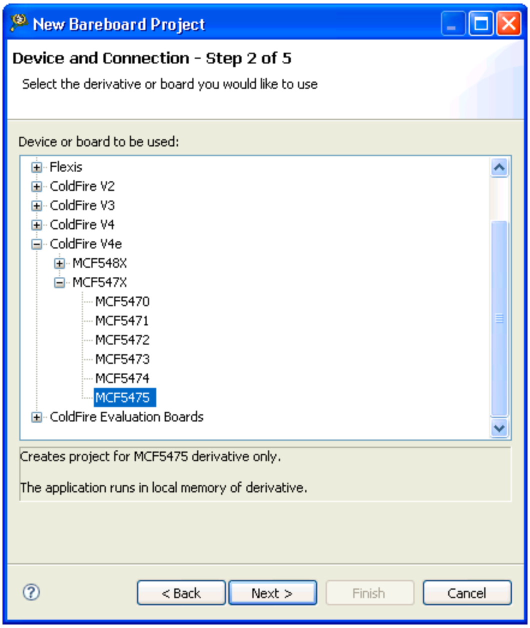


6. Click **Next**.

   The **Device and Connection** page appears.

7. Expand the tree control and select the derivative or board you would like to use. For example, select `ColdFire V4e > MCF547X > MCF5475`.

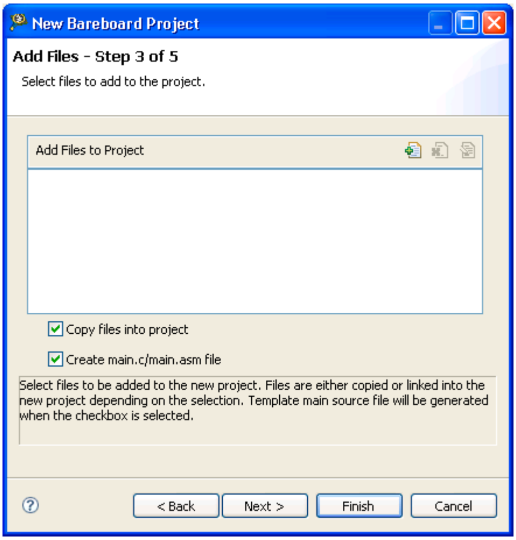
Figure 2.49 New Bareboard Project Wizard — Device and Connection



8. Click **Next**.

   The **Add Files** page appears.

Figure 2.50 New Bareboard Project Wizard — Add Files Page



9. If you want to add a file to the project, click  .

   The **Add File Path** dialog box appears.

   a. Type the path of the file you want to add or browse the file by clicking the **File system** button.

   b. Click **OK** to close the **Add File Path** dialog box.

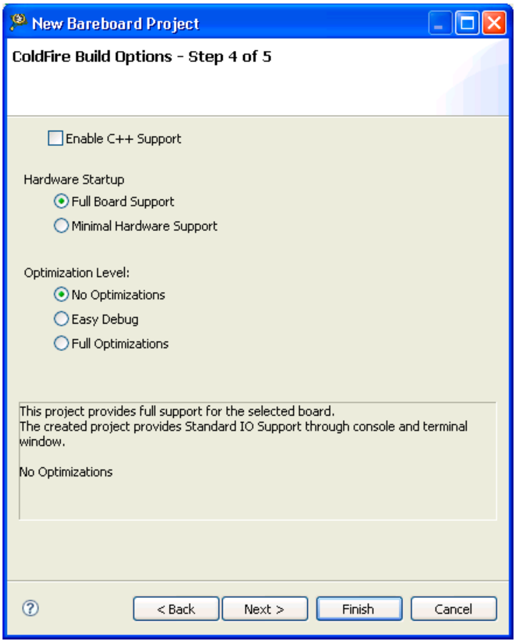
   c. Check the **Copy files into project** checkbox if you want to add the selected file in the project. If you clear the **Copy files into project** checkbox, the file is linked into the project and not copied.

   d. Clear the **Create main.c/main.asm file** checkbox if you do not want to create the main source file in the project.

10. Click **Next**.

    The **ColdFire Build Options** page appears.

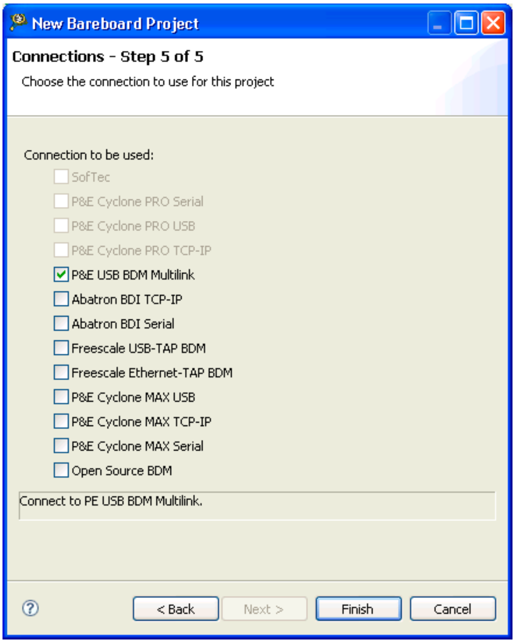
Figure 2.51 New Bareboard Project Wizard — ColdFire Build Options Page



11. Select the appropriate options to enable C++, porting processor macro, console, and floating point supports.
12. Click **Next**.

    The **Connections** page appears.
13. Check the appropriate connection. For example, check the **P&E Cyclone MAX TCP-IP** checkbox.

Figure 2.52 New Bareboard Project Wizard — Connections Page

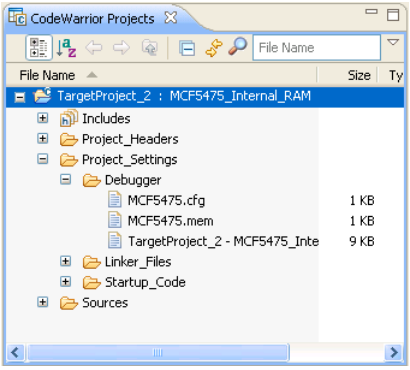


NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

14. Click **Finish**.

    The wizard creates a project for the ColdFire V4e architecture. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

Figure 2.53 CodeWarrior Projects View



The new project is ready for use. You can now customize it by adding your own source code files, changing debugger settings, or adding libraries.

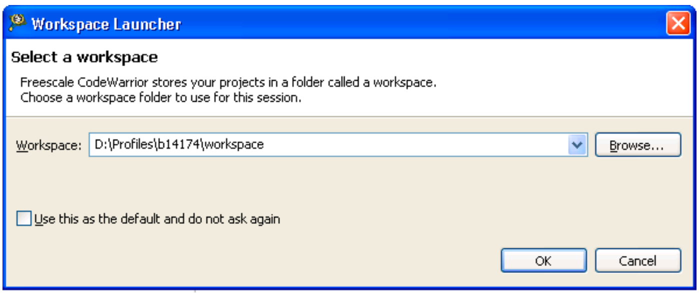
Creating Linux/uClinux Application Project

To create a Linux/uClinux Application Project using the **New Linux/uClinux Application Project** wizard, perform these steps.

1. Select **Start > Programs > Freescale CodeWarrior > CW for Microcontrollers V *number* > CodeWarrior,** where *number* is the version number of your product.

   The IDE launches and the **WorkSpace Launcher** dialog box prompts you to select a workspace to use.

Figure 2.54 WorkSpace Launcher Dialog Box

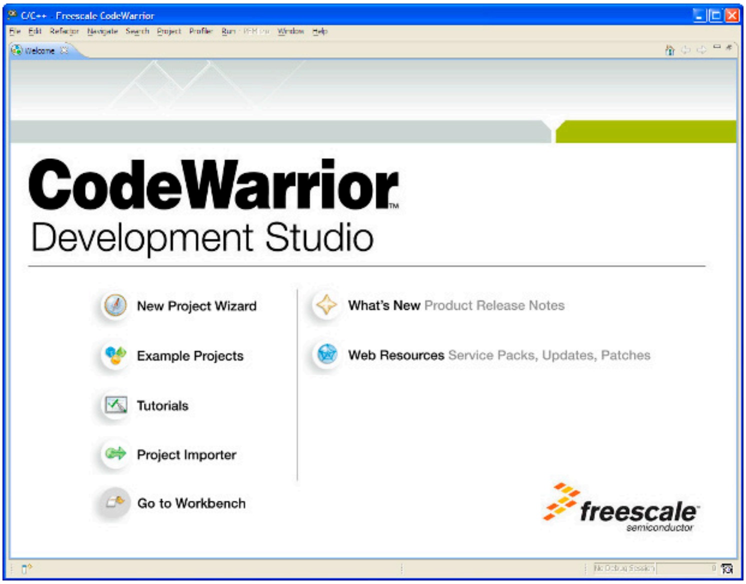


2. Click **OK** to accept the default workspace. To use a workspace different from the default, click **Browse** and specify the desired workspace.

   The IDE starts and displays the **Welcome** page.

NOTE You can also select the **Use this as the default and do not ask again** checkbox to set default/selected path as a default location for storing all your projects.

Figure 2.55 Welcome Page



3. Click the **Go to Workbench** link.

   The **Workbench** window opens.

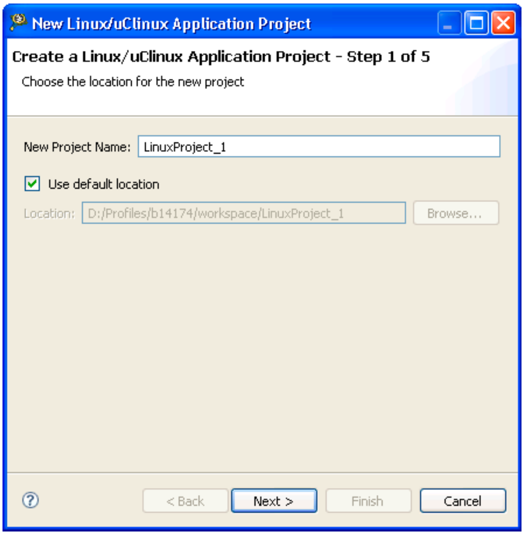
4. Select **File > New > Linux/uClinux Application Project**, from the IDE menu bar.

   The **Create a Linux/uClinux Application Project** page of the **New Linux/uClinux Application Project** wizard appears.

5. Specify a name for the new project. For example, enter the project name as `LinuxProject_1`.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify different location for the new project. By default, the **Use default location** checkbox is checked.

Figure 2.56 Create a Linux/uClinux Application Project Page

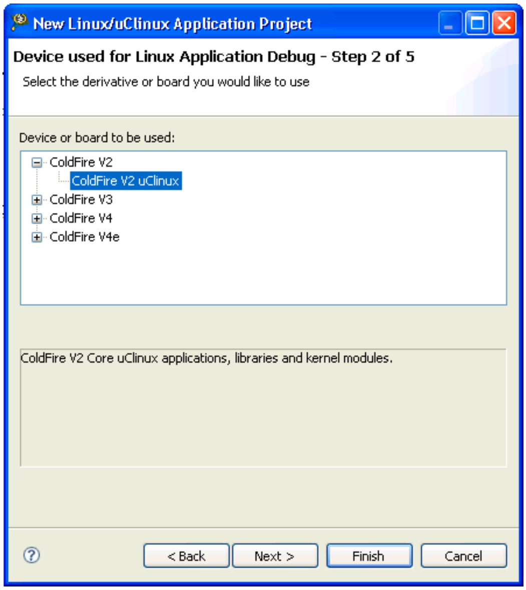


6. Click **Next**.

   The **Device used for Linux Application Debug** page appears.

7. Expand the tree control and select the derivative or board you would like to use. For example, select `ColdFire V2 > ColdFire V2 uClinux`.

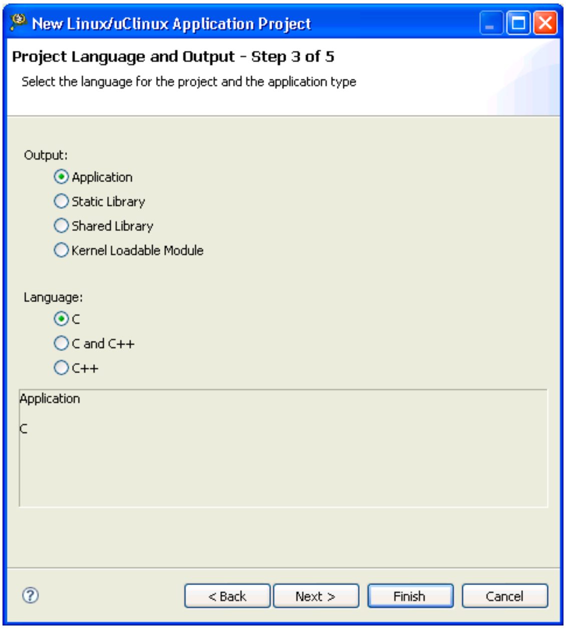
Figure 2.57 Device used for Linux Application Debug Page



8. Click **Next**.

   The **Project Language and Output** page (Figure 2.58) appears.

Figure 2.58 Project Language and Output Page

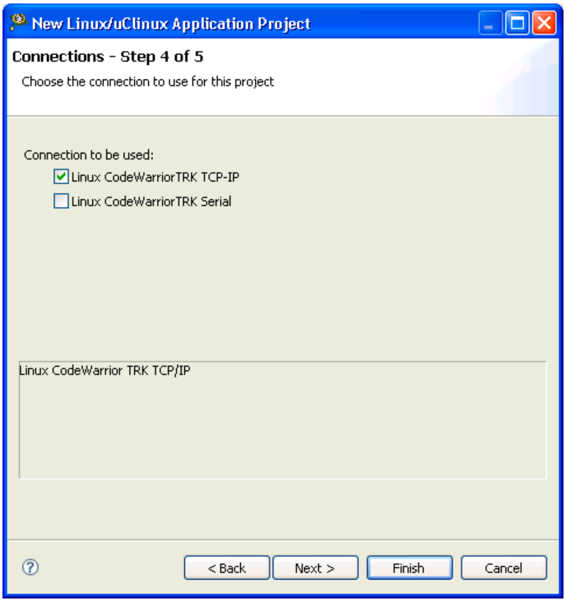


9. Select the output type and the programming language you want to use for this project. For example, select **Application** and **C and C++**.

10. Click **Next**.

    The **Connections** page appears.

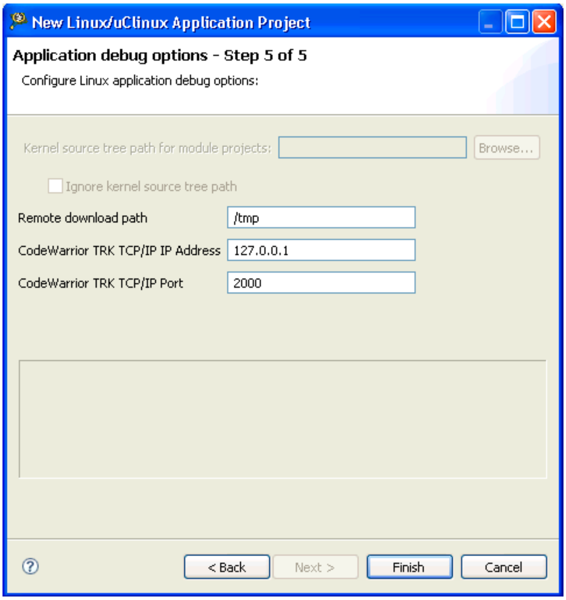
Figure 2.59 Connections Page



11. Check the appropriate connection.
12. Click **Next**.

    The **Application debug options** page appears.

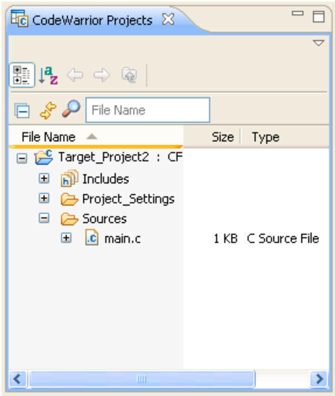
Figure 2.60 Application debug options Page



13. From the list, select the method with which you want the IDE to connect to the target system.
14. In the **Remote download path** text box, specify the path. By default, it is `/tmp`.
15. In the **CodeWarrior TRK TCP/IP Address** and **CodeWarrior TCP/IP** text boxes, enter the IP address and listening port of the target system. By default the is TCP/IP address is `127.0.0.1` and the port number is `2000`.
16. Click **Finish**.

    The wizard closes. The IDE generates a new project according to your specifications. The project window (Figure 2.61) appears.

Figure 2.61 Project Window



Building Projects

CodeWarrior IDE supports two modes of building projects:

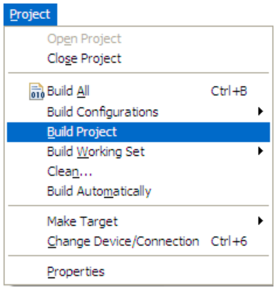
- Manual-build Mode
- Auto-build Mode

Manual-build Mode

In large workspaces, building the entire workspace can take a long time if you make changes with a significant impact on dependent projects. Often there are only a few projects that really matter to you at a given time.

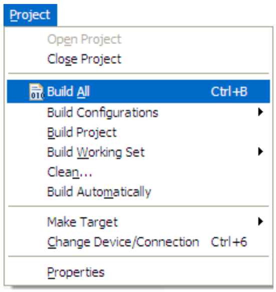
To build only the selected projects, and any prerequisite projects that need to be built in order to correctly build the selected projects, select **Project > Build Project** from the CodeWarrior IDE menu bar (Figure 2.62).

Figure 2.62 Project Menu — Build Project



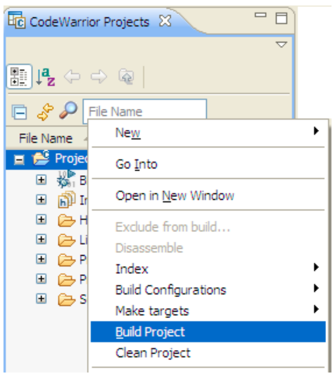
Alternatively, select **Project > Build All** (Figure 2.63).

Figure 2.63 Project Menu — Build All



Alternatively, right-click on the simulator project in the **CodeWarrior Projects** view. A context menu appears. From the context menu, select **Build Project**. The IDE builds the new project (Figure 2.64).

Figure 2.64 Context Menu — Build Project

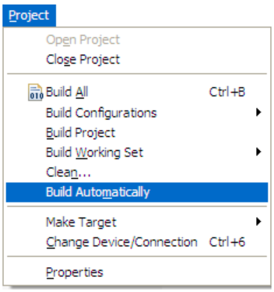


Auto-build Mode

CodeWarrior IDE takes care of compiling source files automatically. Builds occur automatically in the background every time you change files in the workspace (for example saving an editor), if auto-build is enabled.

To automatically build all the projects in a workspace, select **Project > Build Automatically** from the CodeWarrior IDE menu bar (Figure 2.65).

Figure 2.65 Project Menu — Build Automatically



Debugging Projects

When you use the **New Bareboard Project** wizard to create a new project, the wizard sets the debugger settings of the project's launch configurations to default values. You can change these default values based on your requirements.

To debug a project, perform these steps.

1. Launch the IDE.
2. From the main menu bar of the IDE, select **Run > Debug Configurations**. The IDE uses the settings in the launch configuration to generate debugging information and initiate communications with the target board.

   The **Debug Configurations** dialog box appears. The left side of this dialog box has a list of debug configurations that apply to the current application.

NOTE For more information on how to use the debugger, refer to the *Freescale Eclipse Extensions Guid*e and the Working with Debugger chapter of this manual.

3. Expand the **CodeWarrior Download** configuration.

4. From the expanded list, select the debug configuration that you want to modify.

   Figure 2.66 displays the **Debug Configurations** dialog box with the settings for the debug configuration you selected.

Figure 2.66 Debug Configurations Dialog Box

5. Click the **Debugger** tab.

   The **Debugger** page appears in the area beneath the tabs.

Figure 2.67 Debug Configurations Dialog Box — Debugger Page

6. Change the settings on this page as per your requirements. For example, select the required target processor and simulator/emulator.

NOTE For more information on debugger, refer chapter Working with Debugger.

7. Click **Apply** to save the new settings.
8. Click **Debug** to start the debugging session.

   You just finished starting a debugging session and attaching the debugger to a process.

NOTE You can click **Revert** to undo any of the unsaved changes. The IDE restores the last set of saved settings to all pages of the **Debug Configurations** dialog box. Also, the IDE disables **Revert** until you make new pending changes.

Deleting Projects

To delete a project, follow these steps.

1. Select the project you want to delete in the **CodeWarrior Projects** view.
2. Select **Edit** > **Delete**.

   The **Confirm Project Delete** dialog box appears.

NOTE Alternatively, you can also select **Delete** from the context menu when you right-click on the project.

3. Select the **Also delete contents under <*filepath*>** option if you want to delete the contents of the selected project. Else, select the **Do not delete contents** option.

NOTE You will not be able to restore your project using "Undo", if you select the **Also delete contents under <*filepath*>** option.

4. Click **Yes**.

   The project is removed from the **CodeWarrior Projects** view.

Importing Classic CodeWarrior Projects

The CodeWarrior **Project Importer** feature in Eclipse helps automate the conversion of a legacy C/C++ CodeWarrior 5.x project to an Eclipse CDT project.

This feature lets you:

- select the classic CodeWarrior project,
- set targets to import,
- configure source trees and shielded folders,
- edit access paths for each target,
- list files that are not found in the previous settings,
- specify the new Eclipse project name and location,
- list warning or errors in the conversion process, and
- open the newly created Eclipse project.

NOTE For more information on importing classic CodeWarrior projects to Eclipse IDE, refer to the *Freescale Eclipse Extensions Guide* and *CodeWarrior Project Importer Quick Start*.

NOTE For information on importing connection-specific Microcontroller projects, refer to the Tutorials — Importing Connection-Specific Projects topic.

Tutorials — Importing Connection-Specific Projects

This topic consists of tutorials that demonstrate how to import connection-specific classic Microcontrollers projects to Eclipse.

The tutorials include:

- Tutorial A: Porting Classic HCS08 Project
- Tutorial B: Porting Classic RS08 Project
- Tutorial C: Porting Classic ColdFire V1 Project
- Tutorial D: Porting Classic ColdFire V2/3/4 Project

Tutorial A: Porting Classic HCS08 Project

The goal of this tutorial is to import a classic HCS08 project to Eclipse.

NOTE Before starting the process ensure that the CodeWarrior HCS08 project you want to import has all of its files, such as the source, linker command, and settings file.

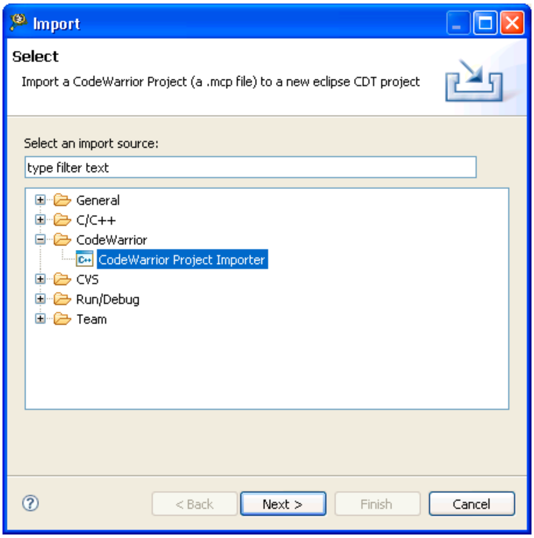
To port a classic HCS08 project, perform these steps.

1. Select **File > Import** from the **Workbench** menu bar.

   The **Import** dialog box appears.

2. Expand the **CodeWarrior** tree control and select **CodeWarrior Project Importer**.

Figure 2.68 Import Dialog Box



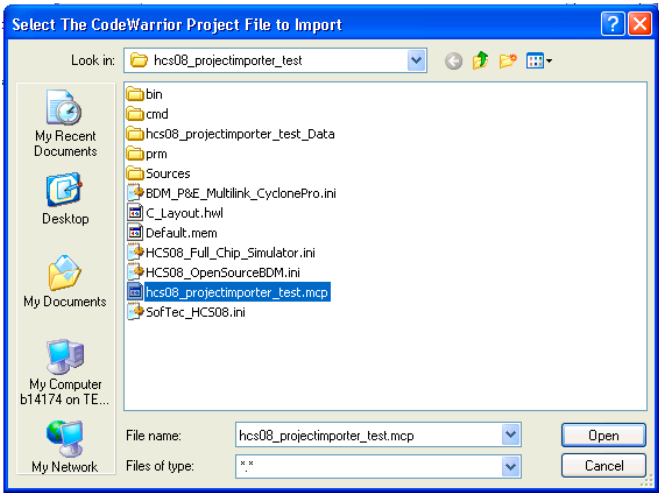
3. Click **Next**.

   The first page of the **CodeWarrior Project Importer** wizard appears.

4. Enter the path and name of the classic CodeWarrior project file to import in the **Project file** text box. Alternatively, click **Browse** and use the **Select The CodeWarrior Project File to Import** dialog box to select the project file to import. In this case, assume that the classic CodeWarrior project filename is `hcs08_projectimporter_test.mcp`.

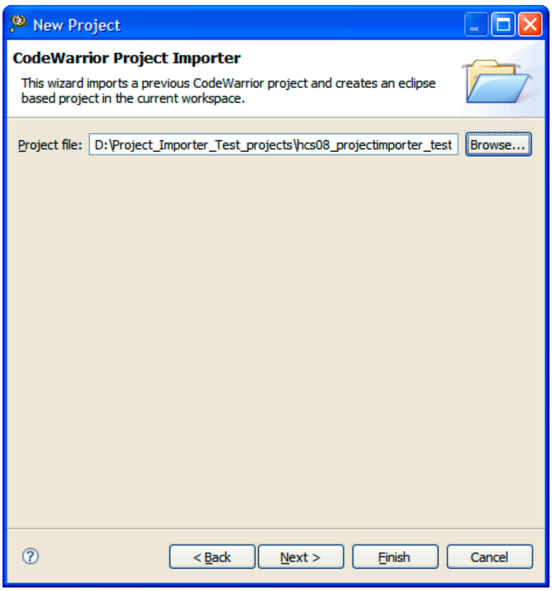
TIP The project file has an extension of `.mcp`. Select the `.mcp` file.

Figure 2.69 Select The CodeWarrior Project File to Import Dialog Box



The path of the project file to import appears in the **Project file** text box.

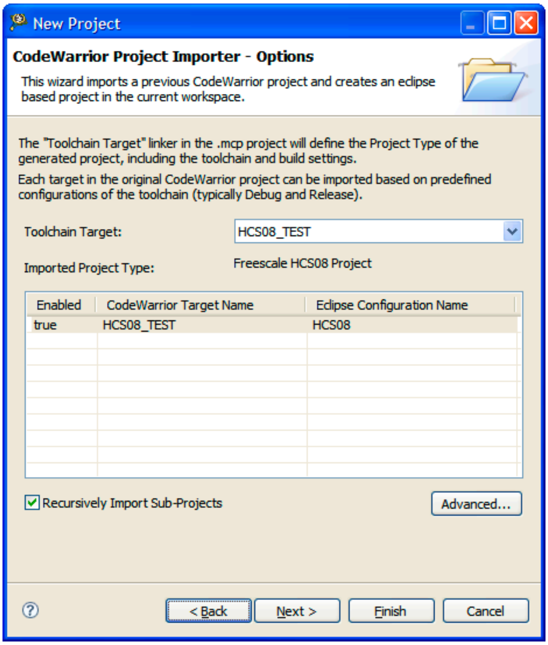
Figure 2.70 Path of CodeWarrior Project File to Import



5. Click **Next**.

   The **Options** page of the **CodeWarrior Project Importer** wizard appears.

Figure 2.71 CodeWarrior Project Importer — Options Page



6. Select the build target that uses the HCS08 toolchain you want the generated Eclipse project to use, from the **Toolchain Target** list box.

NOTE The toolchain target linker in the classic project defines the project type of the generated Eclipse project, including toolchain and build settings.

The build targets table displays all the targets discovered in the project file and is used to generate equivalent Eclipse build configurations.

7. You can import each build target in the classic CodeWarrior project based upon predefined configurations of the toolchain. For example: The HCS08 project in the example lists these values:

   - **Imported Project Type** = *Freescale HCS08 Project*
   - **Enabled** = *true*
   - **CodeWarrior Target Name** = <*Toolchain Target*>
   - **Eclipse Configuration Name** = *HCS08*

TIP To disable the generation of specific configurations, click a row in the build target table. In the **Edit Table Values** dialog box set **Enabled** to *false* and click **OK**.

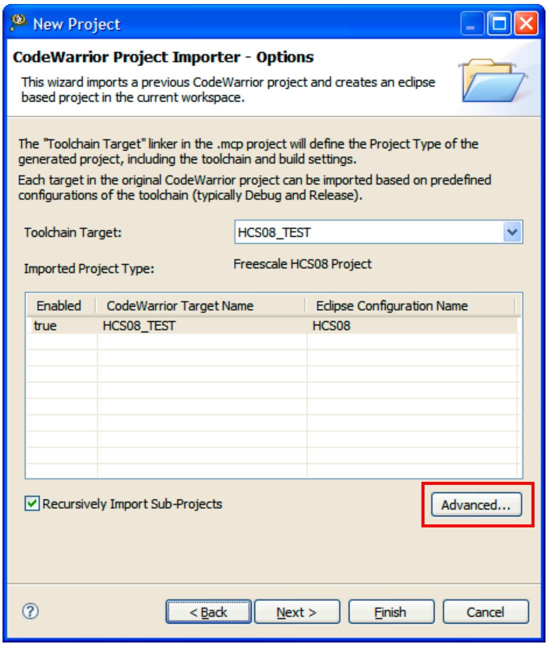
8. If you want to import sub-projects included in the classic CodeWarrior project, check the **Recursively Import Sub-Projects** checkbox.

   The **CodeWarrior Project Importer** wizard imports the sub-projects with the main project.

NOTE The **CodeWarrior Project Importer** wizard will copy only those files that are displayed in the CodeWarrior's project window. The wizard will not import a file if it is not displayed or does not include project information.

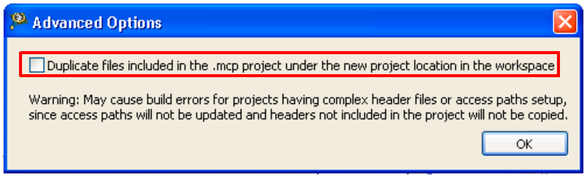
9. Click **Advanced**.

Figure 2.72 CodeWarrior Project Importer — Options Page



The **Advanced Options** dialog box appears.

Figure 2.73 Advanced Options



WARNING! Checking the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox may cause build errors.

10. Check the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox.
11. Click **OK** to close the dialog box.
12. Click **Next**.

    The **Globals** page of the **CodeWarrior Project Importer** wizard appears. This page lets you edit global settings that can effect how the project's build options are imported.

Figure 2.74 CodeWarrior Project Importer — Globals Page

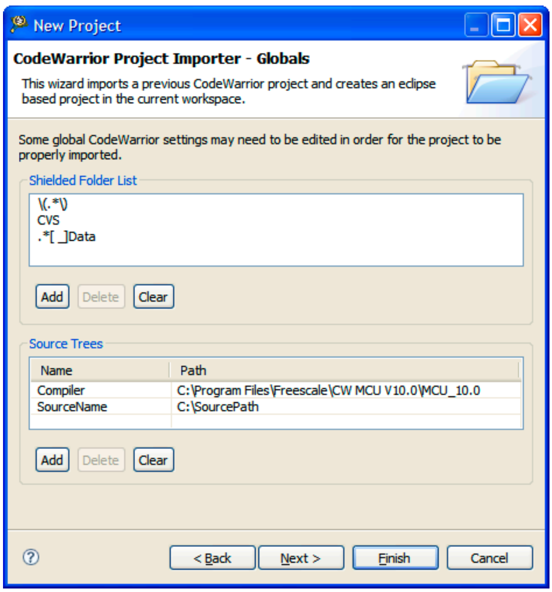


Table 2.14 lists the options on the **CodeWarrior Project Importer — Globals** page.

Table 2.14 CodeWarrior Project Importer — Globals Page Options

Options	Description
Shielded Folder List	Previous versions of the CodeWarrior tools let you conceal the contents of folders from the IDE's search operations during a build. This was done by placing special characters in the directory name. For example, sample code was concealed in a (CodeWarrior Examples) folder. The **Shielded Folder List** table lists these options: • \(.*\) • CVS • .*[_]Data You use the **Add, Delete**, and **Clear** buttons to modify the information in this list. Table 2.15 lists these buttons with their descriptions.
Source Trees	Specifies the location of the source trees. If an access path is defined relative to a source tree, the source tree should be listed in this table. The **{Project}** source tree is defined automatically. The **Sources Trees** table lists these options: • Name — Lists the source name. For example: Compiler. • Compiler — Lists the path source name. For example: `<CW Install>/<Microcontrollers_version>`. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.15 lists these buttons with their descriptions.

Table 2.15 CodeWarrior Project Importer — Globals Page Buttons

Button	Description
Add	Add a new entry to the list.
Delete	Deletes the selected item.
Clear	Clears the entire list.

13. To add a new expression to the **Shielded Folder List** table, perform these steps.

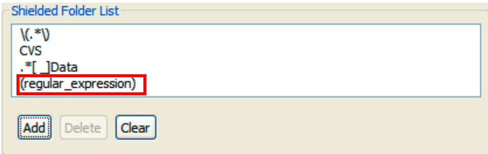
    a. Click **Add**.

    (regular_expression) appears in the shielded folder list.

    b. Double-click *(regular_expression)* and type the required expression.

    The new expression appears in shielded folder list.

Figure 2.75 Shielded Folder List



14. To delete an existing expression from the **Shielded Folder List** table, select the expression and click **Delete**.

    The selected expression is deleted from the shielded folder list.

15. To remove all the existing expressions from the **Shielded Folder List** table, click **Clear**.

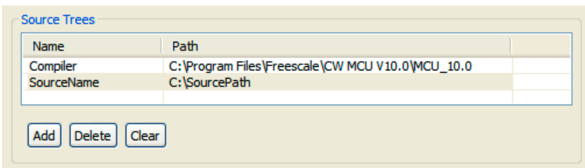
    All the expressions are deleted from the shielded folder list.

16. To add a new source to the **Source Trees** table, perform these steps.

    a. Click **Add**.

    SourceName appears in the source trees list.

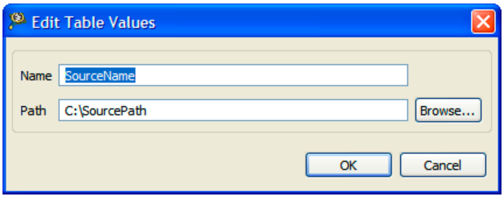
Figure 2.76 Source Trees



    b. Double-click *SourceName.*

    The **Edit Table Values** dialog box appears.

Figure 2.77 Edit Table Values



c. In the **Name** text box, enter the source name.

d. In the **Path** text box, enter the path of the new source. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

e. Click **OK**.

The new source appears in **Source Trees** list.

17. Click **Next**.

The **CodeWarrior Project Importer - Access Paths** page appears.

NOTE Access paths are directory paths the CodeWarrior tools use to search for libraries, runtime support files, and other object files.

Table 2.16 lists the options on the **CodeWarrior Project Importer — Access Paths** page.

Table 2.16 CodeWarrior Project Importer — Access Paths Page

Option	Description
Build Target List Box	Lets you select the build target whose access paths you want to modify. For example: `HCS08_TEST`
Access Path Table	Lists the access paths used by the build target selected in the **Build Target** list box. Each row lists: • **Path** — Directory path. For example: The path is `{Compiler}\lib\HC08c\include`. • **Recursive** — Whether the path is searched recursively. For example: `false` or `true`. • **Type** — Type of path to be searched. For example: `user` or `system`. • **Error** — Unresolved access paths, marked as “X”, if any. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.17 lists these buttons with their descriptions.
Flatten Recursive Access Paths Checkbox	When checked, the **CodeWarrior Project Importer** wizard automatically generates separate include paths for each subdirectory that is a part of the recursive path. This option is set by default as most compilers do not support recursive include paths passed by the command line.

Figure 2.78 CodeWarrior Project Importer — Access Paths Page

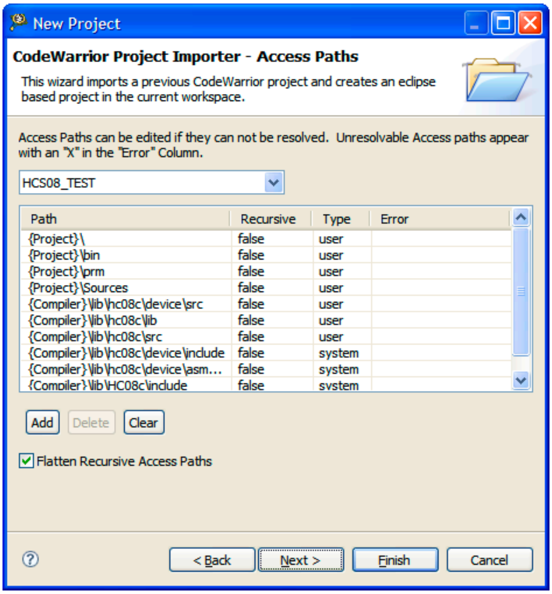


Table 2.17 CodeWarrior Project Importer — Access Paths Page Buttons

Button	Description
Add	Add a new directory path to the list.
Delete	Deletes the selected directory path from the list.
Clear	Clears the entire list.

18. To add a new directory path to list, perform these steps.

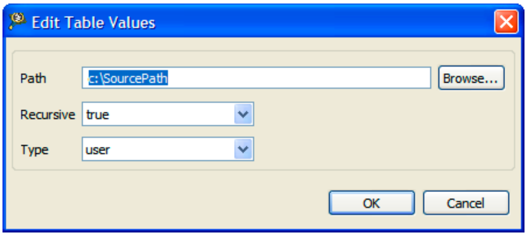
    a. Click **Add**.

       (C:\SourcePath) appears in the **Path** list.

    b. Click *(C:\SourcePath)*.

       The **Edit Table Values** dialog box appears.

Figure 2.79 Edit Table Values



c. In the **Path** text box, enter the directory path. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

d. From the **Recursive** list box, select `false` or `true`.

e. From the **Type** list box, select `user` or `system`.

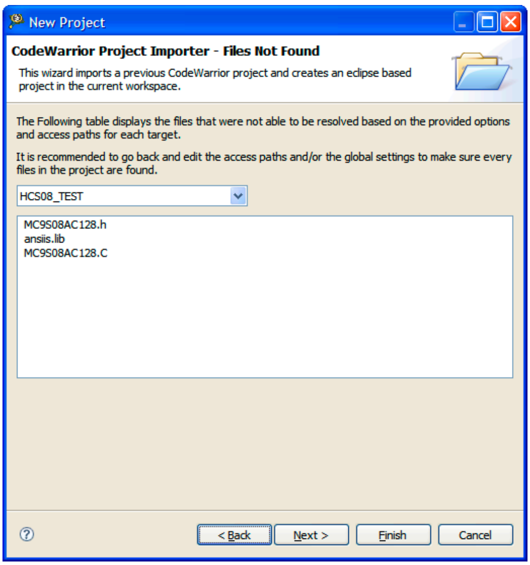
f. Click **OK**.

The new access path appears in table.

19. Click **Next**.

The **CodeWarrior Project Importer — Files Not Found** page appears. This page displays the project files that the wizard could not locate. You can use the Build Target list box to select another build target and view the missing files.

Figure 2.80 CodeWarrior Project Importer — Files Not Found Page



20. To locate the missing files, perform these steps.

    a. Click **Back** to adjust the settings in the **Globals and Access Paths** pages so that the wizard can locate the missing files.

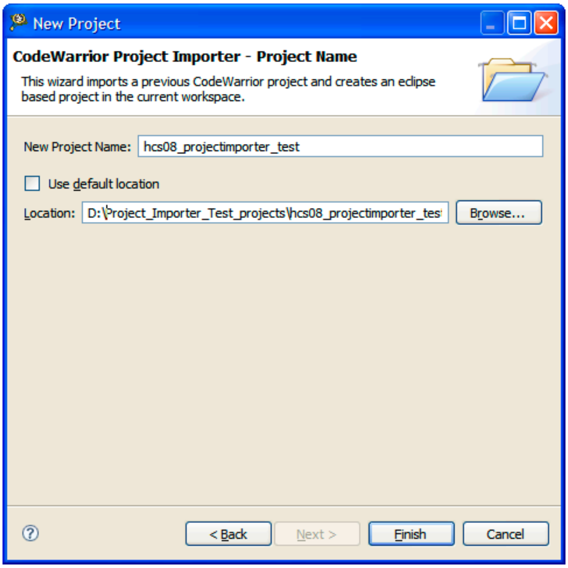
    b. Repeat till you narrow down the number of missing files.

NOTE Some old files do not work with the <*target*> implementation, there will be some files missing.

21. Click **Next**.

    The **CodeWarrior Project Importer - Project Name** page appears. This page lets you specify the name and select a location for the newly imported project.

Figure 2.81 CodeWarrior Project Importer - Project Name Page



22. To specify a name and location to the imported project, perform these steps.

    a. Enter a name for the converted Eclipse project, in the **New Project Name** text box. By default, the old project name is specified.

    b. Check **Use default location** to save the project to the default Eclipse workspace. By default, the location of the project is the directory of the classic project and not the default Eclipse workspace.

TIP If you want to save the converted project to a location other than the default Eclipse workspace, click **Browse** and use the **Browse To Folder** dialog box to navigate to the desired directory.

23. Click **Finish**.

    The **CodeWarrior Project Importer** wizard translates the classic CodeWarrior project and the new Eclipse project appears in the **CodeWarrior Project** view of the **Workbench** window.

NOTE Before debugging the new Eclipse project you might need to edit the build and launch configuration settings. For information on build properties, refer to the chapter Build Properties for Bareboard Projects.

Tutorial B: Porting Classic RS08 Project

The goal of this tutorial is to import a classic RS08 project to Eclipse.

NOTE Before starting the process ensure that the CodeWarrior RS08 project you want to import has all of its files, such as the source, linker command, and settings file.

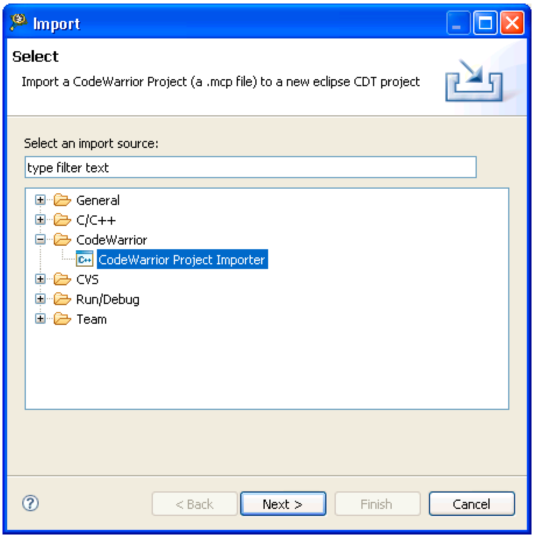
To port a classic RS08 project, perform these steps.

1. Select **File > Import** from the **Workbench** menu bar.

   The **Import** dialog box appears.

2. Expand the **CodeWarrior** tree control and select **CodeWarrior Project Importer**.

Figure 2.82 Import Dialog Box



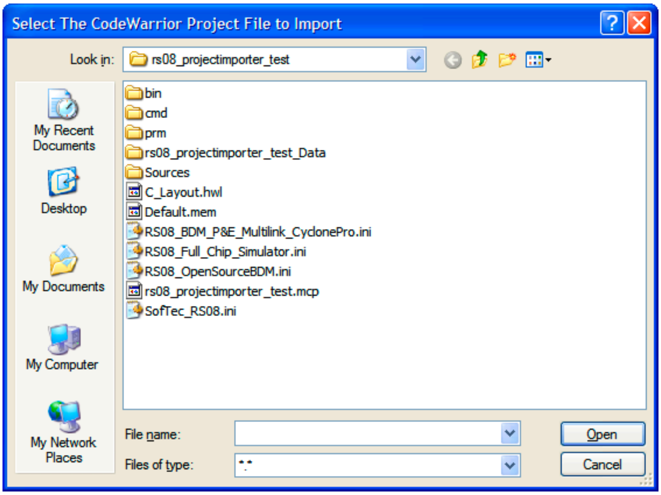
3. Click **Next**.

   The first page of the **CodeWarrior Project Importer** wizard appears.

4. Enter the path and name of the classic CodeWarrior project file to import in the **Project file** text box. Alternatively, click **Browse** and use the **Select The CodeWarrior Project File to Import** dialog box to select the project file to import. In this case, assume that the classic CodeWarrior project filename is `rs08_projectimporter_test.mcp`.

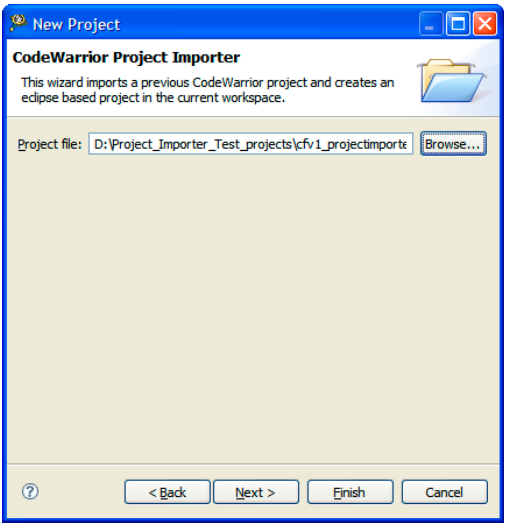
TIP The project file has an extension of `.mcp`. Select the `.mcp` file.

Figure 2.83 Select The CodeWarrior Project File to Import Dialog Box



The path of the project file to import appears in the **Project file** text box.

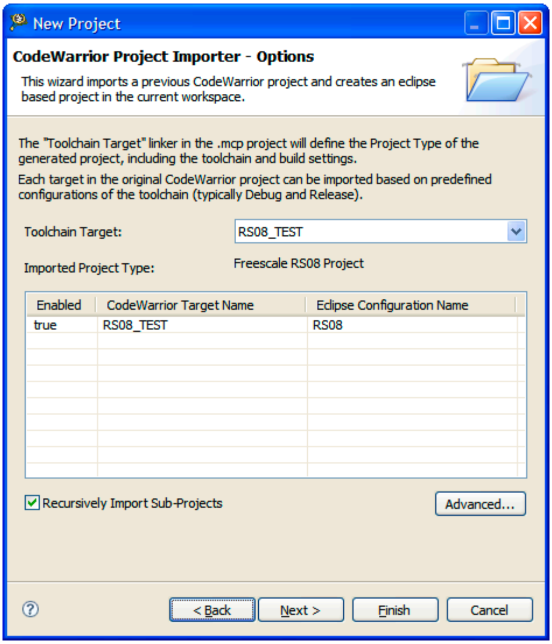
Figure 2.84 Path of CodeWarrior Project File to Import



5. Click **Next**.

   The **Options** page of the **CodeWarrior Project Importer** wizard appears.

Figure 2.85 CodeWarrior Project Importer — Options Page



6. Select the build target that uses the RS08 toolchain you want the generated Eclipse project to use, from the **Toolchain Target** list box.

NOTE The toolchain target linker in the classic project defines the project type of the generated Eclipse project, including toolchain and build settings.

The build targets table displays all the targets discovered in the project file and is used to generate equivalent Eclipse build configurations.

7. You can import each build target in the classic CodeWarrior project based upon predefined configurations of the toolchain. For example: The RS08 project in the example lists these values:
   - **Imported Project Type** = *Freescale RS08 Project*
   - **Enabled** = *true*
   - **CodeWarrior Target Name** = <*Toolchain Target*>
   - **Eclipse Configuration Name** = *RS08*

TIP To disable the generation of specific configurations, click a row in the build target table. In the **Edit Table Values** dialog box set **Enabled** to *false* and click **OK**.

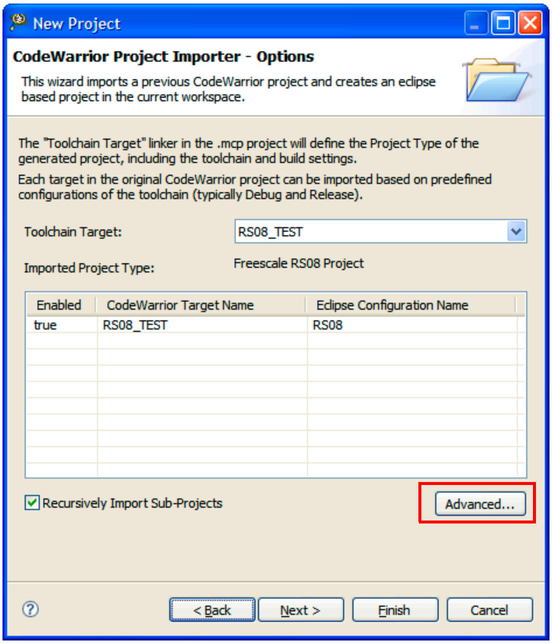
8. If you want to import sub-projects included in the classic CodeWarrior project, check the **Recursively Import Sub-Projects** checkbox.

   The **CodeWarrior Project Importer** wizard imports the sub-projects with the main project.

NOTE The **CodeWarrior Project Importer** wizard will copy only those files that are displayed in the CodeWarrior's project window. The wizard will not import a file if it is not displayed or does not include project information.

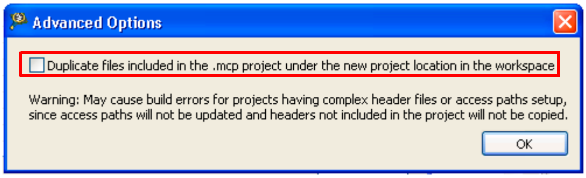
9. Click **Advanced**.

Figure 2.86 CodeWarrior Project Importer — Options Page



The **Advanced Options** dialog box appears.

Figure 2.87 Advanced Options



WARNING! Checking the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox may cause build errors.

10. Check the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox.
11. Click **OK** to close the dialog box.
12. Click **Next**.

    The **Globals** page of the **CodeWarrior Project Importer** wizard appears. This page lets you edit global settings that can effect how the project's build options are imported.

Figure 2.88 CodeWarrior Project Importer — Globals Page

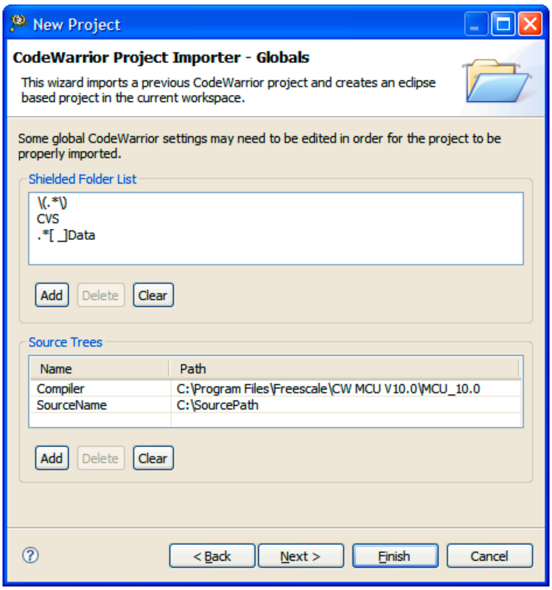


Table 2.18 lists the options on the **CodeWarrior Project Importer — Globals** page.

Table 2.18 CodeWarrior Project Importer — Globals Page Options

Options	Description
Shielded Folder List	Previous versions of the CodeWarrior tools let you conceal the contents of folders from the IDE's search operations during a build. This was done by placing special characters in the directory name. For example, sample code was concealed in a (CodeWarrior Examples) folder. The **Shielded Folder List** table lists these options: • \(.*\) • CVS • .*[_]Data You use the **Add, Delete**, and **Clear** buttons to modify the information in this list. Table 2.19 lists these buttons with their descriptions.
Sources	Specifies the location of the source trees. If an access path is defined relative to a source tree, the source tree should be listed in this table. The **{Project}** source tree is defined automatically. The **Sources Trees** table lists these options: • Name — Lists the source name. For example: Compiler. • Compiler — Lists the path source name. For example: <CW Install>/<Microcontrollers_version>. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.19 lists these buttons with their descriptions.

Table 2.19 CodeWarrior Project Importer — Globals Page Buttons

Button	Description
Add	Add a new entry to the list.
Delete	Deletes the selected item.
Clear	Clears the entire list.

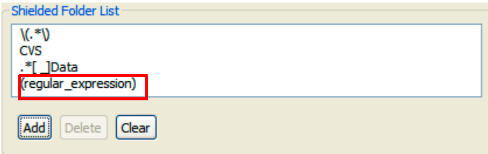
13. To add a new expression to the **Shielded Folder List** table, perform these steps.
    a. Click **Add**.

       (regular_expression) appears in the shielded folder list.

    b. Double-click *(regular_expression)* and type the required expression.

    The new expression appears in shielded folder list.

Figure 2.89 Shielded Folder List



14. To delete an existing expression from the **Shielded Folder List** table, select the expression and click **Delete**.

    The selected expression is deleted from the shielded folder list.

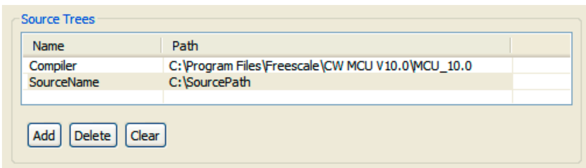
15. To remove all the existing expressions from the **Shielded Folder List** table, click **Clear**.

    All the expressions are deleted from the shielded folder list.

16. To add a new source to the **Source Trees** table, perform these steps.
    a. Click **Add**.

       SourceName appears in the source trees list.

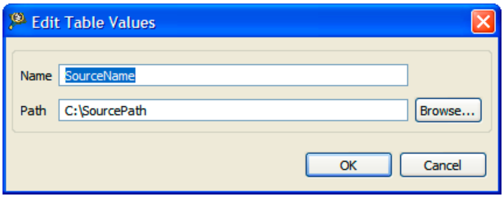
Figure 2.90 Sources Trees



    b. Double-click *SourceName*.

       The **Edit Table Values** dialog box appears.

Figure 2.91 Edit Table Values



c. In the **Name** text box, enter the source name.

d. In the **Path** text box, enter the path of the new source. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

e. Click **OK**.

The new source appears in **Source Trees** list.

17. Click **Next**.

The **CodeWarrior Project Importer - Access Paths** page appears.

NOTE Access paths are directory paths the CodeWarrior tools use to search for libraries, runtime support files, and other object files.

Table 2.20 lists the options on the **CodeWarrior Project Importer — Access Paths** page.

Table 2.20 CodeWarrior Project Importer — Access Paths Page

Option	Description
Build Target List Box	Lets you select the build target whose access paths you want to modify. For example: `RS08_TEST`
Access Path Table	Lists the access paths used by the build target selected in the **Build Target** list box. Each row lists: • **Path** — Directory path. For example: The path is `{Compiler}\lib\rs08c\include`. • **Recursive** — Whether the path is searched recursively. For example: `false` or `true`. • **Type** — Type of path to be searched. For example: `user` or `system`. • **Error** — Unresolved access paths, marked as “X”, if any. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.21 lists these buttons with their descriptions.
Flatten Recursive Access Paths Checkbox	When checked, the **CodeWarrior Project Importer** wizard automatically generates separate include paths for each subdirectory that is a part of the recursive path. This option is set by default as most compilers do not support recursive include paths passed by the command line.

Figure 2.92 CodeWarrior Project Importer — Access Paths Page

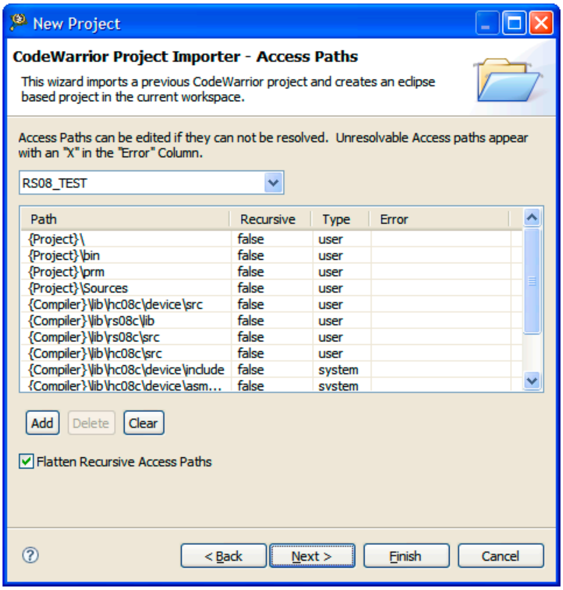


Table 2.21 CodeWarrior Project Importer — Access Paths Page Buttons

Button	Description
Add	Add a new directory path to the list.
Delete	Deletes the selected directory path from the list.
Clear	Clears the entire list.

18. To add a new directory path to list, perform these steps.

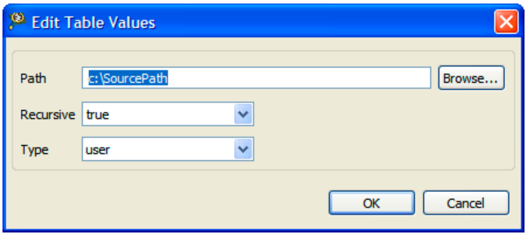
    a. Click **Add**.

    (C:\SourcePath) appears in the **Path** list.

    b. Click *(C:\SourcePath)*.

    The **Edit Table Values** dialog box appears.

Figure 2.93 Edit Table Values



c. In the **Path** text box, enter the directory path. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

d. From the **Recursive** list box, select `false` or `true`.

e. From the **Type** list box, select `user` or `system`.

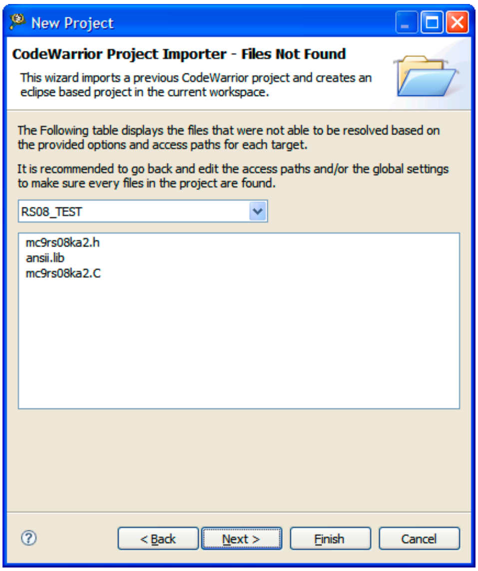
f. Click **OK**.

The new access path appears in table.

19. Click **Next**.

The **CodeWarrior Project Importer — Files Not Found** page appears. This page displays the project files that the wizard could not locate. You can use the Build Target list box to select another build target and view the missing files.

Figure 2.94 CodeWarrior Project Importer — Files Not Found Page



20. To locate the missing files, peform these steps.

    a. Click **Back** to adjust the settings in the **Globals and Access Paths** pages so that the wizard can locate the missing files.

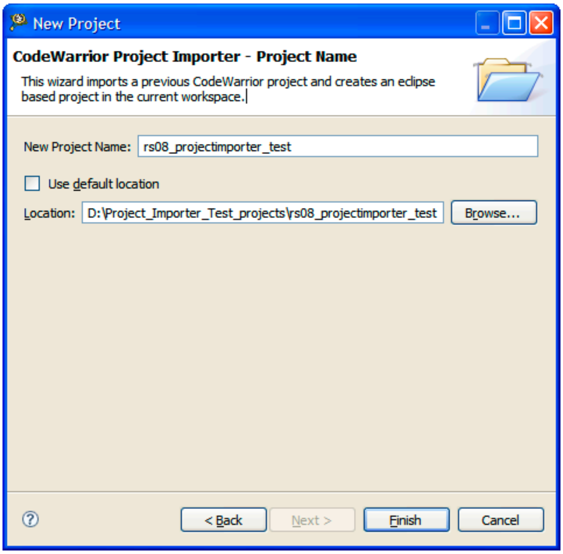
    b. Repeat till you narrow down the number of missing files.

NOTE Some old files do not work with the <*target*> implementation, there will be some files missing.

21. Click **Next**.

    The **CodeWarrior Project Importer - Project Name** page appears. This page lets you specify the name and select a location for the newly imported project.

Figure 2.95 CodeWarrior Project Importer - Project Name Page



22. To specify a name and location to the imported project, perform these steps.

    a. Enter a name for the converted Eclipse project, in the **New Project Name** text box. By default, the old project name is specified.

    b. Check **Use default location** to save the project to the default Eclipse workspace. By default, the location of the project is the directory of the classic project and not the default Eclipse workspace.

TIP If you want to save the converted project to a location other than the default Eclipse workspace, click **Browse** and use the **Browse To Folder** dialog box to navigate to the desired directory.

23. Click **Finish**.

    The **CodeWarrior Project Importer** wizard translates the classic CodeWarrior project and the new Eclipse project appears in the **CodeWarrior Project** view of the **Workbench** window.

NOTE Before debugging the new Eclipse project you might need to edit the build and launch configuration settings. For information on build properties, refer to the chapter Build Properties for Bareboard Projects.

Tutorial C: Porting Classic ColdFire V1 Project

The goal of this tutorial is to import a classic ColdFire V1 project to Eclipse.

NOTE Before starting the process ensure that the ColdFire V1 project you want to import has all of its files, such as the source, linker command, and settings file.

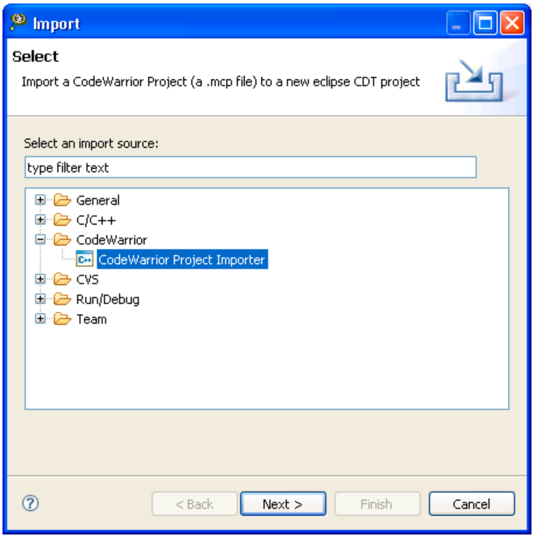
To port a classic ColdFire V1 project, perform these steps.

1. Select **File > Import** from the **Workbench** menu bar.

   The **Import** dialog box appears.

2. Expand the **CodeWarrior** tree control and select **CodeWarrior Project Importer**.

Figure 2.96 Import Dialog Box



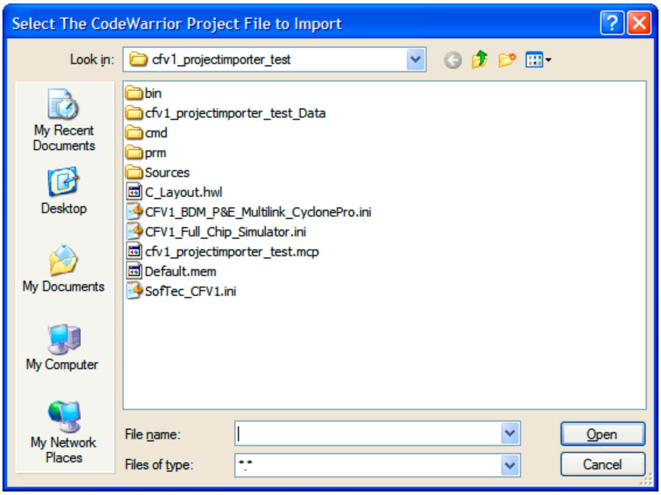
3. Click **Next**.

   The first page of the **CodeWarrior Project Importer** wizard appears.

4. Enter the path and name of the classic CodeWarrior project file to import in the **Project file** text box. Alternatively, click **Browse** and use the **Select The CodeWarrior Project File to Import** dialog box to select the project file to import. In this case, assume that the classic CodeWarrior project filename is `cfv1_projectimporter_test.mcp`.

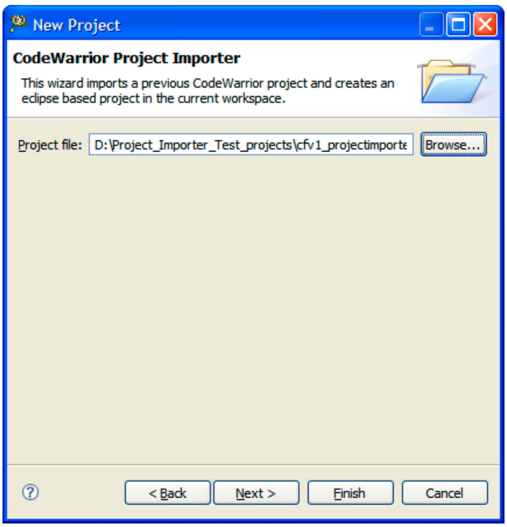
TIP The project file has an extension of `.mcp`. Select the `.mcp` file.

Figure 2.97 Select The CodeWarrior Project File to Import Dialog Box



The path of the project file to import appears in the **Project file** text box.

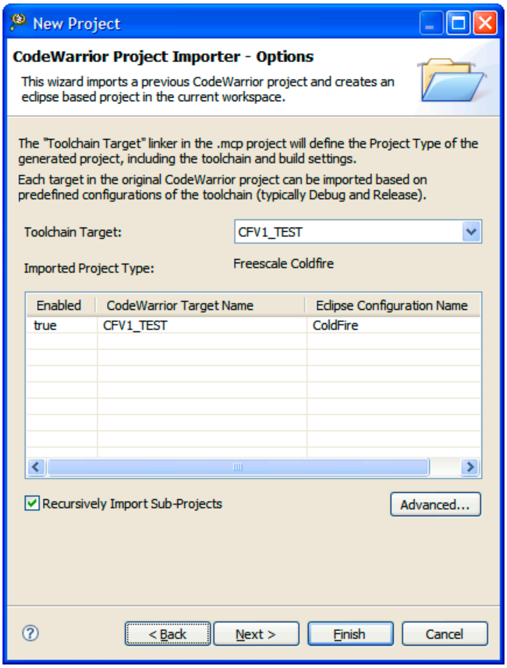
Figure 2.98 Path of CodeWarrior Project File to Import



5. Click **Next**.

   The **Options** page of the **CodeWarrior Project Importer** wizard appears.

Figure 2.99 CodeWarrior Project Importer — Options Page



6. Select the build target that uses the ColdFire toolchain you want the generated Eclipse project to use, from the **Toolchain Target** list box.

NOTE The toolchain target linker in the classic project defines the project type of the generated Eclipse project, including toolchain and build settings.

The build targets table displays all the targets discovered in the project file and is used to generate equivalent Eclipse build configurations.

7. You can import each build target in the classic CodeWarrior project based upon predefined configurations of the toolchain. For example: The ColdFire project in the example lists these values:
   - **Imported Project Type** = *Freescale ColdFire*
   - **Enabled** = *true*
   - **CodeWarrior Target Name** = <*Toolchain Target*>
   - **Eclipse Configuration Name** = *ColdFire*

DRAFT

TIP To disable the generation of specific configurations, click a row in the build target table. In the **Edit Table Values** dialog box set **Enabled** to *false* and click **OK**.

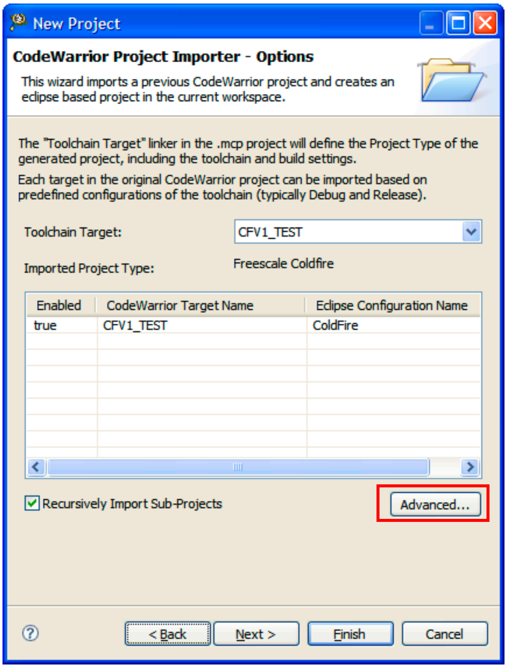
8. If you want to import sub-projects included in the classic CodeWarrior project, check the **Recursively Import Sub-Projects** checkbox.

   The **CodeWarrior Project Importer** wizard imports the sub-projects with the main project.

NOTE The **CodeWarrior Project Importer** wizard will copy only those files that are displayed in the CodeWarrior's project window. The wizard will not import a file if it is not displayed or does not include project information.

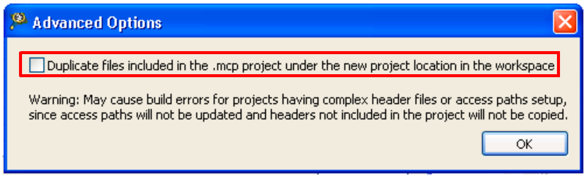
9. Click **Advanced**.

Figure 2.100 CodeWarrior Project Importer — Options Page



The **Advanced Options** dialog box appears.

Figure 2.101 Advanced Options



WARNING! Checking the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox may cause build errors.

10. Check the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox.
11. Click **OK** to close the dialog box.
12. Click **Next**.

    The **Globals** page of the **CodeWarrior Project Importer** wizard appears. This page lets you edit global settings that can effect how the project's build options are imported.

Figure 2.102 CodeWarrior Project Importer — Globals Page

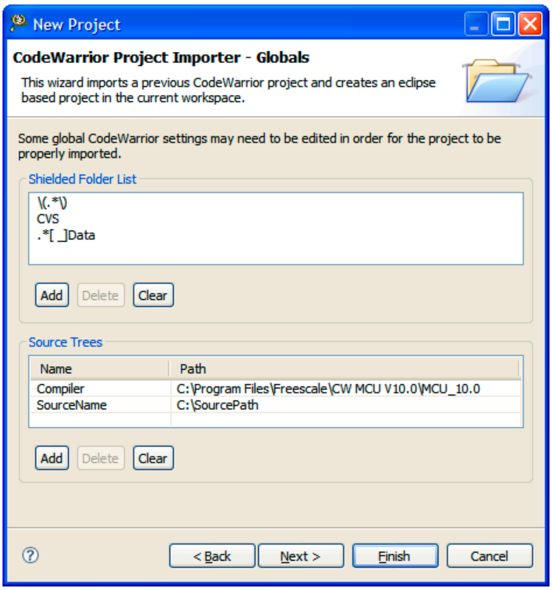


Table 2.22 lists the options on the **CodeWarrior Project Importer — Globals** page.

Table 2.22 CodeWarrior Project Importer — Globals Page Options

Options	Description
Shielded Folder List	Previous versions of the CodeWarrior tools let you conceal the contents of folders from the IDE's search operations during a build. This was done by placing special characters in the directory name. For example, sample code was concealed in a (CodeWarrior Examples) folder. The **Shielded Folder List** table lists these options: • \(.*\) • CVS • .*[_]Data You use the **Add, Delete**, and **Clear** buttons to modify the information in this list. Table 2.23 lists these buttons with their descriptions.
Sources	Specifies the location of the source trees. If an access path is defined relative to a source tree, the source tree should be listed in this table. The **{Project}** source tree is defined automatically. The **Sources Trees** table lists these options: • Name — Lists the source name. For example: Compiler. • Compiler — Lists the path source name. For example: <CW Install>/<Microcontrollers_version>. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.23 lists these buttons with their descriptions.

Table 2.23 CodeWarrior Project Importer — Globals Page Buttons

Button	Description
Add	Add a new entry to the list.
Delete	Deletes the selected item.
Clear	Clears the entire list.

13. To add a new expression to the **Shielded Folder List** table, perform these steps.

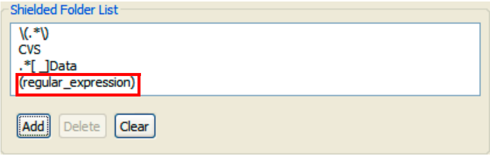
    a. Click **Add**.

    (regular_expression) appears in the shielded folder list.

    b. Double-click *(regular_expression)* and type the required expression.

    The new expression appears in shielded folder list.

Figure 2.103 Shielded Folder List



14. To delete an existing expression from the **Shielded Folder List** table, select the expression and click **Delete**.

    The selected expression is deleted from the shielded folder list.

15. To remove all the existing expressions from the **Shielded Folder List** table, click **Clear**.

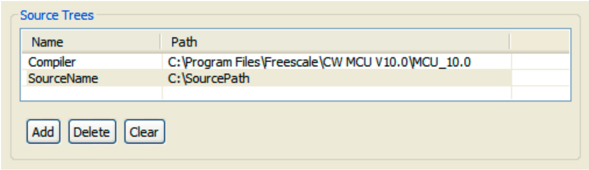
    All the expressions are deleted from the shielded folder list.

16. To add a new source to the **Source Trees** table, perform these steps.

    a. Click **Add**.

    SourceName appears in the source trees list.

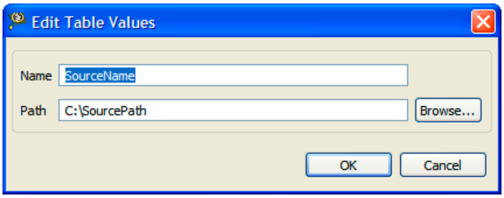
Figure 2.104 Sources Trees



    b. Double-click *SourceName.*

    The **Edit Table Values** dialog box appears.

Figure 2.105 Edit Table Values



c. In the **Name** text box, enter the source name.

d. In the **Path** text box, enter the path of the new source. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

e. Click **OK**.

The new source appears in **Source Trees** list.

17. Click **Next**.

The **CodeWarrior Project Importer - Access Paths** page appears.

NOTE Access paths are directory paths the CodeWarrior tools use to search for libraries, runtime support files, and other object files.

Table 2.24 lists the options on the **CodeWarrior Project Importer — Access Paths** page.

Table 2.24 CodeWarrior Project Importer — Access Paths Page

Option	Description
Build Target List Box	Lets you select the build target whose access paths you want to modify. For example: `CFV1_TEST`
Access Path Table	Lists the access paths used by the build target selected in the **Build Target** list box. Each row lists: • **Path** — Directory path. For example: The path is `{Compiler}\ColdFire_Support\hcs08_compatibility`. • **Recursive** — Whether the path is searched recursively. For example: `false` or `true`. • **Type** — Type of path to be searched. For example: `user` or `system`. • **Error** — Unresolved access paths, marked as “X”, if any. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.25 lists these buttons with their descriptions.
Flatten Recursive Access Paths Checkbox	When checked, the **CodeWarrior Project Importer** wizard automatically generates separate include paths for each subdirectory that is a part of the recursive path. This option is set by default as most compilers do not support recursive include paths passed by the command line.

Figure 2.106 CodeWarrior Project Importer — Access Paths Page

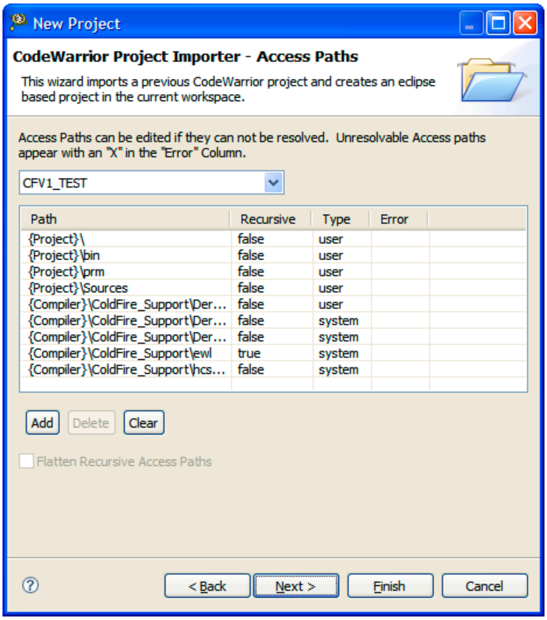


Table 2.25 CodeWarrior Project Importer — Access Paths Page Buttons

Button	Description
Add	Add a new directory path to the list.
Delete	Deletes the selected directory path from the list.
Clear	Clears the entire list.

18. To add a new directory path to list, perform these steps.

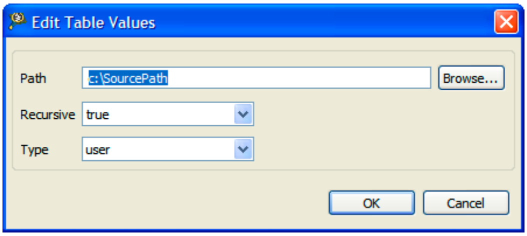
  a. Click **Add**.

  (C:\SourcePath) appears in the **Path** list.

  b. Click *(C:\SourcePath)*.

  The **Edit Table Values** dialog box appears.

Figure 2.107 Edit Table Values



c. In the **Path** text box, enter the directory path. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

d. From the **Recursive** list box, select `false` or `true`.

e. From the **Type** list box, select `user` or `system`.

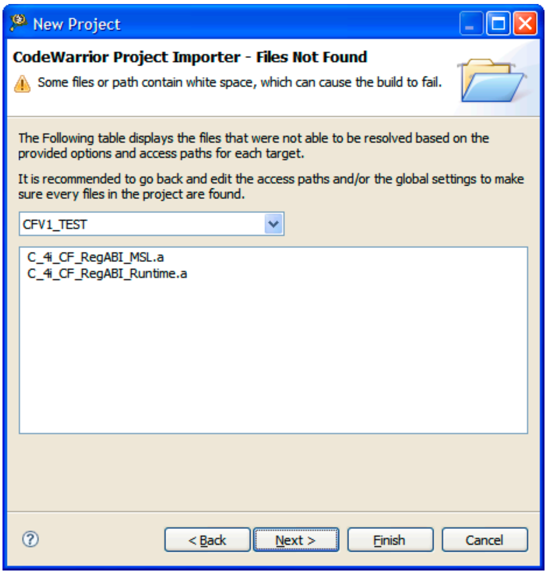
f. Click **OK**.

The new access path appears in table.

19. Click **Next**.

The **CodeWarrior Project Importer — Files Not Found** page appears. This page displays the project files that the wizard could not locate. You can use the Build Target list box to select another build target and view the missing files.

Figure 2.108 CodeWarrior Project Importer — Files Not Found Page



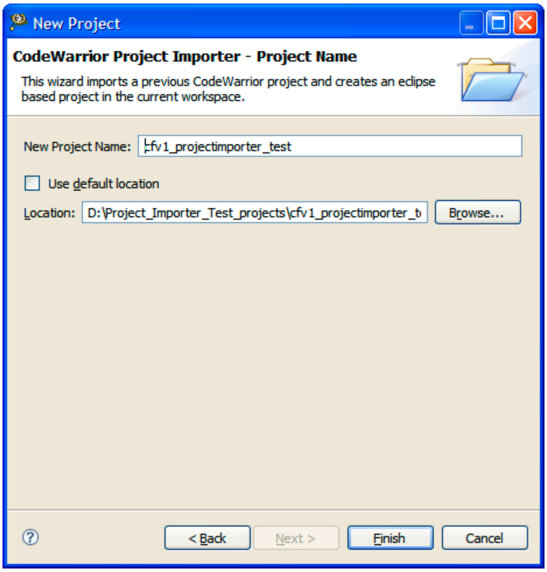
20. To locate the missing files, peform these steps.
    a. Click **Back** to adjust the settings in the **Globals and Access Paths** pages so that the wizard can locate the missing files.
    b. Repeat till you narrow down the number of missing files.

NOTE Some old files do not work with the <*target*> implementation, there will be some files missing.

21. Click **Next**.

    The **CodeWarrior Project Importer - Project Name** page appears. This page lets you specify the name and select a location for the newly imported project.

Figure 2.109 CodeWarrior Project Importer - Project Name Page



22. To specify a name and location to the imported project, perform these steps.
    a. Enter a name for the converted Eclipse project, in the **New Project Name** text box. By default, the old project name is specified.
    b. Check **Use default location** to save the project to the default Eclipse workspace. By default, the location of the project is the directory of the classic project and not the default Eclipse workspace.

TIP If you want to save the converted project to a location other than the default Eclipse workspace, click **Browse** and use the **Browse To Folder** dialog box to navigate to the desired directory.

23. Click **Finish**.

    The **CodeWarrior Project Importer** wizard translates the classic CodeWarrior project and the new Eclipse project appears in the **CodeWarrior Project** view of the **Workbench** window.

NOTE Before debugging the new Eclipse project you might need to edit the build and launch configuration settings. For information on build properties, refer to the chapter Build Properties for Bareboard Projects.

Tutorial D: Porting Classic ColdFire V2/3/4 Project

The goal of this tutorial is to import a classic ColdFireV2/3/4 project to Eclipse.

NOTE Before starting the process ensure that the CodeWarrior V2/3/4 project you want to import has all of its files, such as the source, linker command, and settings file.

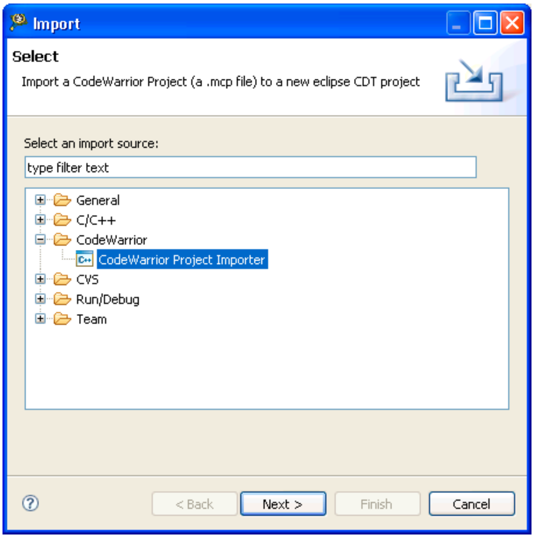
To port a classic ColdFire V2/3/4 project, perform these steps.

1. Select **File > Import** from the **Workbench** menu bar.

   The **Import** dialog box appears.

2. Expand the **CodeWarrior** tree control and select **CodeWarrior Project Importer**.

Figure 2.110 Import Dialog Box



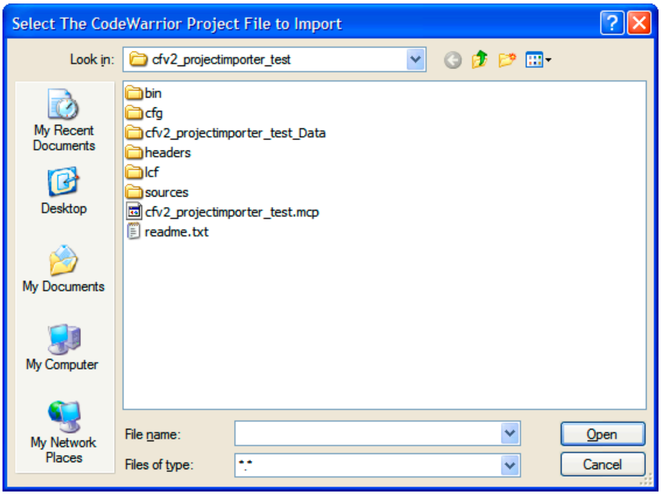
3. Click **Next**.

   The first page of the **CodeWarrior Project Importer** wizard appears.

4. Enter the path and name of the classic CodeWarrior project file to import in the **Project file** text box. Alternatively, click **Browse** and use the **Select The CodeWarrior Project File to Import** dialog box to select the project file to import. In this case, assume that the classic CodeWarrior project filename is `cfv2_projectimporter_test.mcp`.

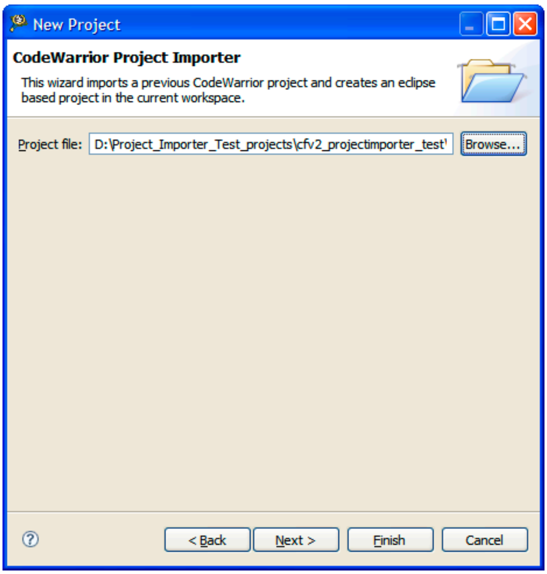
TIP The project file has an extension of `.mcp`. Select the `.mcp` file.

Figure 2.111 Select The CodeWarrior Project File to Import Dialog Box



The path of the project file to import appears in the **Project file** text box.

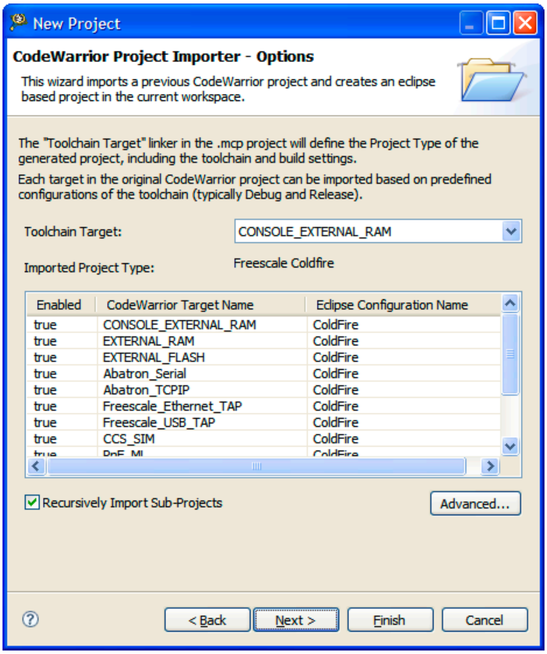
Figure 2.112 Path of CodeWarrior Project File to Import



5. Click **Next**.

   The **Options** page of the **CodeWarrior Project Importer** wizard appears.

Figure 2.113 CodeWarrior Project Importer — Options Page



6. Select the build target that uses the ColdFire toolchain you want the generated Eclipse project to use, from the **Toolchain Target** list box.

NOTE The toolchain target linker in the classic project defines the project type of the generated Eclipse project, including toolchain and build settings.

   The build targets table displays all the targets discovered in the project file and is used to generate equivalent Eclipse build configurations.

7. You can import each build target in the classic CodeWarrior project based upon predefined configurations of the toolchain. For example: The ColdFire project in the example lists these values:
   - **Imported Project Type** = *Freescale ColdFire*
   - **Enabled** = *true*
   - **CodeWarrior Target Name** = <*Toolchain Targets*>
   - **Eclipse Configuration Name** = *ColdFire*

TIP To disable the generation of specific configurations, click a row in the build target table. In the **Edit Table Values** dialog box set **Enabled** to *false* and click **OK**.

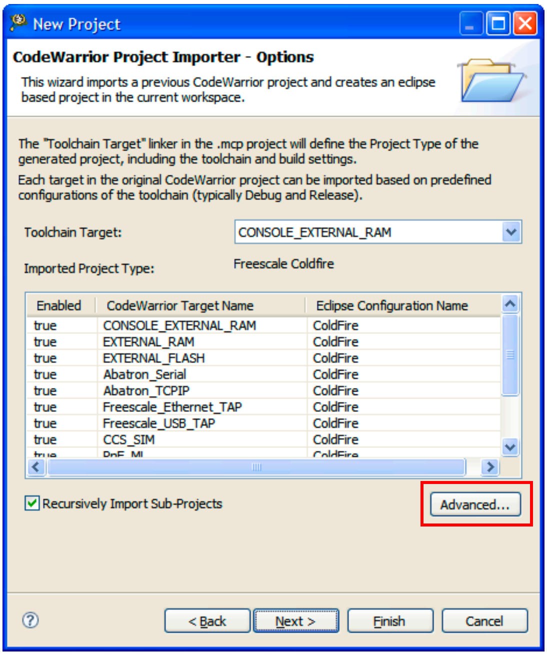
8. If you want to import sub-projects included in the classic CodeWarrior project, check the **Recursively Import Sub-Projects** checkbox.

   The **CodeWarrior Project Importer** wizard imports the sub-projects with the main project.

NOTE The **CodeWarrior Project Importer** wizard will copy only those files that are displayed in the CodeWarrior's project window. The wizard will not import a file if it is not displayed or does not include project information.

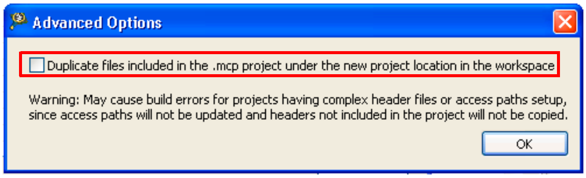
9. Click **Advanced**.

Figure 2.114 CodeWarrior Project Importer — Options Page



The **Advanced Options** dialog box appears.

Figure 2.115 Advanced Options



WARNING! Checking the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox may cause build errors.

10. Check the **Duplicate files included in the .mcp project under the new project location in the workspace** checkbox.
11. Click **OK** to close the dialog box.
12. Click **Next**.

    The **Globals** page of the **CodeWarrior Project Importer** wizard appears. This page lets you edit global settings that can effect how the project's build options are imported.

Figure 2.116 CodeWarrior Project Importer — Globals Page

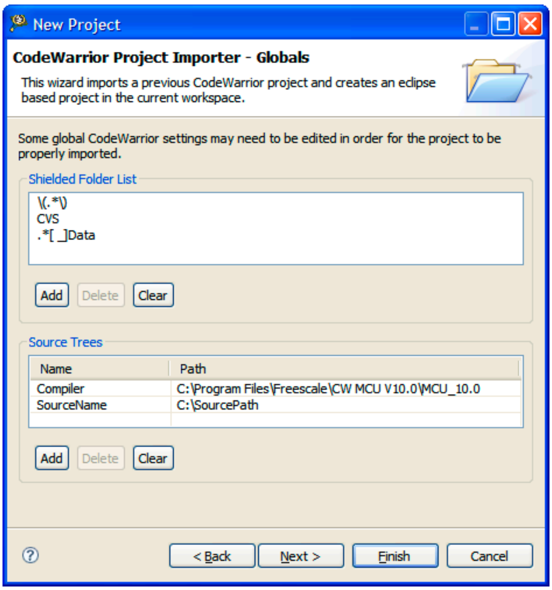


Table 2.26 lists the options on the **CodeWarrior Project Importer — Globals** page.

To add a new expression to the **Shielded Folder List** table, perform these steps.

Table 2.26 CodeWarrior Project Importer — Globals Page Options

Options	Description
Shielded Folder List	Previous versions of the CodeWarrior tools let you conceal the contents of folders from the IDE's search operations during a build. This was done by placing special characters in the directory name. For example, sample code was concealed in a (CodeWarrior Examples) folder. The **Shielded Folder List** table lists these options: • \(.*\) • CVS • .*[_]Data You use the **Add, Delete**, and **Clear** buttons to modify the information in this list. Table 2.27 lists these buttons with their descriptions.
Sources	Specifies the location of the source trees. If an access path is defined relative to a source tree, the source tree should be listed in this table. The **{Project}** source tree is defined automatically. The **Sources Trees** table lists these options: • Name — Lists the source name. For example: Compiler. • Compiler — Lists the path source name. For example: `<CW Install>/<Microcontrollers_version>`. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.27 lists these buttons with their descriptions.

Table 2.27 CodeWarrior Project Importer — Globals Page Buttons

Button	Description
Add	Add a new entry to the list.
Delete	Deletes the selected item.
Clear	Clears the entire list.

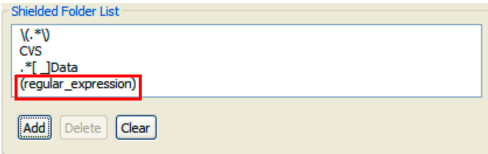
a. Click **Add**.

(regular_expression) appears in the shielded folder list.

b. Double-click *(regular_expression)* and type the required expression.

The new expression appears in shielded folder list.

Figure 2.117 Shielded Folder List



13. To delete an existing expression from the **Shielded Folder List** table, select the expression and click **Delete**.

    The selected expression is deleted from the shielded folder list.

14. To remove all the existing expressions from the **Shielded Folder List** table, click **Clear**.

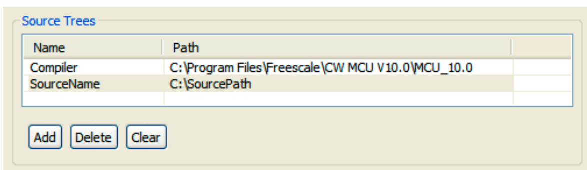
    All the expressions are deleted from the shielded folder list.

15. To add a new source to the **Source Trees** table, perform these steps.

    a. Click **Add**.

    SourceName appears in the source trees list.

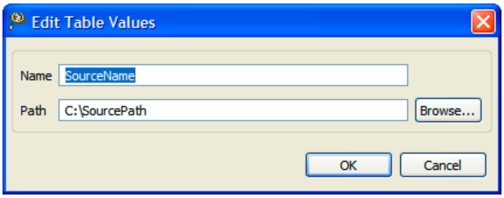
Figure 2.118 Sources Trees



b. Double-click *SourceName*.

The **Edit Table Values** dialog box appears.

Figure 2.119 Edit Table Values



c. In the **Name** text box, enter the source name.

d. In the **Path** text box, enter the path of the new source. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

e. Click **OK**.

The new source appears in **Source Trees** list.

16. Click **Next**.

The **CodeWarrior Project Importer - Access Paths** page appears.

NOTE Access paths are directory paths the CodeWarrior tools use to search for libraries, runtime support files, and other object files.

Table 2.28 lists the options on the **CodeWarrior Project Importer — Access Paths** page.

Table 2.28 CodeWarrior Project Importer — Access Paths Page

Option	Description
Build Target List Box	Lets you select the build target whose access paths you want to modify. For example: `CONSOLE_EXTERNAL_RAM`.
Access Path Table	Lists the access paths used by the build target selected in the **Build Target** list box. Each row lists: • **Path** — Directory path. For example: The path is `{Compiler}\ColdFire_Support\ewl`. • **Recursive** — Whether the path is searched recursively. For example: `false` or `true`. • **Type** — Type of path to be searched. For example: `user` or `system`. • **Error** — Unresolved access paths, marked as “X”, if any. You use the **Add**, **Delete**, and **Clear** buttons to modify the information in this list. Table 2.29 lists these buttons with their descriptions.
Flatten Recursive Access Paths Checkbox	When checked, the **CodeWarrior Project Importer** wizard automatically generates separate include paths for each subdirectory that is a part of the recursive path. This option is set by default as most compilers do not support recursive include paths passed by the command line.

Figure 2.120 CodeWarrior Project Importer — Access Paths Page

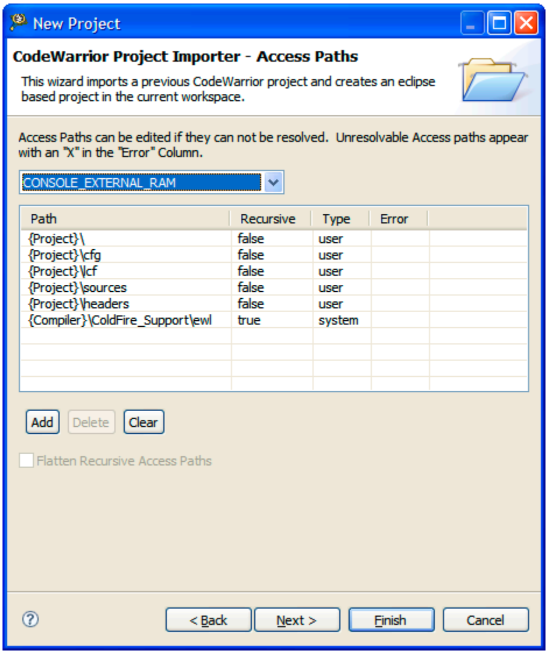


Table 2.29 CodeWarrior Project Importer — Access Paths Page Buttons

Button	Description
Add	Add a new directory path to the list.
Delete	Deletes the selected directory path from the list.
Clear	Clears the entire list.

17. To add a new directory path to list, perform these steps.

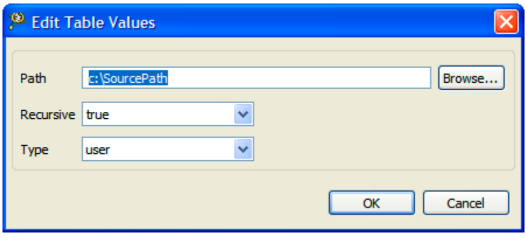
    a. Click **Add**.

    (C:\SourcePath) appears in the **Path** list.

    b. Click *(C:\SourcePath)*.

    The **Edit Table Values** dialog box appears.

Figure 2.121 Edit Table Values



c. In the **Path** text box, enter the directory path. Alternatively, click **Browse** and use the **Browse For Folder** dialog box and navigate to the required source.

d. From the **Recursive** list box, select `false` or `true`.

e. From the **Type** list box, select `user` or `system`.

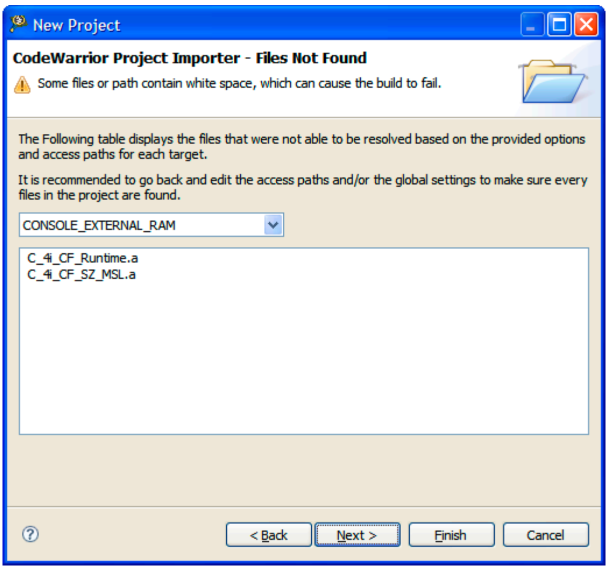
f. Click **OK**.

The new access path appears in table.

18. Click **Next**.

The **CodeWarrior Project Importer — Files Not Found** page appears. This page displays the project files that the wizard could not locate. You can use the Build Target list box to select another build target and view the missing files.

Figure 2.122 CodeWarrior Project Importer — Files Not Found Page



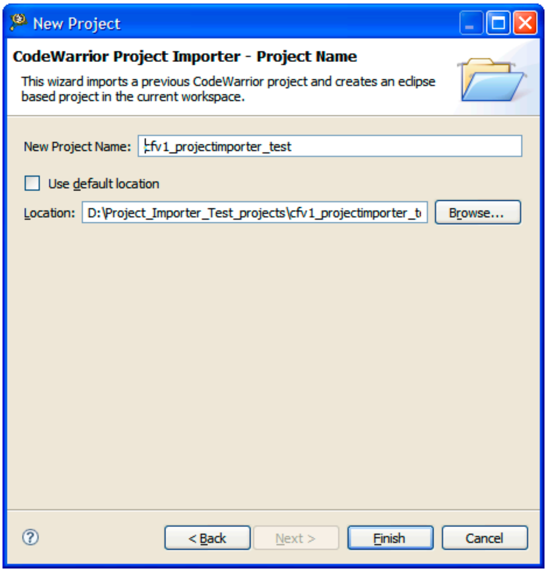
19. To locate the missing files, peform these steps.
    a. Click **Back** to adjust the settings in the **Globals and Access Paths** pages so that the wizard can locate the missing files.
    b. Repeat till you narrow down the number of missing files.

NOTE Some old files do not work with the <*target*> implementation, there will be some files missing.

20. Click **Next**.

    The **CodeWarrior Project Importer - Project Name** page appears. This page lets you specify the name and select a location for the newly imported project.

Figure 2.123 CodeWarrior Project Importer - Project Name Page



21. To specify a name and location to the imported project, perform these steps.
    a. Enter a name for the converted Eclipse project, in the **New Project Name** text box. By default, the old project name is specified.
    b. Check **Use default location** to save the project to the default Eclipse workspace. By default, the location of the project is the directory of the classic project and not the default Eclipse workspace.

TIP If you want to save the converted project to a location other than the default Eclipse workspace, click **Browse** and use the **Browse To Folder** dialog box to navigate to the desired directory.

22. Click **Finish**.

    The **CodeWarrior Project Importer** wizard translates the classic CodeWarrior project and the new Eclipse project appears in the **CodeWarrior Project** view of the **Workbench** window.

NOTE Before debugging the new Eclipse project you might need to edit the build and launch configuration settings. For information on build properties, refer to the chapter Build Properties for Bareboard Projects.

3

Build Properties for Bareboard Projects

This chapter explains build properties for Microcontrollers project. The Microcontrollers **New Bareboard Project** wizard uses the information it gathers from you to set up the project's build and launch configurations.

A project's *build configuration* contains information on the tool settings used to make the program. For example, it describes the compiler and linker settings, and the files involved, such as source and libraries.

A project's *launch configuration* describes how the IDE starts the program, such as whether it executes by itself on a target, or under debugger control. Launch configurations also specify the core the program executes on (if the target processor has multiple cores).They also specify the connection interface and communications protocol that the debugger uses to control the environment that the program executes in.

NOTE The settings of the CodeWarrior IDE's build and launch configuration correspond to an object called a *target* made by the classic CodeWarrior IDE.

When the wizard completes its process, it generates launch configurations with names that follow the pattern ***projectname*** - ***configtype*** - ***targettype***, where:

- ***projectname*** represents the name of the project
- ***configtype*** represents the project's name, which usually describes the build configuration
- ***targettype*** represents the type of target software or hardware on which the launch configuration acts

For each launch configuration, you can specify build properties, such as:

- additional libraries to use for building code
- behavior of the compilers, linkers, assemblers, and other build-related tools
- specific build properties, such as the byte ordering of the generated code

The topics in this chapter are:

- Changing Build Properties
- Restoring Build Properties

- Build Properties for HCS08
- Build Properties for RS08
- Build Properties for ColdFire

Changing Build Properties

The Microcontrollers **New Bareboard Project** wizard creates a set of build properties for the project. You can modify these build properties to better suit your needs.

Perform these steps to change build properties:

1. Start the IDE.
2. In the **CodeWarrior Projects** view, select the project for which you want to modify the build properties.
3. Select **Project > Properties**.

   The **Properties** window appears. The left side of this window has a properties list. This list shows the build properties that apply to the current project.
4. Expand the **C/C++ Build** property.
5. Select **Settings**.

   The **Properties** window shows the corresponding build properties as in Figure 3.1.

Figure 3.1 Properties for *<Project>* Window

6. Use the **Configuration** drop-down list to specify the launch configuration for which you want to modify the build properties.
7. Click the **Tool Settings** tab.

   The corresponding page appears.
8. From the list of tools on the **Tool Settings** page, select the tool for which you want to modify properties.
9. Change the settings that appear in the page.
10. Click **Apply**.

    The IDE saves your new settings.

You can select other tool pages and modify their settings. When you finish, click **OK** to save your changes and close the Properties window.

Restoring Build Properties

If you modify a build configuration that the CodeWarrior wizard generates, you can restore that configuration to its default state. You might want to restore the build properties in order to have a factory-default configuration, or to revert to a last-known working build configuration. To undo your modifications to build properties, click the **Restore Defaults** button at the bottom of the **Properties** window.

This changes the values of the options to the absolute default of the toolchain. By default, the toolchain options are blank.

For example, when a HCS08 project is created the **Linker > Input** panel has some values set for the **Parameter File** and **Libraries** options, which are specific to the project. Clicking the **Restore Defaults** button defaults the values of the **Parameter File** and **Libraries** options to the blank state of the toolchain .

Build Properties for HCS08

The **Properties for *<project>*** window shows the corresponding build properties for an HCS08 project (Figure 3.2).

Figure 3.2 Build Properties - HCS08

Table 3.1 lists the build properties specific to developing software for HCS08.

The properties that you specify in these panels apply to the selected build tool on the **Tool Settings** page of the **Properties for *<project>*** window.

Table 3.1 Build Properties for HCS08

Build Tool	Build Properties Panels
Messages	Messages
General	General
Disassembler	Disassembler > Output
Linker	Linker > Input
	Linker > Optimization
	Linker > Output
	Linker > General
Burner	Burner > General
HCS08 Compiler	HCS08 Compiler > Preprocessor
	HCS08 Compiler > Input
	HCS08 Compiler > Language
	HCS08 Compiler > Type Sizes
	HCS08 Compiler > Code Generation
	HCS08 Compiler > Optimization
	HCS08 Compiler > Output
	HCS08 Compiler > General
HCS08 Assembler	HCS08 Assembler > Input
	HCS08 Assembler > Language
	HCS08 Assembler > Output
	HCS08 Assembler > General

Messages

Use this panel to specify whether to generate symbolic information for debugging the build target (Figure 3.3).

Figure 3.3 Tool Settings - Messages

Table 3.2 lists and describes the message options.

Table 3.2 Tool Settings - Messages Options

Option	Description
Maximum number of error messages (-WmsgNe)	Specify the number of errors allowed until the application stops processing.
Maximum number of information messages (-WmsgNi)	Specify the maximum number of information messages allowed.
Maximum number of warning messages (-WmsgNw)	Specify the maximum number of warnings allowed.
Disable user messages (-WmsgNu)	Check to disable user messages and allow only the normal message categories (WARNING, INFORMATION, ERROR, or FATAL); reduces the number of messages, and simplifies the error parsing of other tools.
Other Flags	Specify additional command line options; type in custom flags that are not otherwise available in the UI. Default value is `-WmsgFob"%%f%%e:%%l: %%k: %%m\n"`

General

Use this panel to specify the memory model that the architecture uses. The build tools (compiler, linker, and assembler) use the properties that you specify.

Figure 3.4 shows the **General** settings.

Figure 3.4 Tool Settings - General

Table 3.3 lists and describes the memory model options for HCS08.

Table 3.3 Tool Settings - General

Option	Description
Memory Model (-M)	Specify the memory model for the build tools: • **Tiny** — Assumes that data pointers have 8-bit addresses unless explicitly specified with the keyword __far • **Small** — Default memory model; assumes that all functions and pointers have 16 bit addresses and requires code and data to be located in 64 kilobytes address space • **Banked** — Lets you place program code into atmost 256 pages of 16 kilobytes each, but does not affect data allocation
Enable Memory Management Unit (MMU) Support (-MMU)	Check to inform the compiler that `CALL` and `RTC` instructions are available, enabling code banking, and that the current architecture has extended data access capabilities, enabling support for `__linear` data types. This option can be used only when `-Cs08` is enabled.

Disassembler

Use this panel to specify the command, options, and expert settings for HCS08 Disassembler.

Figure 3.5 shows the Disassembler page.

Figure 3.5 Tool Settings > Disassembler

Table 3.4 lists and describes the Disassembler options.

Table 3.4 Tool Settings - Disassembler Options

Option	Description
Command	Shows the location of the disassembler executable file; default is `${HC08Tools}/decoder`.
All options	Shows the actual command line the linker will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} -O${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`

Disassembler > Output

Use this panel to control how the disassembler generates the output file.

Figure 3.6 shows the **Output** panel.

Figure 3.6 Tool Settings - Disassembler > Output

Table 3.5 lists and describes the output options for HCS08 disassembler.

Table 3.5 Tool Settings - Disassembler > Output Options

Option	Description
Print full listing	Prints a listing with the header information of the object file.
Write disassembly listing with source code	Check to enable the decoder decoding Freescale object files write the source code within the disassembly listing. This option setting is default for the Freescale object files as input.
Decode DWARF section	Check to write the DWARF section information in the listing file. Decoding from the DWARF section inserts this information in the listing file. See the following listings for more information.
Configure which parts of DWARF in formation to decode	Check to configure parts of DWARF in formation to decode.
Decode ELF sections	Check to ensure that the ELF section information is also written to the listing file. Decoding from the ELF section inserts the following information in the listing file.

Table 3.5 Tool Settings - Disassembler > Output Options (*continued*)

Option	Description
Dump ELF sections	Check to generate a HEX dump of all ELF sections.
Dump ELF sections in LST file	Check to generate a HEX dump of all ELF sections in a LST file.
Produce inline assembly file	Check to ensure that the output listing is an inline assembly file without additional information, but in C comments.
No symbols in disassembled listing	Check to prevent symbols from printing in the disassembled listing.
Shows the cycle count for each instruction	Check to ensure that each instruction line contains the count of cycles in '[',']' braces. The cycle count is written before the mnemonics of the instruction. Note that the cycle count display is not supported for all architectures.
Write disassembly listing only	Check to ensure that the Decoder decoding Freescale object files writes the source code within the disassembly listing only.
Write disassembly listing with source and all comments	Check to write the origin source and its comments within the disassembly listing.

Linker

Use this panel to specify the command, options, and expert settings for the build tool linker. Additionally, the Linker tree control includes the general, libraries, and search path settings.

Figure 3.7 shows the **Linker** settings.

Figure 3.7 Tool Settings - Linker

Table 3.6 lists and describes the linker options for HCS08.

Table 3.6 Tool Settings - Linker Options

Option	Description
Command	Shows the location of the linker executable file. Default value is `"${HC08Tools}/linker.exe"`
All options	Shows the actual command line the linker will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} ${OUTPUT_FLAG}${OUTPUT_PREFIX}${OUTPUT} -add( ${INPUTS} )`

Linker > Input

Use this panel to specify the parameter file path, startup function, object file search paths, and any additional libraries that the **C/C++ Linker** should use. You can specify multiple additional libraries and library search paths. Also, you can change the order in which the IDE uses or searches the libraries.

The IDE first looks for an include file in the current directory, or the directory that you specify in the `INCLUDE` directive. If the IDE does not find the file, it continues searching the paths shown in this panel. The IDE keeps searching paths until it finds the `#include` file or finishes searching the last path at the bottom of the **Include File Search Paths** list. The IDE appends to each path the string that you specify in the `INCLUDE` directive.

NOTE The IDE displays an error message if a header file is in a different directory from the referencing source file. Sometimes, the IDE also displays an error message if a header file is in the same directory as the referencing source file.

For example, if you see the message `Could not open source file myfile.h`, you must add the path for `myfile.h` to this panel.

Figure 3.8 shows the **Input** panel.

Figure 3.8 Tool Settings - Linker > Input

Table 3.7 lists and describes the linker input options for HCS08.

Table 3.7 Tool Settings - Linker > Input Options

Option	Description
Parameter File	Shows the path of the parameter file. Default value is `${ProjDirPath}/Project_Settings/Linker_Files/Project.prm`.
Specify startup function (-E)	Specify the path of command-line tool to preprocess source files.
Search paths (-L)	Shows the list of all search paths; the ELF part of the linker searches object files first in all paths and then the usual environment variables are considered.
Libraries	Lists paths to additional libraries that the C/C++ linker uses. Default value is `"${MCUToolsBaseDir}/lib/hc08c/lib/ansiis.lib"`

Table 3.8 lists and describes the toolbar buttons that help work with the libraries and the additional object file search paths.

Table 3.8 Search Paths Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add directory path** dialog box (Figure 3.9) and specify the object file search path.
	**Delete** — Click to delete the selected object file search path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit directory path** dialog box (Figure 3.10) and update the selected object file search path.

Table 3.8 Search Paths Toolbar Buttons (*continued*)

Button	Description
	**Move up —** Click to move the selected object file search path one position higher in the list.
	**Move down —** Click to move the selected object file search path one position lower in the list.

Figure 3.9 shows the **Add directory path** dialog box.

Figure 3.9 Add directory path Dialog Box

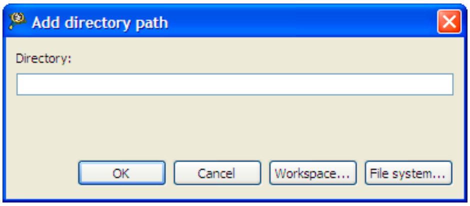
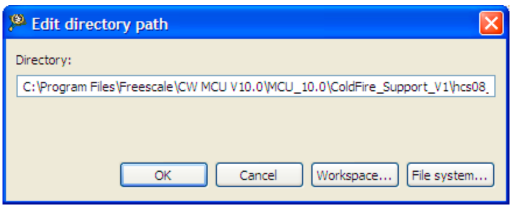


Figure 3.10 shows the **Edit directory path** dialog box.

Figure 3.10 Edit directory path Dialog Box



The buttons in the **Add directory path and Edit directory path** dialog boxes help work with the object file search paths.

- **OK —** Click to confirm the action and exit the dialog box.
- **Cancel —** Click to cancel the action and exit the dialog box.
- **Workspace —** Click to display the **Folder Selection** dialog box and specify the object file search path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system —** Click to display the **Browse for Folder** dialog box and specify the object file search path. The resulting path appears in the appropriate list.

Table 3.9 lists and describes the toolbar buttons that help work with the libraries and the additional object files.

Table 3.9 Libraries Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add file path** dialog box (Figure 3.11) and specify location of the library you want to add.
	**Delete** — Click to delete the selected library path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit file path** dialog box (Figure 3.12) and update the selected path.
	**Move up** — Click to move the selected path one position higher in the list.
	**Move down** — Click to move the selected path one position lower in the list.

Figure 3.11 shows the **Add file path** dialog box.

Figure 3.11 Tool Settings - Linker > Libraries - Add file path Dialog Box

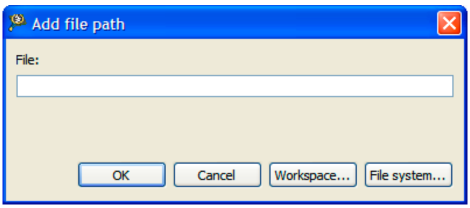
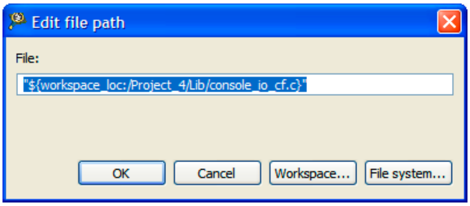


Figure 3.12 shows the **Edit file path** dialog box.

Figure 3.12 Tool Settings - Linker > Libraries - Edit file path Dialog Box



The buttons in the **Add file path and Edit file path** dialog boxes help work with the file paths.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel** — Click to cancel the action and exit the dialog box.
- **Workspace** — Click to display the **File Selection** dialog box and specify the file path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system** — Click to display the **Open** dialog box and specify the file path. The resulting absolute path appears in the appropriate list.

Linker > Optimization

Use this panel to control linker optimizations. The linker's optimizer can apply any of its optimizations in either global or non-global optimization mode. You can apply global optimization at the end of the development cycle, after compiling and optimizing all source files individually or in groups.

Figure 3.13 shows the **Optimization** panel.

Figure 3.13 Tool Settings - Linker > Optimization

Table 3.10 lists and describes the linker optimization options for HCS08.

Table 3.10 Tool Settings - Linker > Optimization Options

Option	Description
Allocation over segment boundaries (-Alloc)	The linker supports to allocate objects from one ELF section into different segments. The allocation strategy controls where space for the next object is allocated as soon as the first segment is full. In the AllocNext strategy, the linker always takes the next segment as soon as the current segment is full. Holes generated during this process are not used later. With this strategy, the allocation order corresponds to the definition order in the object files. Objects defined first in a source file are allocated before later defined objects. In the AllocFirst strategy, the linker checks for every object, if there is a previously only partially used segment, into which the current object does fit. This strategy does not maintain the definition order. In the AllocChange strategy, the linker checks as soon as a object does no longer fit into the current segment, if there is a previously only partially used segment, into which the current object does fit. This strategy does not maintain the definition order, but it does however use fewer different ranges than the AllocFirst case.
Overlap constants in ROM (-COCC)	Defines the default if constants and code should be optimized; commands `DO_OVERLAP_CONSTS` and `DO_NOT_OVERLAP_CONSTS` take precedence over the option.
Optimize copy down (-OCopy)	Changes the copy down structure to use few spaces. The optimization does assume that the application does perform both the zero out and the copy down step of the global initialization. If a value is set to zero by the zero out, then zero values are removed from the copy down information. The resulting initialization is not changed by this optimization if the default startup code is used.

Linker > Output

Use this panel to control how the linker formats the listing file, as well as error and warning messages. Figure 3.14 shows the **Output** panel.

Figure 3.14 Tool Settings - Linker > Output

Table 3.11 lists and describes the linker output options for HCS08.

Table 3.11 Tool Settings - Linker > Output Options

Option	Description
Link as ROM library (-AsROMlib)	Check to link the application as a ROM library. This option has the same effect as specifying AS ROM_LIB in the linker parameter file.
Generate S_record file (-B)	Check to specify that in addition to an absolute file, also an srecord file should be generated. The name of the srecord file is the same as the name of the abs file, except that the extension "SX" is used. The default.env variable "SRECORD" may specify an alternative extension.
Check if objects overlap in the absolute file (even if different address spaces) (-CheckAcrossAddrSpace)	Check to instruct the linker to check if objects overlap, taking into account their address space.
Generate map file (-M)	Check to scan source files for dependencies and emit a Makefile, without generating object code.

Table 3.11 Tool Settings - Linker > Output Options (*continued*)

Option	Description
Strip symbolic information (-S)	Check to disable the generation of DWARF sections in the absolute file to save memory space.
Generate fixups in abs file (-SFixups)	Check to ensure compatibility with previous linker versions. Usually, absolute files do not contain any fixups because all fixups are evaluated at link time. But with fixups, the decoder might symbolically decode the content in absolute files. Some debuggers do not load absolute files which contain fixups because they assume that these fixups are not yet evaluated. But the fixups inserted with this option are actually already handled by this linker.
Specify statistic file (e.g. statistic.txt) (-StatF)	Specify the name of the linker statistic file. The statistic file reports each allocated object and its attributes. Every attribute is separated by a tab character, so it can be easily imported into a spreadsheet/database program for further processing.

Linker > General

Use this panel to specify the general linker behavior.

Figure 3.15 shows the **General** panel.

Figure 3.15 Tool Settings - Linker > General

Table 3.12 lists and describes the **general linker options for HCS08**.

Table 3.12 Tool Settings - Linker > General Options

Option	Description
Other flags	Specify additional command line options for the linker; type in custom flags that are not otherwise available in the UI. Default value is: `-WmsgSd1100 -WmsgSd1912`

Burner

Use the Burner for HCS08 Preference Panel to map *.bbl (batch burner language) files to the Burner Plug-In. When the project folder contains a *.bbl file, *.bbl file processing during the post-link phase uses the settings in the Burner preference panel.

Figure 3.16 shows the HCS08 Burner settings.

Figure 3.16 Tool Settings > Burner

Table 3.15 lists and describes the burner options for HCS08.

Table 3.13 Tool Settings - Burner Options

Option	Description
Command	Shows the location of the linker executable file. Default value is: `"${HC08Tools}/burner"`
All options	Shows the actual command line the burner will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} ${INPUTS}`.

Burner > General

Use this panel to specify other flags for the HCS08 Burner to use.

Figure 3.17 shows the **General** panel.

Figure 3.17 Tool Settings - Burner > General

Table 3.14 lists and describes the general options for HCS08 burner.

Table 3.14 Tool Settings - Burner > General Options

Option	Description
Other flags	Specify additional command line options for the burner; type in custom flags that are not otherwise available in the UI.

HCS08 Compiler

Use this panel to specify the command, options, and expert settings for the build tool compiler. Additionally, the HCS08 Compiler tree control includes the general, include file search path settings.

Figure 3.18 shows the HCS08 Compiler settings.

Figure 3.18 Tool Settings - HCS08 Compiler

Table 3.15 lists and describes the compiler options for HCS08.

Table 3.15 Tool Settings - Compiler Options

Option	Description
Command	Shows the location of the linker executable file. Default value is: `"${HC08Tools}/chc08.exe"`
All options	Shows the actual command line the compiler will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS}${OUTPUT_FLAG}${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`.

HCS08 Compiler > Preprocessor

Use this panel to specify preprocessor behavior. You can specify the file paths and define macros. Figure 3.19 shows the **Preprocessor** panel.

Figure 3.19 Tool Settings - HCS08 Compiler > Preprocessor

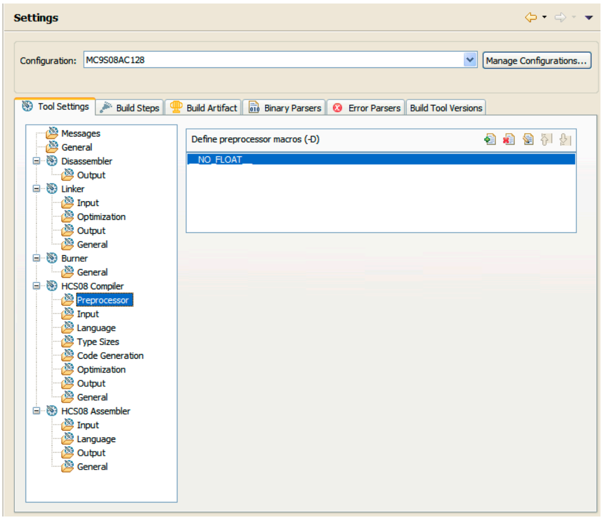


Table 3.16 lists and describes the preprocessor options for HCS08 Compiler.

Table 3.16 Tool Settings - HCS08 Compiler > Preprocessor Option

Option	Description
Define preprocessor macros (-D)	Define, delete, or rearrange preprocessor macros. You can specify multiple macros and change the order in which the IDE uses the macros. Define preprocessor macros and optionally assign their values. This setting is equivalent to specifying the `-D` *`name`*`[=`*`value`*`]` command-line option. To assign a value, use the equal sign (=) with no white space. For example, this syntax defines a preprocessor value named `EXTENDED_FEATURE` and assigns `ON` as its value: `EXTENDED_FEATURE=ON` Note: If you do not assign a value to the macro, the shell assigns a default value of 1.

Table 3.17 lists and describes the toolbar buttons that help work with preprocessor macro definitions.

Table 3.17 Define Preprocessor Macros Toolbar Buttons

Button	Description
	**Add —** Click to open the **Enter Value** dialog box (Figure 3.20) and specify the path/macro.
	**Delete —** Click to delete the selected path/macro. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit —** Click to open the **Edit Dialog** dialog box (Figure 3.21) and update the selected path/macro.

Table 3.17 Define Preprocessor Macros Toolbar Buttons (*continued*)

Button	Description
	**Move up** — Click to move the selected path/macro one position higher in the list.
	**Move down** — Click to move the selected path/macro one position lower in the list.

Figure 3.11 shows the **Enter Value** dialog box.

Figure 3.20 Tool Settings - HCS08 Compiler > Preprocessor - Enter Value Dialog Box

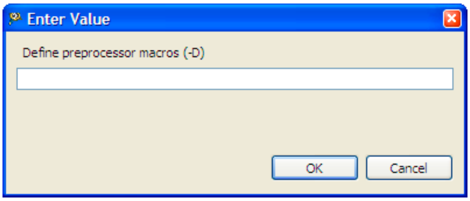
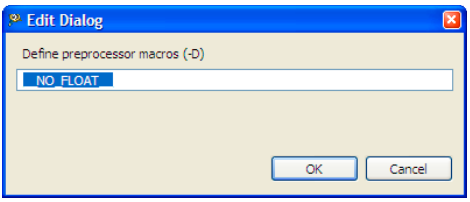


Figure 3.12 shows the **Edit Dialog** dialog box.

Figure 3.21 Tool Settings - HCS08 Compiler > Preprocessor - Edit Dialog Dialog Box



The buttons in the **Enter Value and Edit** dialog boxes help work with the preprocessor macros.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel** — Click to cancel the action and exit the dialog box.

HCS08 Compiler > Input

Use this panel to specify file search paths and any additional include files the **HCS08 Compiler** should use. You can specify multiple search paths and the order in which you want to perform the search.

The IDE first looks for an include file in the current directory, or the directory that you specify in the `INCLUDE` directive. If the IDE does not find the file, it continues searching the paths shown in this panel. The IDE keeps searching paths until it finds the `#include` file or finishes searching the last path at the bottom of the Include File Search Paths list. The IDE appends to each path the string that you specify in the `INCLUDE` directive.

NOTE The IDE displays an error message if a header file is in a different directory from the referencing source file. Sometimes, the IDE also displays an error message if a header file is in the same directory as the referencing source file.

For example, if you see the message `Could not open source file myfile.h`, you must add the path for `myfile.h` to this panel.

Figure 3.22 shows the **Input** panel.

Figure 3.22 Tool Settings - HCS08 Compiler > Input

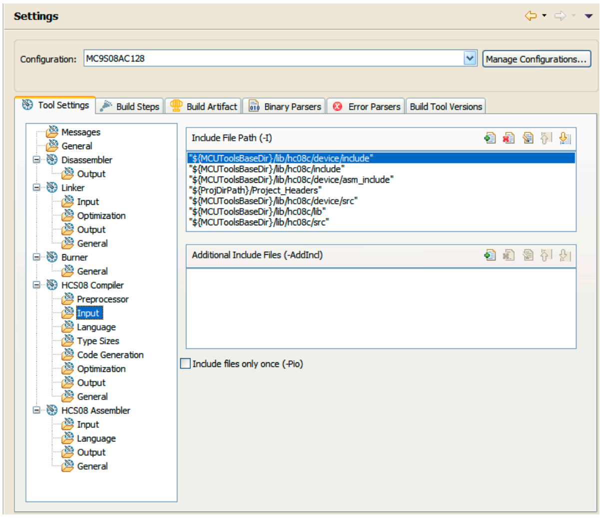


Table 3.18 lists and describes the input options for HCS08 Compiler.

Table 3.18 Tool Settings - HCS08 Compiler > Input Options

Option	Description
Include File Path (-I)	Specify, delete, or rearrange file search paths.
Additional Include Files (-AddInd)	Specify, delete, or rearrange paths to search any additional #include files.
Include files only once (-Pio)	Check to include every header file only once; duplicates are ignored.

Table 3.19 lists and describes the toolbar buttons that help work with the file paths.

Table 3.19 Include File Path (-I) Toolbar Buttons

Button	Description
	**Add —** Click to open the **Add directory path** dialog box (Figure 3.9) and specify location of the library you want to add.
	**Delete —** Click to delete the selected library path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit —** Click to open the **Edit directory path** dialog box (Figure 3.10) and update the selected path.
	**Move up —** Click to move the selected path one position higher in the list.
	**Move down —** Click to move the selected path one position lower in the list.

Table 3.20 lists and describes the toolbar buttons that help work with the search paths.

Table 3.20 Additional Include Files (-AddIncl) Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add directory path** dialog box (Figure 3.23) and specify location of the library you want to add.
	**Delete** — Click to delete the selected library path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit directory path** dialog box (Figure 3.24) and update the selected path.
	**Move up** — Click to move the selected path one position higher in the list.
	**Move down** — Click to move the selected path one position lower in the list.

Figure 3.23 Tool Settings - HCS08 Compiler > Input - Add file path Dialog Box

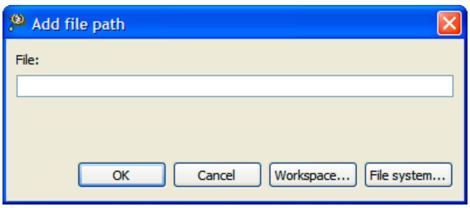
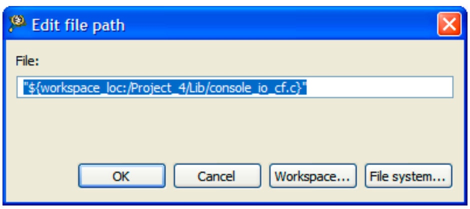


Figure 3.24 Tool Settings - HCS08 Compiler > Input - Edit file path Dialog Box



The buttons in the **Add file path** (Figure 3.23) **and Edit file path** (Figure 3.24) dialog boxes help work with the paths.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel —** Click to cancel the action and exit the dialog box.
- **Workspace —** Click to display the **File Selection** dialog box and specify the path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system —** Click to display the **Open** dialog box and specify the path. The resulting path appears in the appropriate list.

HCS08 Compiler > Language

Use this panel to specify code- and symbol-generation options for the HCS08 Compiler.

Figure 3.25 shows the **Language** panel.

Figure 3.25 Tool Settings - HCS08 Compiler > Language

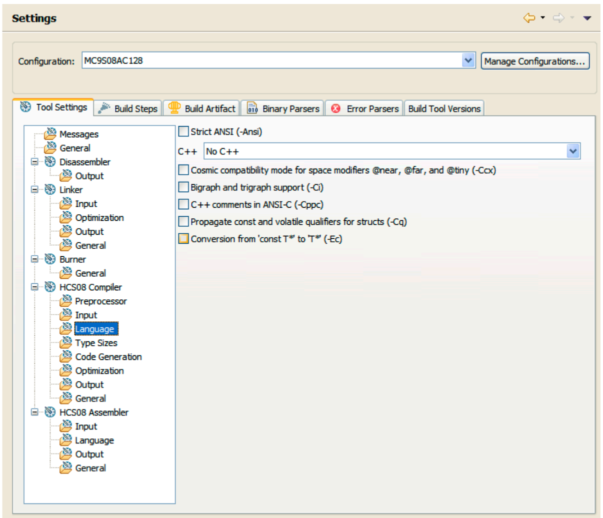


Table 3.21 lists and describes the language options for HCS08.

Table 3.21 Tool Settings - HCS08 Compiler > Language Options

Option	Description
Strict ANSI	Check if you want the C compiler to operate in strict ANSI mode. In this mode, the compiler strictly applies the rules of the ANSI/ISO specification to all input files. This setting is equivalent to specifying the `-ansi` command-line option. The compiler issues a warning for each ANSI/ISO extension it finds.
C++	With this option enabled, the Compiler behaves as a C++ Compiler. You can select between three different types of C++: • **Full C++ (-C++f) —** Supports the whole C++ language. • **Embedded C++ (-C++e)** — Supports a constant subset of the C++ language. EC++ does not support inefficient things like templates, multiple inheritance, virtual base classes and exception handling. • **CompactC++ (-C++c) —** Supports a configurable subset of the C++ language. You can configure this subset with the option -Cn. • **No C++** — If the option is not set, the Compiler behaves as an ANSI-C Compiler. If the option is enabled and the source file name extension is *.c, the Compiler behaves as a C++ Compiler. If the option is not set, but the source filename extension is .cpp or .cxx, the Compiler behaves as if the -C++f option were set.

Table 3.21 Tool Settings - HCS08 Compiler > Language Options (*continued*)

Option	Description
Cosmic compatibility mode for space modifiers @near, @far, and @tiny (-Ccx)	Check to allow Cosmic style @near, @far and @tiny space modifiers as well as @interrupt in your C code. The -ANSI option must be switched off. It is not necessary to remove the Cosmic space modifiers from your application code. There is no need to place the objects to sections addressable by the Cosmic space modifiers. The following is done when a Cosmic modifier is parsed: The objects declared with the space modifier are always allocated in a special Cosmic compatibility (_CX) section (regardless of which section pragma is set) depending on the space modifier, on the const qualifier or if it is a function or a variable. Space modifiers on the left hand side of a pointer declaration specify the pointer type and pointer size, depending on the target.
Bigraph and trigraph support (-Ci)	Check to replace certain unavailable tokens with the equivalent keywords.
C++ comments in ANSI-C (-Cppc)	Check to allow C++ comments.
Propagate const and colatile qualifiers for structs (-Cq)	Check to propagate const and volatile qualifiers for structures. If all members of a structure are constant or volatile, the structure itself is constant or volatile. If the structure is declared as constant or volatile, all its members are constant or volatile, respectively.
Conversion from ‘const T*’ to ‘T*’ (-Ec)	Check to enable this non-ANSI compliant extension allows the compiler to treat a pointer to a constant type like a pointer to the non-constant equivalent of the type. Earlier Compilers did not check a store to a constant object through a pointer. This option is useful when compiling older source code.

HCS08 Compiler > Type Sizes

Use this panel to specify the available data type size options for the HCS08 Compiler.

Figure 3.25 shows the **Type Sizes** panel.

Figure 3.26 Tool Settings - HCS08 Compiler > Type Sizes

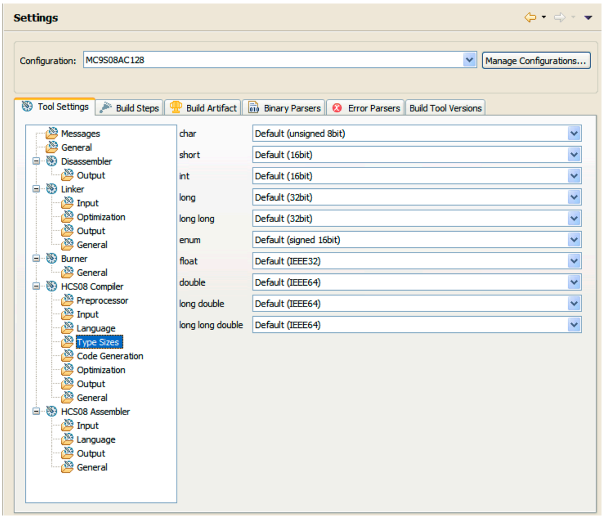


Table 3.22 lists and describes the possible type size options for HCS08 Compiler using the `-T` option.

Table 3.22 Tool Settings - HCS08 Compiler > Type Sizes

Option	Description
char	Selects the size of the `char` type. Options are: • Default (unsigned 8bit) • unsigned 8bit (`-TuCC1`) • signed 8bit (`-TsCC1`) • signed 16bit (`-TsCC2`) • signed 32bit (`-TsCC4`)
short	Selects the size of the `short` type. Options are: • Default (16bit) • signed 8bit (`-TS1`) • signed 16bit (`-TS2`) • signed 32bit (`-TS4`)
int	Selects the size of the `int` type. Options are: • Default (16bit) • signed 8bit (`-TI1`) • signed 16bit (`-TI2`) • signed 32bit (`-TI4`)
long	Selects the size of the `long` type. Options are: • Default (32bit) • signed 8bit (`-TL1`) • signed 16bit (`-TL2`) • signed 32bit (`-TL4`)
long long	Selects the size of the `long long` type. Options are: • Default (32bit) • signed 8bit (`-TLL1`) • signed 16bit (`-TLL2`) • signed 32bit (`-TLL4`)

Table 3.22 Tool Settings - HCS08 Compiler > Type Sizes (*continued*)

Option	Description
enum	Selects the size of the `enum` type. Options are: • Default (signed 16bit) • signed 8bit (`-TE1sE`) • signed 16bit (`-TE2sE`) • signed 32bit (`-TE4sE`) • unsigned 8bit (`-TE1uE`)
float	Selects the size of the `float` type. Options are: • Default (IEEE32) • IEEE32 • IEEE64
double	Selects the size of the `double` type. Options are: • Default (IEEE64) • IEEE32 • IEEE64
long double	Selects the size of the `long double` type. Options are: • Default (IEEE64) • IEEE32 • IEEE64
long long double	Selects the size of the `long long double` type. Options are: • Default (IEEE64) • IEEE32 • IEEE64

HCS08 Compiler > Code Generation

Use this panel to specify code- and symbol-generation options for the HCS08 Compiler

Figure 3.27 shows the **Code Generation** panel.

Figure 3.27 Tool Settings - HCS08 Compiler > Code Generation

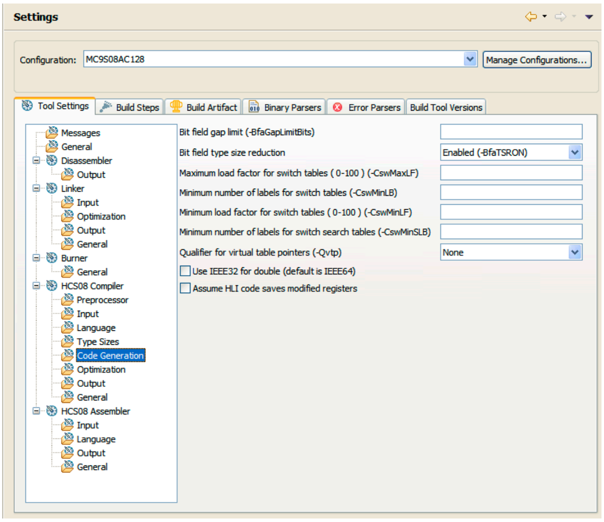


Table 3.23 lists and describes the code generation options for HCS08 compiler.

Table 3.23 Tool Settings - HCS08 Compiler > Code Generation Options

Option	Description
Bit field gap limits (-BfaGapLimitBits)	Check to affect the maximum allowable number of gap bits. The bitfield allocation tries to avoid crossing a byte boundary whenever possible. To optimize accesses, the compiler may insert some padding or gap bits.
Bit field type size reduction	This option is configurable whether or not the compiler uses type-size reduction for bitfields. Type-size reduction means that the compiler can reduce the type of an int bitfield to a char bitfield if it fits into a character. This allows the compiler to allocate memory only for one byte instead of for an integer. Options are: • **Enabled** (-BfaTSRON) • **Disabled** (-BfaTSROFF)

Table 3.23 Tool Settings - HCS08 Compiler > Code Generation Options (*continued*)

Option	Description
Maximum load factor for switch tables (-100) (-CswMaxLF)	Allows changing the default strategy of the Compiler to use tables for switch statements; is only available if the compiler supports switch tables.
Minimum number of labels for switch tables (-CswMinLB)	Allows changing the default strategy of the Compiler using tables for switch statements; is only available if the compiler supports switch tables.
Minimum load factor for switch tables (100) (-CswMinLF)	Allows the Compiler to use tables for switch statements; is only available if the compiler supports switch tables.
Qualifier for virtual table pointers (-Qvtp)	Using a virtual function in C++ requires an additional pointer to virtual function tables. The Compiler cannot access the pointer and generates the pointer in every class object when virtual function tables are associated. Options are: • None • Near • Far
Use IEEE32 for double (default is IEEE64)	Check to use doubles that are in IEEE32 instead of IEEE64 (default).
Assume HLI code saves modified registers	With this option set, the compiler assumes that registers touched in HLI are saved or restored in the HLI code as well. If this option is not set, the compiler saves or restores the H, X, and A registers.

HCS08 Compiler > Optimization

Use this panel to control compiler optimizations. The compiler's optimizer can apply any of its optimizations in either global or non-global optimization mode. You can apply global optimization at the end of the development cycle, after compiling and optimizing all source files individually or in groups.

Figure 3.28 shows the **Optimization** panel.

Figure 3.28 Tool Settings - HCS08 Compiler > Optimization

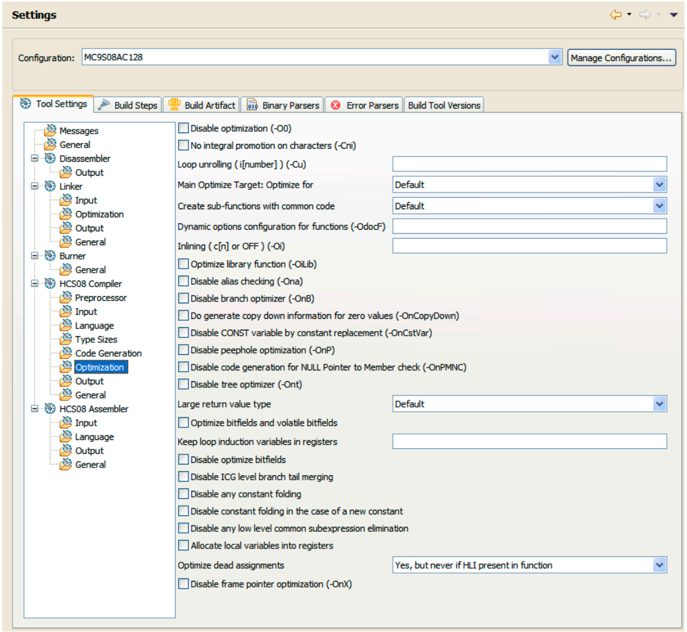


Table 3.24 lists and describes the optimization options for HCS08 compiler.

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options

Option	Description
Disable optimization (-O0)	Disables all optimizations.
No integral promotion on characters (-Cni)	Enhances character operation code density by omitting integral promotion. This option enables behavior that is not ANSI-C compliant. Code generated with this option set does not conform to ANSI standards. Code compiled with this option is not portable. Using this option is not recommended in most cases.

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options (*continued*)

Option	Description
Loop unrolling (i[number]) (-Cu)	Enables loop unrolling with the following restrictions: • Only simple for statements are unrolled, e.g., for (i=0; i<10; i++) • Initialization and test of the loop counter must be done with a constant. • Only <, >, <=, >= are permitted in a condition. • Only ++ or -- are allowed for the loop variable increment or decrement. • The loop counter must be integral. • No change of the loop counter is allowed within the loop. • The loop counter must not be used on the left side of an assignment. • No address operator (&) is allowed on the loop counter within the loop. • Only small loops are unrolled: Loops with few statements within the loop. Loops with fewer than 16 increments or decrements of the loop counter. The bound may be changed with the optional argument = i<number>. The -Cu=i20 option unrolls loops with a maximum of 20 iterations.

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options (*continued*)

Option	Description
Main Optimize Target: Optimize for	There are various points where the Compiler has to select between two possibilities: it can either generate fast, but large code, or small but slower code. The Compiler generally optimizes on code size. It often has to decide between a runtime routine or an expanded code. The programmer can decide whether to select between the slower and shorter or the faster and longer code sequence by setting a command line switch. • The **Code Size (-Os)** option directs the Compiler to optimize the code for smaller code size. The Compiler trades faster-larger code for slower-smaller code. • The **Execution Time (-Ot)** option directs the Compiler to optimize the code for faster execution time. The Compiler replaces slower/ smaller code with faster/larger code. This option only affects some special code sequences. This option has to be set together with other optimization options (e.g., register optimization) to get best results.
Create sub-functions with common code	Performs the reverse of inlining. It detects common code parts in the generated code. The Compiler moves the common code to a different place and replaces all occurrences with a JSR to the moved code. At the end of the common code, the Compiler inserts an RTS instruction. The Compiler increases all SP uses by an address size. This optimization takes care of stack allocation, control flow, and of functions having arguments on the stack. Inline assembler code is never treated as common code. Options are: • **Default** • **Disable (-Onf)** • **Off (-Of)**

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options (*continued*)

Option	Description
Dynamic options configuration for functions (-OdocF)	Allows the Compiler to select from a set of options to reach the smallest code size for every function. Without this feature, you must set fixed Compiler switches over the whole compilation unit. With this feature, the Compiler finds the best option combination from a user-defined set for every function.
Inlining (C[n] or OFF) (-Oi)	Enables inline expansion. If there is a #pragma INLINE before a function definition, all calls of this function are replaced by the code of this function, if possible. Using the -Oi=c0 option switches off inlining. Functions marked with the #pragma INLINE are still inlined. To disable inlining, use the -Oi=OFF option.
Optimize library function (-OiLib)	Enables the compiler to optimize specific known library functions to reduce execution time. The Compiler frequently uses small functions such as strcpy(), strcmp(), and so forth.
Disable alias checking (-Ona)	Prevents the Compiler from redefining these variables, which lets you reuse already-loaded variables or equivalent constants. Use this option only when you are sure no real writes of aliases to a variable memory location will occur.
Disable branch optimizer (-OnB)	Disables all branch optimizations.
Do generate copy down information for zero values (-OnCopyDown)	Using this option, the compiler does not generate a copy down for i. The initialization with zero optimization shown for the arr array only works in the HIWARE format. The ELF format requires initializing the whole array to zero.
Disable CONST variable by constant replacement (-OnCstVar)	Lets you switch OFF the replacement of CONST variable by the constant value.

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options (*continued*)

Option	Description
Disable peephole optimization (-OnP)	Disables the whole peephole optimizer. To disable only a single peephole optimization, use the optional syntax -OnP=<char>.
Disable code generation for NULL Pointer to Member check (-OnPMNC)	Before assigning a pointer to a member in C++, you must ensure that the pointer to the member is not NULL in order to generate correct and safe code. In embedded systems development, the difficulty becomes generating the denser code while avoiding overhead whenever possible (this NULL check code is a good example). This option enables you to switch off the code generation for the NULL check.
Disable tree optimizer (-Ont)	Disables the tree optimizer. Use this option for debugging and to force the Compiler to produce 'straightforward' code. Note that the optimizations below are just examples for the classes of optimizations.
Large return value type	Compiler supports this option even though returning a 'large' return value may be not as efficient as using an additional pointer. The Compiler introduces an additional parameter for the return value if the return value cannot be passed in registers. Options are: • **Default** • **Large return value pointer, always with temporary (-Rpt)** • **Large return value pointer and temporary elimination (-Rpe)**
Optimize bitfields and volatile bitfields	Use this option to optimize bitfields and volatile bitfields. The compiler changes the access order or combines many accesses into one, even if the bitfields are declared as volatile.

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options (*continued*)

Option	Description
Keep loop induction variables in registers	Limits the number of loop induction variables the Compiler keeps in registers. Specify any number down to zero (no loop induction variables). The compiler reads and writes loop induction variables within the loop (e.g., loop counter), and attempts to keep the variables in registers to reduce execution time and code size. The Compiler takes the optimal number (code density) when this option is not specified. Specifying a high number of loop induction variables may increase code size, particularly for spill and merge code.
Disable optimize bitfields	Prevents the Compiler from combining sequences of bitfield assignments containing constants. This simplifies debugging and makes the code more readable.
Disable ICG level branch tail merging	Switches the ICG level branch tail merging off. This simplifies debugging and produces more readable code.
Disable any constant folding	Prevents the Compiler from folding constants over statement boundaries. All arithmetical operations are coded. This option must be set when using the library functions setjmp() and longjmp(), or the Compiler makes wrong assumptions.
Disable any constant folding in the case of a new constant	Prevents the Compiler from folding constants when the resulting constant is new. The option affects only those processors where constants are difficult to load (e.g., RISC processors). On other processors this option makes no change.

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options (*continued*)

Option	Description
Disable any low level common subexpression elimination	Prevents the Compiler from reusing common subexpressions, such as array indexes and array base addresses. The code size may increase. The low-level CSE does not have the alias problems of the frontend CSE and is therefore switched on by default. The two CSE optimizations do not cover the same cases. The low-level CSE has a finer granularity but does not handle all cases of the frontend CSE. Use this option only to generate more readable code for debugging.
Allocate local variables into registers	Allocates local variables (char or int) in registers. The number of local variables allocated in registers depends on the number of available registers. Use this option when using variables as loop counters or switch selectors or when the processor requires register operands for multiple operations (e.g., RISC processors). Compiling with this option may increase your code size (spill and merge code). This optimization may increase code complexity when using High-Level Languages, making debugging more difficult.

Table 3.24 Tool Settings - HCS08 Compiler > Optimization Options (*continued*)

Option	Description
Optimize dead assignments	Optimizes dead assignments. The Compiler removes assignments to unused local variables. There are three possible settings for this option: • **Always, even if HLI present in function**: Always optimize dead assignments (even if HLI is present in current function). The Compiler does not consider inline assembler accesses. **Note**: This option is unsafe when inline assembler code contains accesses to local variables. • **Yes, but never if HLI present in function:** No optimization occurs. This generates the best possible debug information, and produces larger and slower code. • **Never**: Optimize dead assignments if HLI is not present in the current function.
Disable frame pointer optimization (-OnX)	Prevents the Compiler from converting stack pointer-relative accesses into X-relative accesses. The frame optimizer tries to convert all SP-relative accesses (local variables, spills) into shorter and faster X-relative accesses. In addition, the Compiler traces the value of H:X and removes useless TSX and AIX instructions. Using -OnX to switch the frame optimizer off facilitates debugging.

HCS08 Compiler > Output

Use this panel to control how the compiler generates the output file, as well as error and warning messages. You can specify whether to allocate constant objects in ROM, generate debugging information, and strip file path information.

Figure 3.29 shows the **Output** panel.

Figure 3.29 Tool Settings - HCS08 Compiler > Output

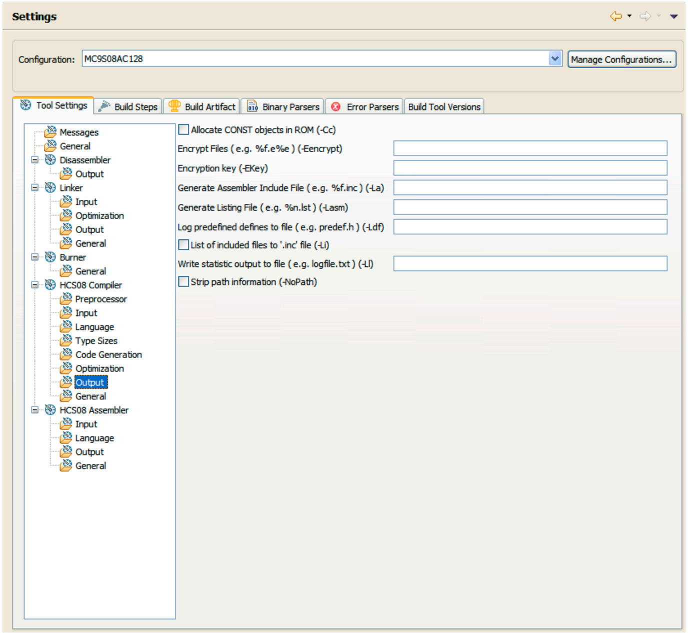


Table 3.25 lists and describes the output options for HCS08 compiler.

Table 3.25 Tool Settings - HCS08 Compiler > Output Options

Option	Description
Allocate CONST objects in ROM (-Cc)	Check if you want the compiler to assign const objects into the ROM_VAR segment, which the Linker parameter file assigns to a ROM section.
Encrypt Files (e.g. %f.e%e) (-Eencrypt)	Encrypts all files passed together with this option, using the given key with the -Ekey: Encryption Key option.
Encryption key (-EKey)	Encrypts files with the given key number (-Eencrypt option).

Table 3.25 Tool Settings - HCS08 Compiler > Output Options (*continued*)

Option	Description
General Assembler Include File (e.g. %f.inc) (-La)	Enables the Compiler to generate an assembler include file when the CREATE_ASM_LISTING pragma occurs. This option specifies the name of the created file. If no name is specified, the compiler takes a default of %f.inc. To put the file into the directory specified by the TEXTPATH: Text File Path environment variable, use the option "-la=%n.inc". The %f option already contains the path of the source file. When %f is used, the compiler puts the generated file in the same directory as the source file. The content of all modifiers refers to the main input file and not to the actual header file. The main input file is the one specified on the command line.
Generate Listing File (e.g. %n.lst) (-Lasm)	Enables the Compiler to generate an assembler listing file directly. The Compiler also prints all assembler-generated instructions to this file. The option specifies the name of the file. If no name is specified, the Compiler takes a default of %n.lst. If the resulting filename contains no path information the Compiler uses the TEXTPATH: Text File Path environment variable. The syntax does not always conform with the inline assembler or the assembler syntax. Therefore, use this option only to review the generated code. It cannot currently be used to generate a file for assembly.
Log predefined defines to file (e.g. predef.h) (-Ldf)	Enables the Compiler to generate a text file that contains a list of the compiler-defined #define. The default filename is predef.h, but may be changed (e.g., -Ldf="myfile.h"). The file is generated in the directory specified by the TEXTPATH: Text File Path environment variable. The defines written to this file depend on the actual Compiler option settings (e.g., type size settings or ANSI compliance).

Table 3.25 Tool Settings - HCS08 Compiler > Output Options (*continued*)

Option	Description
List of included files to '.inc' file (-Li)	Enables the Compiler to generate a text file which contains a list of the #include files specified in the source. This text file shares the same name as the source file but with the extension, *.inc. The Compiler stores the file in the path specified by the TEXTPATH: Text File Path environment variable. The generated file may be used in make files.
Write statistic output to file (e.g. logfile.txt) (-Ll)	Enables the Compiler to append statistical information about the compilation session to the specified file. The information includes Compiler options, code size (in bytes), stack usage (in bytes) and compilation time (in seconds) for each procedure of the compiled file. The Compiler appends the information to the specified filename (or the file make.txt, if no argument given). Set the TEXTPATH: Text File Path environment variable to store the file into the path specified by the environment variable. Otherwise the Compiler stores the file in the current directory.
Strip path information	Check to enable the compiler remove both unreferenced path reference from your program. Enabling this option reduces your program's memory footprint.

HCS08 Compiler > General

Use this panel to specify other flags for the HCS08 Compiler to use.

Figure 3.30 shows the **General** panel.

Figure 3.30 Tool Settings - HCS08 Compiler > General

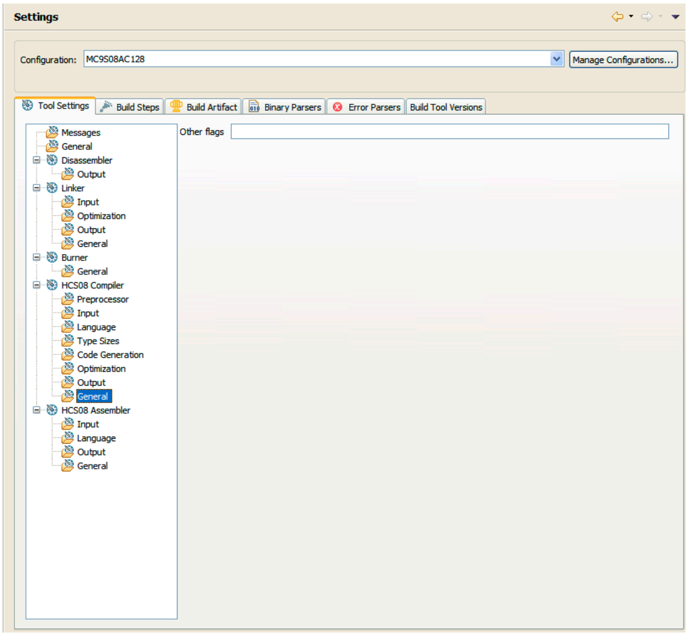


Table 3.26 lists and describes the general options for HCS08 compiler.

Table 3.26 Tool Settings - HCS08 Compiler > General Options

Option	Description
Other flags	Specify additional command line options for the compiler; type in custom flags that are not otherwise available in the UI.

HCS08 Assembler

Use this panel to specify the command, options, and expert settings for the build tool assembler.

Figure 3.31 shows the **Assembler** settings.

Figure 3.31 Tool Settings - Assembler

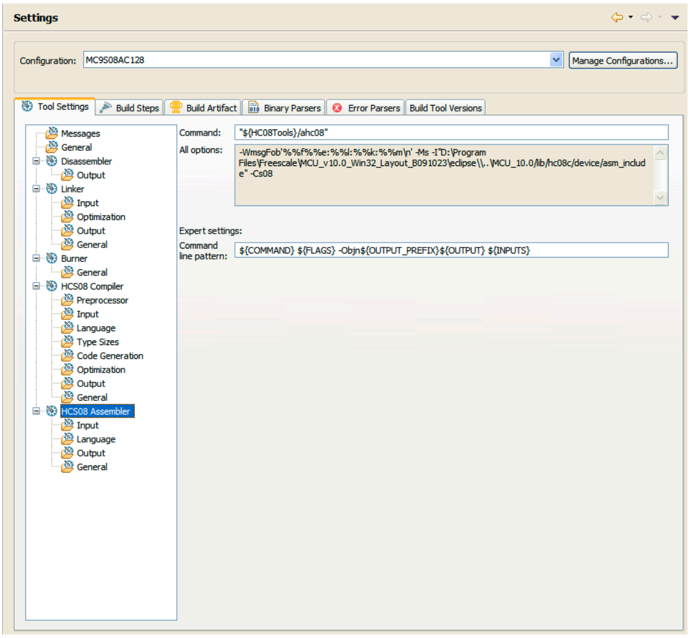


Table 3.27 lists and describes the assembler options for HCS08.

Table 3.27 Tool Settings - Assembler Options

Option	Description
Command	Shows the location of the assembler executable file.
All options	Shows the actual command line the assembler will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS}-Objn${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`.

HCS08 Assembler > Input

Use this panel to specify file search paths and any additional include files the **HCS08 Assembler** should use. You can specify multiple search paths and the order in which you want to perform the search.

Figure 3.22 shows the **Input** panel.

Figure 3.32 Tool Settings - HCS08 Assembler > Input

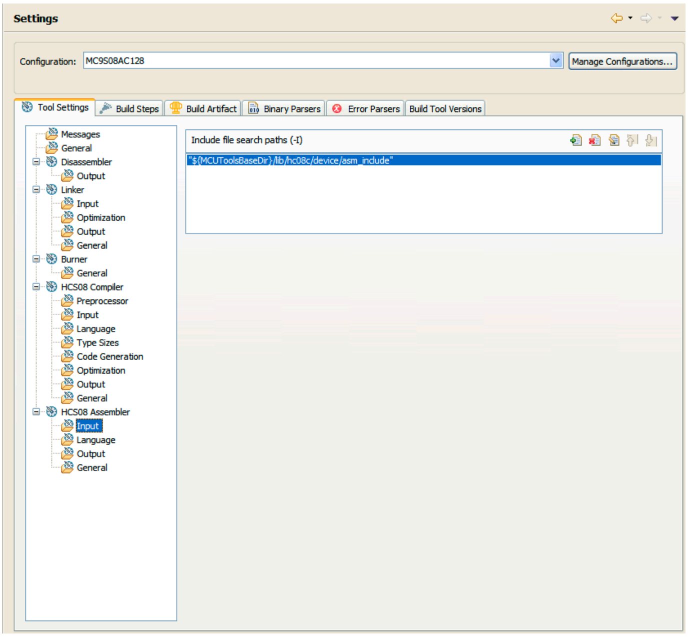


Table 3.28 lists and describes the toolbar buttons that help work with the file search paths.

Table 3.28 Search Paths Toolbar Buttons

Button	Description
	**Add —** Click to open the **Add directory path** dialog box (Figure 3.9) and specify the file search path.
	**Delete —** Click to delete the selected file search path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.

Table 3.28 Search Paths Toolbar Buttons (*continued*)

Button	Description
	**Edit —** Click to open the **Edit directory path** dialog box (Figure 3.10) and update the selected object file search path.
	**Move up —** Click to move the selected file search path one position higher in the list.
	**Move down —** Click to move the selected file search path one position lower in the list.

HCS08 Assembler > Language

Use this panel to specify code- and symbol-generation options for the HCS08 Compiler.

Figure 3.33 shows the **Language** panel.

Figure 3.33 Tool Settings - HCS08 Assembler > Language

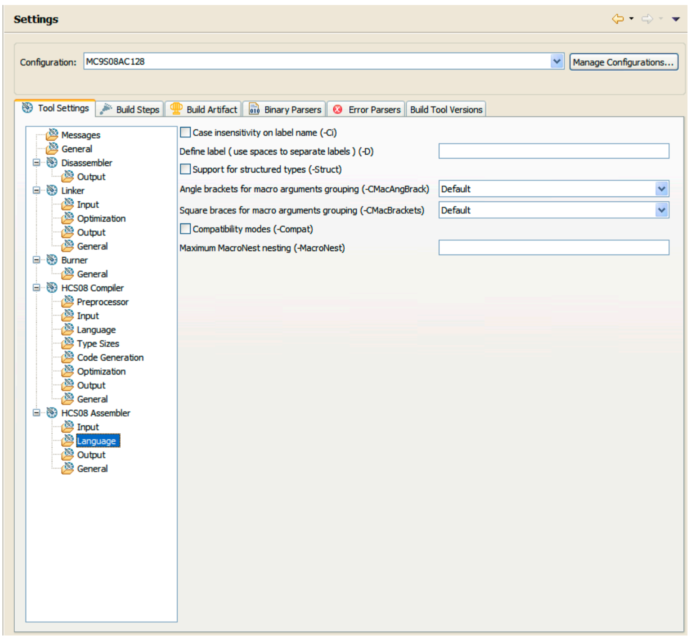


Table 3.29 lists and describes the language options for HCS08 Assembler.

Table 3.29 Tool Settings - HCS08 Assembler > Language Options

Option	Description
Case insensitivity on label name (-Ci)	Turns off case sensitivity on label names. When this option is activated, the Assembler ignores case sensitivity for label names. If the Assembler generates object files but not absolute files directly (-FA2 assembler option), the case of exported or imported labels must still match. Or, the -Ci assembler option should be specified in the linker as well.
Define label (use spaces to separate labels) (-D)	Lets you define labels and assign them values. The labels are used for conditional compilation, where a common source file can be used to generate code for different processor derivatives, based on the labels supplied here.
Support for structured types (-Struct)	Enables the Macro Assembler support the definition and usage of structured types. This is interesting for application containing both ANSI-C and Assembly modules.
Angle brackets for macro arguments grouping (-CMacAngBrack)	Controls whether the < > syntax for macro invocation argument grouping is available. When it is disabled, the Assembler does not recognize the special meaning for < in the macro invocation context. There are cases where the angle brackets are ambiguous. In new code, use the [? ?] syntax instead. Options are: • Allow • Disallow
Square braces for macro arguments grouping (-CMacBrackets)	Controls the availability of the [? ?] syntax for macro invocation argument grouping. When it is disabled, the Assembler does not recognize the special meaning for [? in the macro invocation context. Options are: • Allow • Disallow

Table 3.29 Tool Settings - HCS08 Assembler > Language Options (*continued*)

Option	Description
Compatibitlity modes (-Compat)	Controls some compatibility enhancements of the Assembler. The goal is not to provide 100% compatibility with any other Assembler but to make it possible to reuse as much as possible. The various suboptions control different parts of the assembly.
Maximum MacroNest nesting (-MacroNest)	Controls how deep macros calls can be nested. Its main purpose is to avoid endless recursive macro invocations.

HCS08 Assembler > Output

Use this panel to control how the assembler generates the output file, as well as error and warning messages. You can specify whether to allocate constant objects in ROM, generate debugging information, and strip file path information.

Figure 3.34 shows the **Output** panel.

Figure 3.34 Tool Settings - HCS08 Assembler > Output

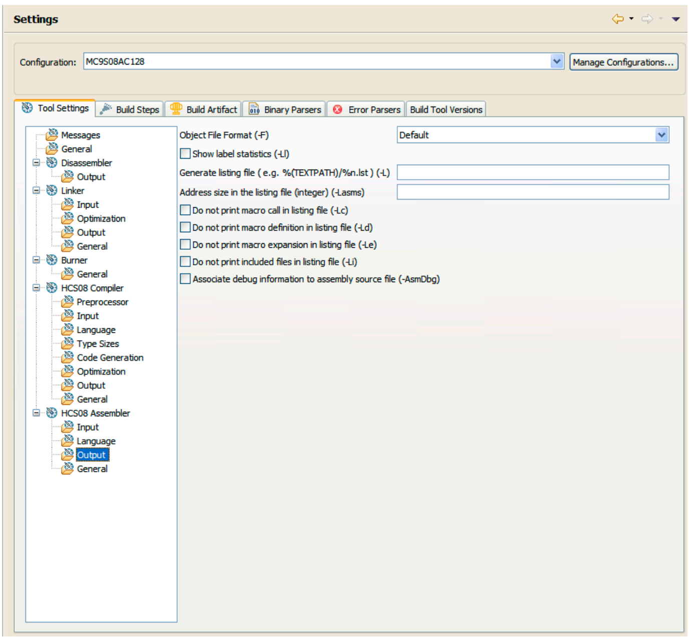


Table 3.30 lists and describes the output options for HCS08 Assembler.

Table 3.30 Tool Settings - HCS08 Assembler > Output Options

Option	Description
Object File Format (-F)	Defines the format for the output file generated by the Assembler.
Show label statistics (-Ll)	Enables the Compiler to append statistical information about the compilation session to the specified file. The information includes Compiler options, code size (in bytes), stack usage (in bytes) and compilation time (in seconds) for each procedure of the compiled file. The Compiler appends the information to the specified filename (or the file make.txt, if no argument given). Set the TEXTPATH: Text File Path environment variable to store the file into the path specified by the environment variable. Otherwise the Compiler stores the file in the current directory.
Generate listing file (for example, %(TEXTPATH)/ %n.lst) (-L)	Specifies the name, %n, of the assembly listing file. The file is placed in the directory specified by %TEXTPATH. If this option is left blank, no listing file is output.
Address size in the listing file (-Lasms)	Specifies the size of the addresses displayed in the listing. Options are: • 1 to display addresses as xx • 2 to display addresses as xxxx • 3 to display addresses as xxxxxx • 4 to display addresses asf xxxxxxxx
Do not print macro call in listing file (-Lc)	Specifies whether macro calls encountered in the source code are expanded and appear in the listing file.
Do not print macro definition in listing file (-Ld)	Instructs the Assembler to generate a listing file but not including any macro definitions. The listing file contains macro invocation and expansion lines as well as expanded include files.
Do not print macro expansion in listing file (-Le)	Switches on the generation of the listing file, but macro expansions are not present in the listing file. The listing file contains macro definition and invocation lines as well as expanded include files.

Table 3.30 Tool Settings - HCS08 Assembler > Output Options (*continued*)

Option	Description
Do not print included files in listing file (-Li)	Switches on the generation of the listing file, but include files are not expanded in the listing file. The listing file contains macro definition, invocation, and expansion lines.
Associate debug information to assembly source file (-AsmDbg)	Enables the Assembler to produce debugging information for the generated files and associate the debug information to the assembly source file.

HCS08 Assembler > General

Use this panel to specify the general assembler behavior.

Figure 3.35 shows the **General** panel.

Figure 3.35 Tool Settings - HCS08 Assembler > General

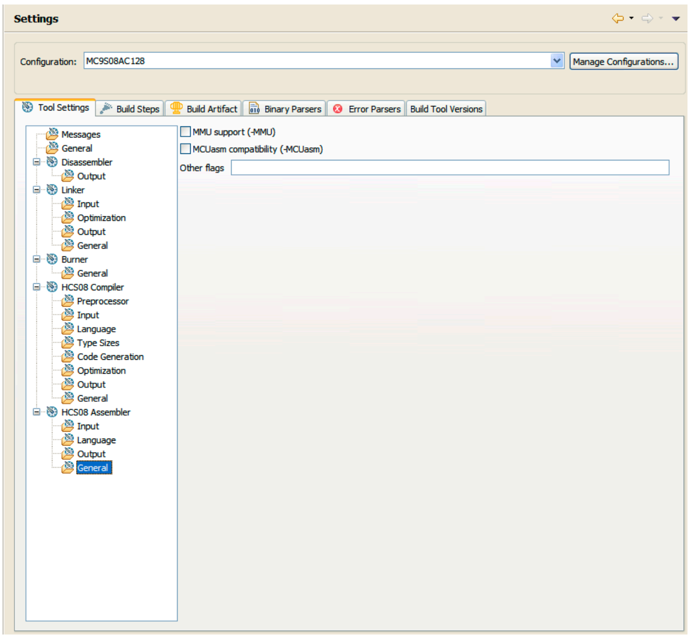


Table 3.31 lists and describes the general assembler options for HCS08.

Table 3.31 Tool Settings - Assembler > General Options

Option	Description
MMU Support (-MMU)	Check to inform the compiler that CALL and RTC instructions are available, enabling code banking, and that the current architecture has extended data access capabilities, enabling support for `__linear` data types. This option can be used only when `-Cs08` is enabled.
MCUasm compatibility (-MCUasm)	Check to activate the compatibility mode with the MCUasm Assembler.
Other Flags	Specify additional command line options for the assembler; type in custom flags that are not otherwise available in the UI.

Build Properties for RS08

The **Properties for *<project>*** window shows the corresponding build properties for an RS08 project (Figure 3.36).

Figure 3.36 Build Properties - RS08

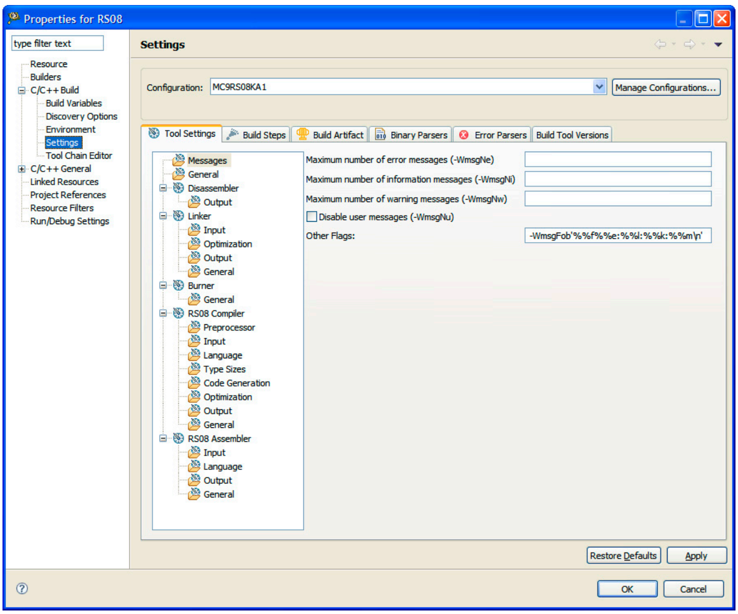


Table 3.32 lists the build properties specific to developing software for HCS08.

The properties that you specify in these panels apply to the selected build tool on the **Tool Settings** page of the **Properties for <*project*>** window.

Table 3.32 Build Properties for RS08

Build Tool	Build Properties Panels
Messages	Messages
General	General
Disassembler	Disassembler > Output
Linker	Linker > Input
	Linker > Optimization
	Linker > Output
	Linker > General
Burner	Burner > General
RS08 Compiler	RS08 Compiler > Preprocessor
	RS08 Compiler > Input
	RS08 Compiler > Language
	RS08 Compiler > Type Sizes
	RS08 Compiler > Code Generation
	RS08 Compiler > Optimization
	RS08 Compiler > Output
	RS08 Compiler > General
RS08 Assembler	RS08 Assembler > Input
	RS08 Assembler > Language
	RS08 Assembler > Output
	RS08 Assembler > General

Messages

Use this panel to specify whether to generate symbolic information for debugging the build target

Figure 3.37 shows the **Messages** panel.

Figure 3.37 Tool Settings - Messages

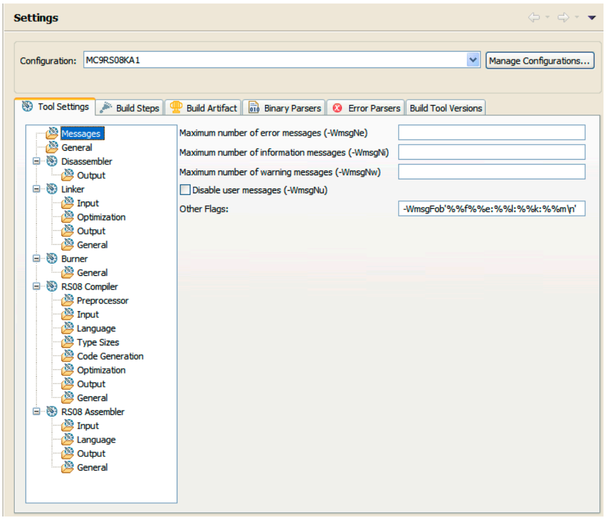


Table 3.33 lists and describes the message options.

Table 3.33 Tool Settings - Messages Options

Option	Description
Maximum number of error messages (-WmsgNe)	Specify the number of errors allowed until the application stops processing
Maximum number of information messages (-WmsgNi)	Limits the number of information messages that the Compiler logs.
Maximum number of warning messages (-WmsgNw)	Specify the maximum number of warnings allowed.

Table 3.33 Tool Settings - Messages Options (*continued*)

Option	Description
Disable user messages (-WmsgNu)	The application produces some messages which are not in the normal message categories (WARNING, INFORMATION, ERROR, or FATAL). With this option such messages can be disabled. The purpose for this option is to reduce the amount of messages and to simplify the error parsing of other tools.
Other Flags	Specify additional command line options; type in custom flags that are not otherwise available in the UI. Default value is: - `WmsgFob"%%f%%e:%%l: %%k: %%m\n`

General

Use this panel to specify the memory model that the architecture uses. The build tools (compiler, linker, and assembler) use the properties that you specify.

Figure 3.38 shows the **General** panel.

Figure 3.38 Tool Settings - General

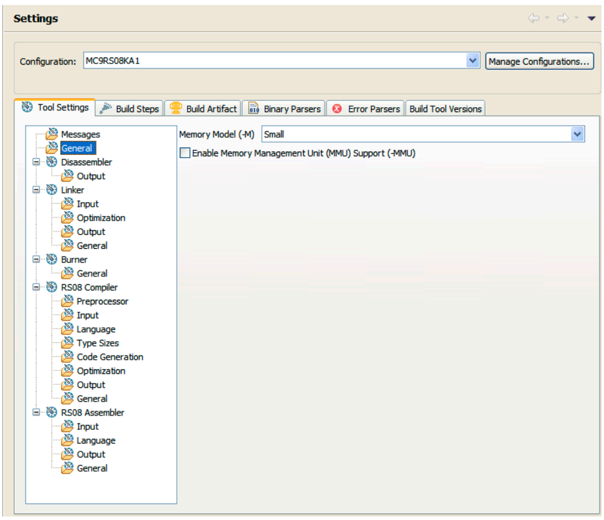


Table 3.34 lists and describes the memory model options for RS08.

Table 3.34 Tool Settings - General

Option	Description
Memory Model (-M)	Specify the memory model for the build tools: • **Tiny** — Assumes that data pointers have 8-bit addresses unless explicitly specified with the keyword __far • **Small** — Default memory model; assumes that all functions and pointers have 16 bit addresses and requires code and data to be located in 64 kilobytes address space • **Banked** — Lets you place program code into atmost 256 pages of 16 kilobytes each, but does not affect data allocation
Enable Memory Management Unit (MMU) Support (-MMU)	Check to inform the compiler that `CALL` and `RTC` instructions are available, enabling code banking, and that the current architecture has extended data access capabilities, enabling support for `__linear` data types. This option can be used only when `-Cs08` is enabled.

Disassembler

Use this panel to specify the command, options, and expert settings for RS08 Disassembler.

Figure 3.39 shows the Disassembler page.

Figure 3.39 Tool Settings > Disassembler

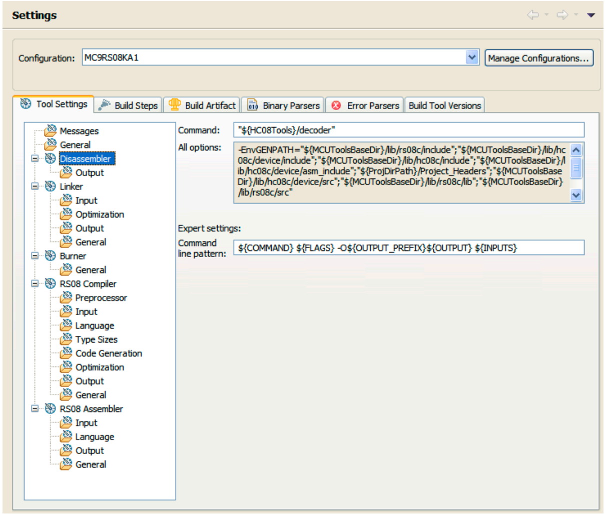


Table 3.35 lists and describes the Disassembler options.

Table 3.35 Tool Settings - Disassembler Options

Option	Description
Command	Shows the location of the disassembler executable file; default is `${HC08Tools}/decoder`.
All options	Shows the actual command line the linker will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} -O${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`

Disassembler > Output

Use this panel to control how the disassembler generates the output file.

Figure 3.40 shows the **Output** panel.

Figure 3.40 Tool Settings - Disassembler > Output

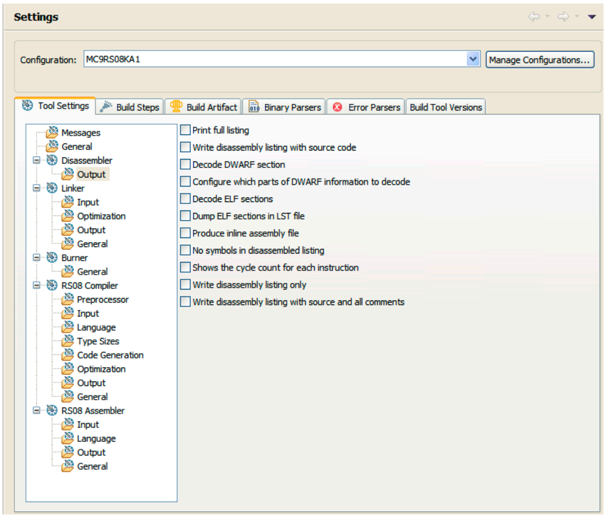


Table 3.36 lists and describes the output options for RS08 disassembler.

Table 3.36 Tool Settings - Disassembler > Output Options

Option	Description
Print full listing	Prints a listing with the header information of the object file.
Write disassembly listing with source code	Check to enable the decoder decoding Freescale object files write the source code within the disassembly listing. This option setting is default for the Freescale object files as input.
Decode DWARF section	Check to write the DWARF section information in the listing file. Decoding from the DWARF section inserts this information in the listing file. See the following listings for more information.
Configure which parts of DWARF in formation to decode	Check to configure parts of DWARF in formation to decode.
Decode ELF sections	Check to ensure that the ELF section information is also written to the listing file. Decoding from the ELF section inserts the following information in the listing file.

Table 3.36 Tool Settings - Disassembler > Output Options (*continued*)

Option	Description
Dump ELF sections	Check to generate a HEX dump of all ELF sections.
Dump ELF sections in LST file	Check to generate a HEX dump of all ELF sections in a LST file.
Produce inline assembly file	Check to ensure that the output listing is an inline assembly file without additional information, but in C comments.
No symbols in disassembled listing	Check to prevent symbols from printing in the disassembled listing.
Shows the cycle count for each instruction	Check to ensure that each instruction line contains the count of cycles in '[',']' braces. The cycle count is written before the mnemonics of the instruction. Note that the cycle count display is not supported for all architectures.
Write disassembly listing only	Check to ensure that the Decoder decoding Freescale object files writes the source code within the disassembly listing only.
Write disassembly listing with source and all comments	Check to write the origin source and its comments within the disassembly listing.

Linker

Use this panel to specify the command, options, and expert settings for the build tool linker. Additionally, the Linker tree control includes the general, libraries, and search path settings.

Figure 3.41 shows the **Linker** settings.

Figure 3.41 Tool Settings - Linker

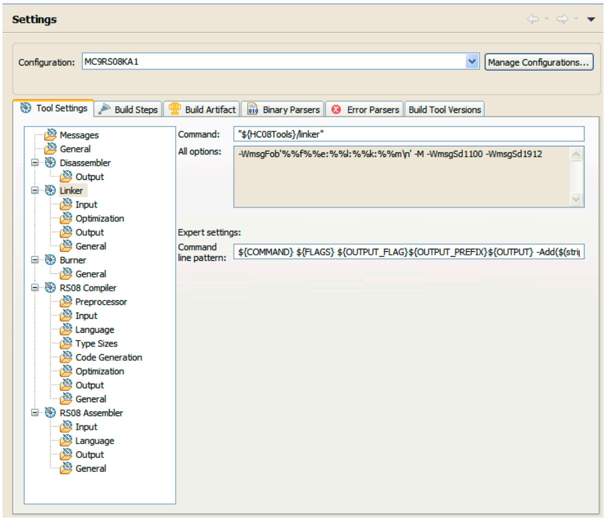


Table 3.37 lists and describes the linker options for RS08.

Table 3.37 Tool Settings - Linker Options

Option	Description
Command	Shows the location of the linker executable file.
All options	Shows the actual command line the linker will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS}${OUTPUT_FLAG}${OUTPUT_PREFIX}${OUTPUT} -add( ${INPUTS} ).`

Linker > Input

Use this panel to specify the parameter file path, startup function, object file search paths, and any additional libraries that the **C/C++ Linker** should use. You can specify multiple additional libraries and library search paths. Also, you can change the order in which the IDE uses or searches the libraries.

The IDE first looks for an include file in the current directory, or the directory that you specify in the `INCLUDE` directive. If the IDE does not find the file, it continues searching the paths shown in this panel. The IDE keeps searching paths until it finds the `#include` file or finishes searching the last path at the bottom of the Include File Search Paths list. The IDE appends to each path the string that you specify in the `INCLUDE` directive.

NOTE The IDE displays an error message if a header file is in a different directory from the referencing source file. Sometimes, the IDE also displays an error message if a header file is in the same directory as the referencing source file.

For example, if you see the message `Could not open source file myfile.h`, you must add the path for `myfile.h` to this panel.

Figure 3.42 shows the **Input** panel.

Figure 3.42 Tool Settings - Linker > Input

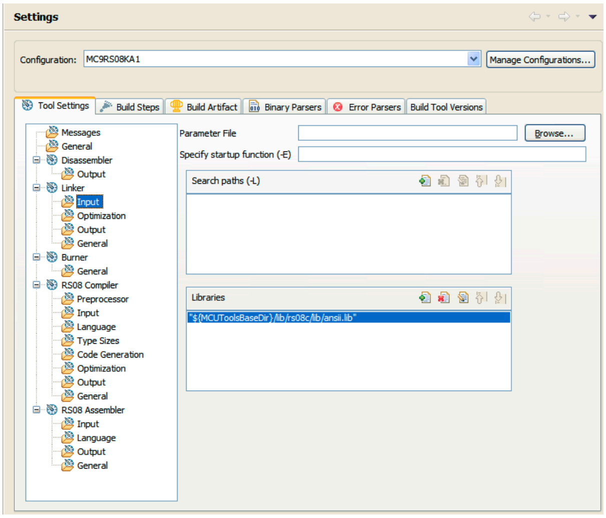


Table 3.38 lists and describes the linker input options for RS08.

Table 3.38 Tool Settings - Linker > Input Options

Option	Description
Parameter File	Shows the path of the parameter file. Default value is: `${ProjDirPath}/Project_Settings/Linker_Files/Project.prm`.
Specify startup function (-E)	Tells the command-line tool to preprocess source files.
Search paths (-L)	Shows the list of all search paths; the ELF part of the linker searches object files first in all paths and then the usual environment variables are considered.
Libraries	Lists paths to additional libraries that the C/C++ linker uses

Table 3.39 lists and describes the toolbar buttons that help work with the libraries and the additional object file search paths.

Table 3.39 Search Paths Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add directory path** dialog box (Figure 3.43) and specify the object file search path.
	**Delete** — Click to delete the selected object file search path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit directory path** dialog box (Figure 3.44) and update the selected object file search path.
	**Move up** — Click to move the selected object file search path one position higher in the list.
	**Move down** — Click to move the selected object file search path one position lower in the list.

Figure 3.43 shows the **Add directory path** dialog box.

Figure 3.43 Add directory path Dialog Box

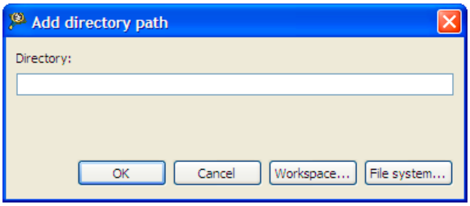
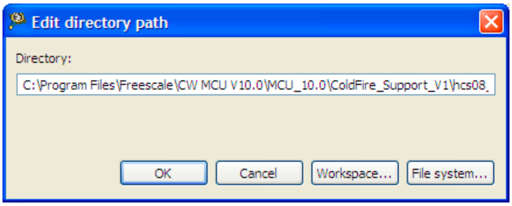


Figure 3.44 shows the **Edit directory path** dialog box.

Figure 3.44 Edit directory path Dialog Box



The buttons in the **Add directory path and Edit directory path** dialog boxes help work with the object file search paths.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel** — Click to cancel the action and exit the dialog box.
- **Workspace** — Click to display the **Folder Selection** dialog box and specify the object file search path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system** — Click to display the **Browse for Folder** dialog box and specify the object file search path. The resulting path appears in the appropriate list.

Table 3.40 lists and describes the toolbar buttons that help work with the libraries and the additional object files.

Table 3.40 Libraries Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add file path** dialog box (Figure 3.45) and specify location of the library you want to add.
	**Delete** — Click to delete the selected library path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit file path** dialog box (Figure 3.46) and update the selected path.
	**Move up** — Click to move the selected path one position higher in the list.
	**Move down** — Click to move the selected path one position lower in the list.

Figure 3.45 shows the **Add file path** dialog box.

Figure 3.45 Tool Settings - Linker > Libraries - Add file path Dialog Box

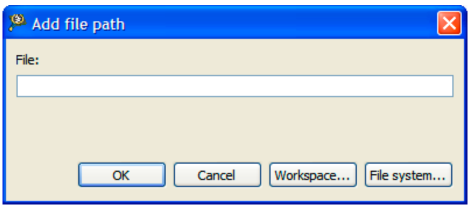
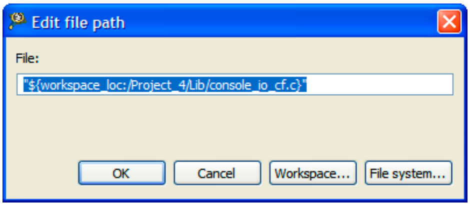


Figure 3.46 shows the **Edit file path** dialog box.

Figure 3.46 Tool Settings - Linker > Libraries - Edit file path Dialog Box



The buttons in the **Add file path and Edit file path** dialog boxes help work with the file paths.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel** — Click to cancel the action and exit the dialog box.
- **Workspace** — Click to display the **File Selection** dialog box and specify the file path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system** — Click to display the **Open** dialog box and specify the file path. The resulting absolute path appears in the appropriate list.

Linker > Optimization

Use this panel to control linker optimizations. The linker's optimizer can apply any of its optimizations in either global or non-global optimization mode. You can apply global optimization at the end of the development cycle, after compiling and optimizing all source files individually or in groups.

Figure 3.47 shows the **Optimization** panel.

Figure 3.47 Tool Settings - Linker > Optimizations

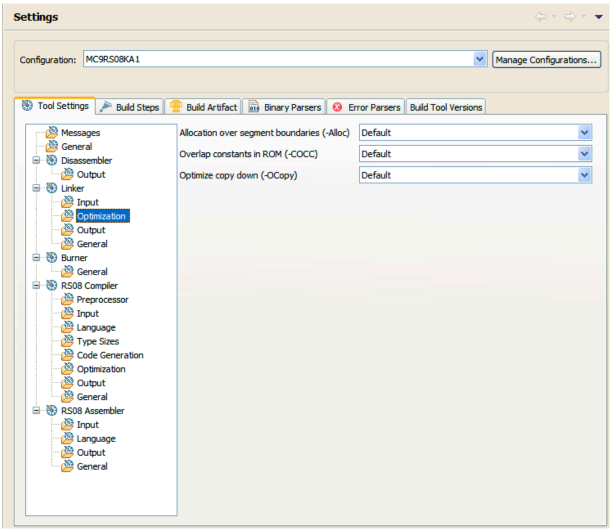


Table 3.41 lists and describes the linker optimization options for RS08.

Table 3.41 Tool Settings - Linker > Optimization Options

Option	Description
Allocation over segment boundaries (-Alloc)	The linker supports to allocate objects from one ELF section into different segments. The allocation strategy controls where space for the next object is allocated as soon as the first segment is full. Options are: • **Always use next segment:** In the AllocNext strategy, the linker always takes the next segment as soon as the current segment is full. Holes generated during this process are not used later. With this strategy, the allocation order corresponds to the definition order in the object files. Objects defined first in a source file are allocated before later defined objects. • **Always check for free previous segment:** In the AllocFirst strategy, the linker checks for every object, if there is a previously only partially used segment, into which the current object does fit. This strategy does not maintain the definition order. • **Check for free previous segment when current is full:** In the AllocChange strategy, the linker checks as soon as a object does no longer fit into the current segment, if there is a previously only partially used segment, into which the current object does fit. This strategy does not maintain the definition order, but it does however use fewer different ranges than the AllocFirst case.

Table 3.41 Tool Settings - Linker > Optimization Options

Option	Description
Overlap constants in ROM (-COCC)	Defines the default if constants and code should be optimized. The commands DO_OVERLAP_CONSTS and DO_NOT_OVERLAP_CONSTS take precedence over the option. Options are: • **Default** • **Overlap constant data and code** • **Overlap constant data** • **Overlap code**
Optimize copy down (-OCopy)	Changes the copy down structure to use few spaces. The optimization does assume that the application does perform both the zero out and the copy down step of the global initialization. If a value is set to zero by the zero out, then zero values are removed from the copy down information. The resulting initialization is not changed by this optimization if the default startup code is used. Options are: • **Enable** • **Disable**

Linker > Output

Use this panel to control how the linker formats the listing file, as well as error and warning messages.

Figure 3.48 shows the **Output** panel.

Figure 3.48 Tool Settings - Linker > Output

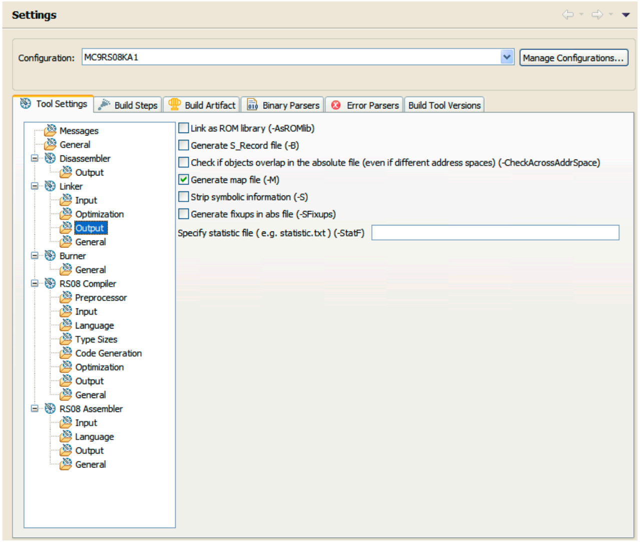


Table 3.42 lists and describes the linker output options for RS08.

Table 3.42 Tool Settings - Linker > Output Options

Option	Description
Link as ROM library (-AsROMlib)	Check to link the application as a ROM library. This option has the same effect as specifying AS ROM_LIB in the linker parameter file.
Generate S_record file (-B)	Check to specify that in addition to an absolute file, also an srecord file should be generated. The name of the srecord file is the same as the name of the abs file, except that the extension SX is used. The default env variable SRECORD may specify an alternative extension.
Check if objects overlap in the absolute file (even if different address spaces) (-CheckAcrossAddrSpace)	Check to instruct the linker to check if objects overlap, taking into account their address space.
Generate map file (-M)	Forces the generation of a map file after a successful linking session.

Table 3.42 Tool Settings - Linker > Output Options (*continued*)

Option	Description
Strip symbolic information (-S)	Check to disable the generation of DWARF sections in the absolute file to save memory space.
Generate fixups in abs file (-SFixups)	Check to ensure compatibility with previous linker versions. Usually, absolute files do not contain any fixups because all fixups are evaluated at link time. But with fixups, the decoder might symbolically decode the content in absolute files. Some debuggers do not load absolute files which contain fixups because they assume that these fixups are not yet evaluated. But the fixups inserted with this option are actually already handled by this linker.
Specify statistic file (e.g. statistic.txt) (-StatF)	Specify the name of the linker statistic file. The statistic file reports each allocated object and its attributes. Every attribute is separated by a tab character, so it can be easily imported into a spreadsheet/database program for further processing.

Linker > General

Use this panel to specify the general linker behavior.

Figure 3.49 shows the **General** panel.

Figure 3.49 Tool Settings - Linker > General

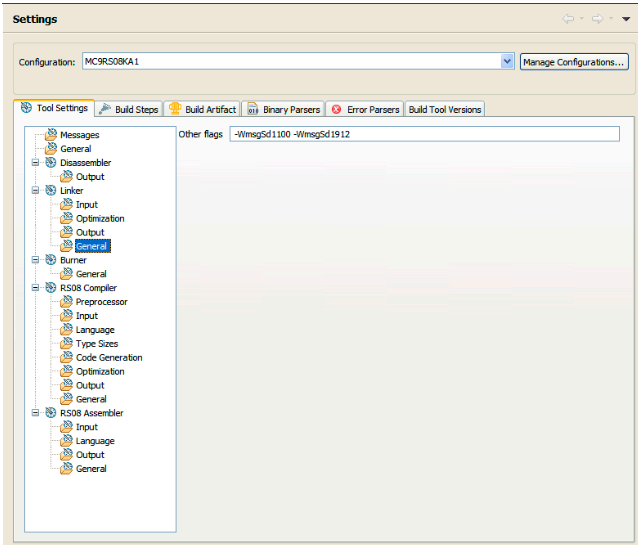


Table 3.43 lists and describes the general linker options for RS08.

Table 3.43 Tool Settings - Linker > General Options

Option	Description
Other flags	Specify additional command line options for the linker; type in custom flags that are not otherwise available in the UI. default value is `-WmsgSd1100 -WmsgSd1912`.

Burner

Use the Burner for RS08 Preference Panel to map *.bbl (batch burner language) files to the Burner Plug-In. When the project folder contains a *.bbl file, *.bbl file processing during the post-link phase uses the settings in the Burner preference panel.

Figure 3.50 shows the RS08 Burner settings.

Figure 3.50 Tool Settings > Burner

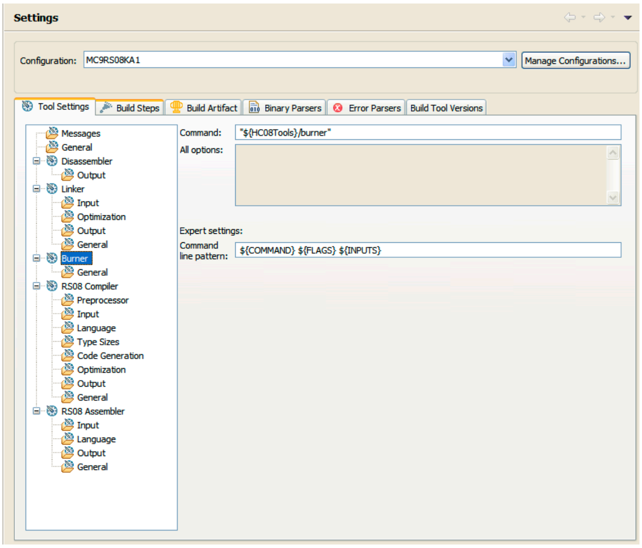


Table 3.44 lists and describes the burner options for RS08.

Table 3.44 Tool Settings - Burner Options

Option	Description
Command	Shows the location of the linker executable file. Default value is: `"${HC08Tools}/burner"`
All options	Shows the actual command line the burner will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} ${INPUTS}`.

Burner > General

Use this panel to specify other flags for the RS08 Burner to use.

Figure 3.51 shows the **General** panel.

Figure 3.51 Tool Settings - Burner > General

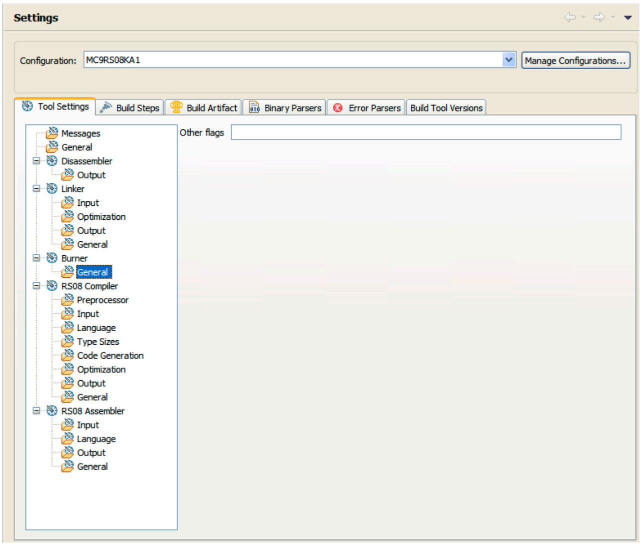


Table 3.45 lists and describes the general options for RS08 burner.

Table 3.45 Tool Settings - Burner > General Options

Option	Description
Other flags	Specify additional command line options for the burner; type in custom flags that are not otherwise available in the UI.

RS08 Compiler

Use this panel to specify the command, options, and expert settings for the build tool compiler. Additionally, the RS08 Compiler tree control includes the general, include file search path settings.

Figure 3.52 shows the RS08 Compiler settings.

Figure 3.52 Tool Settings - RS08 Compiler

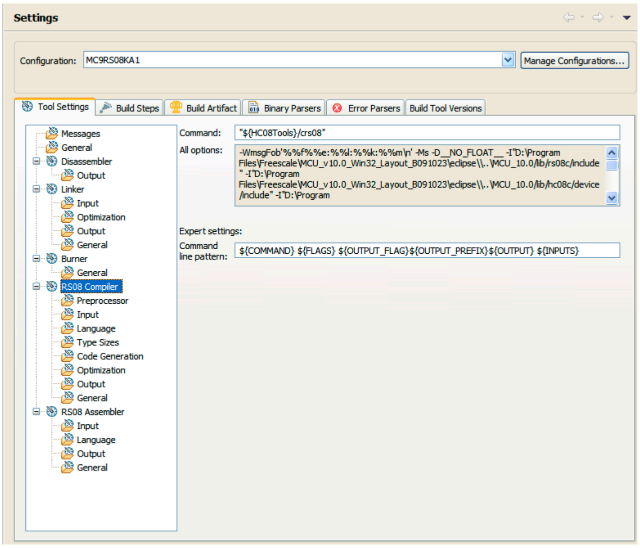


Table 3.46 lists and describes the compiler options for RS08

Table 3.46 Tool Settings - Compiler Options

Option	Description
Command	Shows the location of the linker executable file. Default value is : "`${HC08Tools}/crs08.exe`"
All options	Shows the actual command line the compiler will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `{COMMAND} ${FLAGS}${OUTPUT_FLAG}${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`.

RS08 Compiler > Preprocessor

Use this panel to specify preprocessor behavior and define macros.

Figure 3.53 shows the **Preprocessor** panel.

Figure 3.53 Tool Settings - RS08 Compiler > Preprocessor

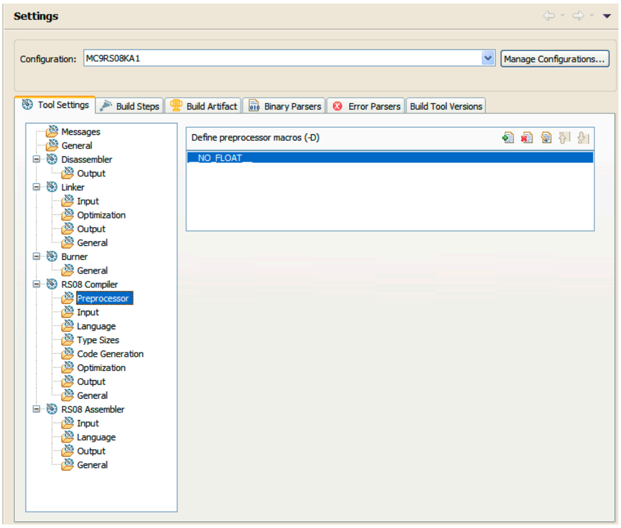


Table 3.47 lists and describes the preprocessor options for RS08 Compiler.

Table 3.47 Tool Settings - RS08 Compiler > Preprocessor Options

Option	Description
Define preprocessor macros (-D)	Define, delete, or rearrange preprocessor macros. You can specify multiple macros and change the order in which the IDE uses the macros. Define preprocessor macros and optionally assign their values. This setting is equivalent to specifying the `-D` *`name`*`[=`*`value`*`]` command-line option. To assign a value, use the equal sign (=) with no white space. For example, this syntax defines a preprocessor value named `EXTENDED_FEATURE` and assigns `ON` as its value: `EXTENDED_FEATURE=ON` Note that if you do not assign a value to the macro, the shell assigns a default value of 1.

Table 3.48 lists and describes the toolbar buttons that help work with preprocessor macro definitions.

Table 3.48 Define Preprocessor Macros Toolbar Buttons

Button	Description
	**Add —** Click to open the **Enter Value** dialog box (Figure 3.54) and specify the path/macro.
	**Delete —** Click to delete the selected path/ macro. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit —** Click to open the **Edit Dialog** dialog box (Figure 3.55) and update the selected path/macro.
	**Move up —** Click to move the selected path/ macro one position higher in the list.
	**Move down —** Click to move the selected path/macro one position lower in the list

Figure 3.54 shows the **Enter Value** dialog box.

Figure 3.54 Tool Settings - RS08 Compiler > Preprocessor - Enter Value Dialog Box

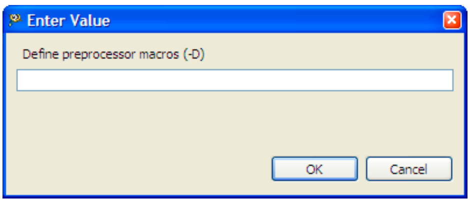
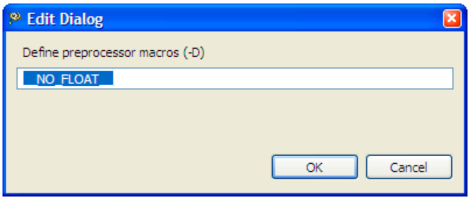


Figure 3.55 shows the **Edit Dialog** dialog box.

Figure 3.55 Tool Settings - RS08 Compiler > Preprocessor - Edit Dialog Dialog Box



The buttons in the **Enter Value and Edit** dialog boxes help work with the preprocessor macros.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel —** Click to cancel the action and exit the dialog box.

RS08 Compiler > Input

Use this panel to specify file search paths and any additional include files the **RS08 Compiler** should use. You can specify multiple search paths and the order in which you want to perform the search.

The IDE first looks for an include file in the current directory, or the directory that you specify in the `INCLUDE` directive. If the IDE does not find the file, it continues searching the paths shown in this panel. The IDE keeps searching paths until it finds the `#include` file or finishes searching the last path at the bottom of the Include File Search Paths list. The IDE appends to each path the string that you specify in the `INCLUDE` directive.

NOTE The IDE displays an error message if a header file is in a different directory from the referencing source file. Sometimes, the IDE also displays an error message if a header file is in the same directory as the referencing source file.

For example, if you see the message `Could not open source file myfile.h`, you must add the path for `myfile.h` to this panel.

Figure 3.56 shows the **Input** panel.

Figure 3.56 Tool Settings - RS08 Compiler > Input

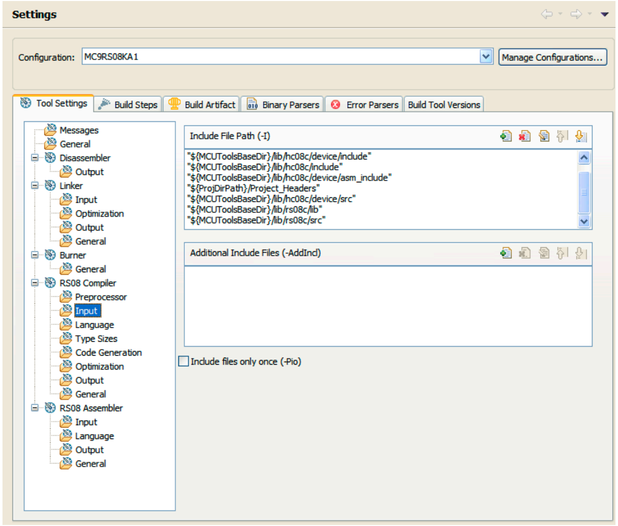


Table 3.49 lists and describes the input options for RS08 Compiler.

Table 3.49 Tool Settings - RS08 Compiler > Input Options

Option	Description
Include File Path (-I)	Specify, delete, or rearrange file search paths.
Additional Include Files (-AddInd)	Specify, delete, or rearrange paths to search any additional #include files.
Include files only once	Check to include every header file only once; duplicates are ignored.

Table 3.50 lists and describes the toolbar buttons that help work with the file paths.

Table 3.50 Include File Path (-I) Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add directory path** dialog box (Figure 3.57) and specify location of the library you want to add.
	**Delete** — Click to delete the selected library path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit directory path** dialog box (Figure 3.58) and update the selected path.
	**Move up** — Click to move the selected path one position higher in the list.
	**Move down** — Click to move the selected path one position lower in the list.

Table 3.51 lists and describes the toolbar buttons that help work with the search paths.

Table 3.51 Additional Include Files (-AddIncl) Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add directory path** dialog box (Figure 3.57) and specify location of the library you want to add.
	**Delete** — Click to delete the selected library path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit directory path** dialog box (Figure 3.58) and update the selected path.

Table 3.51 Additional Include Files (-AddIncl) Toolbar Buttons (*continued*)

Button	Description
	**Move up —** Click to move the selected path one position higher in the list.
	**Move down —** Click to move the selected path one position lower in the list.

Figure 3.57 Tool Settings - RS08 Compiler > Input - Add file path Dialog Box

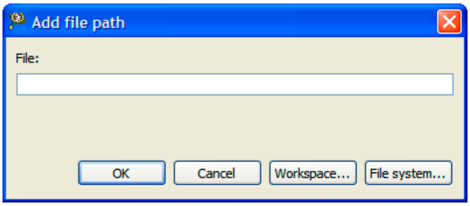
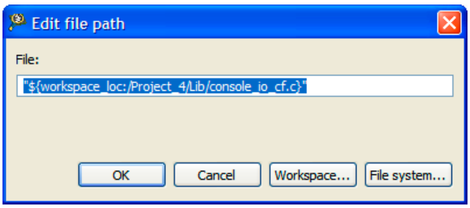


Figure 3.58 Tool Settings - RS08 Compiler > Input - Edit file path Dialog Box



The buttons in the **Add file path** (Figure 3.57) **and Edit file path** (Figure 3.58) dialog boxes help work with the paths.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel —** Click to cancel the action and exit the dialog box.
- **Workspace —** Click to display the **File Selection** dialog box and specify the path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system —** Click to display the **Open** dialog box and specify the path. The resulting path appears in the appropriate list.

RS08 Compiler > Language

Use this panel to specify code- and symbol-generation options for the RS08 Compiler.

Figure 3.59 shows the **Language** panel.

Figure 3.59 Tool Settings - RS08 Compiler > Language

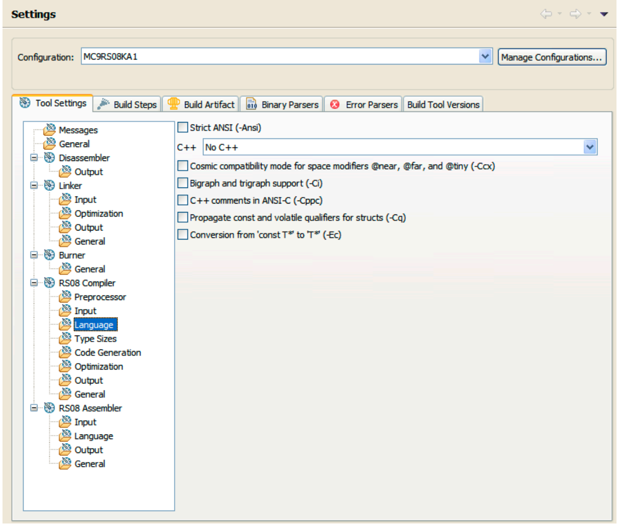


Table 3.52 lists and describes the language options for RS08.

Table 3.52 Tool Settings - RS08 Compiler > Language Options

Option	Description
Strict ANSI	Check if you want the C compiler to operate in strict ANSI mode. In this mode, the compiler strictly applies the rules of the ANSI/ISO specification to all input files. This setting is equivalent to specifying the `-ansi` command-line option. The compiler issues a warning for each ANSI/ISO extension it finds.
C++	With this option enabled, the Compiler behaves as a C++ Compiler. You can select between three different types of C++: • **Full C++ (-C++f) —** Supports the whole C++ language. • **Embedded C++ (-C++e)** — Supports a constant subset of the C++ language. EC++ does not support inefficient things like templates, multiple inheritance, virtual base classes and exception handling. • **CompactC++ (-C++c) —** Supports a configurable subset of the C++ language. You can configure this subset with the option -Cn. • **No C++** — If the option is not set, the Compiler behaves as an ANSI-C Compiler. If the option is enabled and the source file name extension is *.c, the Compiler behaves as a C++ Compiler. If the option is not set, but the source filename extension is .cpp or .cxx, the Compiler behaves as if the -C++f option were set.

Table 3.52 Tool Settings - RS08 Compiler > Language Options (*continued*)

Option	Description
Cosmic compatibility mode for space modifiers @near, @far, and @tiny (-Ccx)	Check to allow Cosmic style @near, @far and @tiny space modifiers as well as @interrupt in your C code. The -ANSI option must be switched off. It is not necessary to remove the Cosmic space modifiers from your application code. There is no need to place the objects to sections addressable by the Cosmic space modifiers. The following is done when a Cosmic modifier is parsed: The objects declared with the space modifier are always allocated in a special Cosmic compatibility (_CX) section (regardless of which section pragma is set) depending on the space modifier, on the const qualifier or if it is a function or a variable. Space modifiers on the left hand side of a pointer declaration specify the pointer type and pointer size, depending on the target.
Bigraph and trigraph support (-Ci)	Check to replace certain unavailable tokens with the equivalent keywords.
C++ comments in ANSI-C (-Cppc)	Check to allow C++ comments.
Propagate const and colatile qualifiers for structs (-Cq)	Check to propagate const and volatile qualifiers for structures. If all members of a structure are constant or volatile, the structure itself is constant or volatile. If the structure is declared as constant or volatile, all its members are constant or volatile, respectively.
Conversion from 'const T*' to 'T*' (-Ec)	Check to enable this non-ANSI compliant extension allows the compiler to treat a pointer to a constant type like a pointer to the non-constant equivalent of the type. Earlier Compilers did not check a store to a constant object through a pointer. This option is useful when compiling older source code.

RS08 Compiler > Type Sizes

Use this panel to specify the available data type size options for the RS08 Compiler.

Figure 3.60 shows the **Type Sizes** panel.

Figure 3.60 Tool Settings - RS08 Compiler > Type Sizes

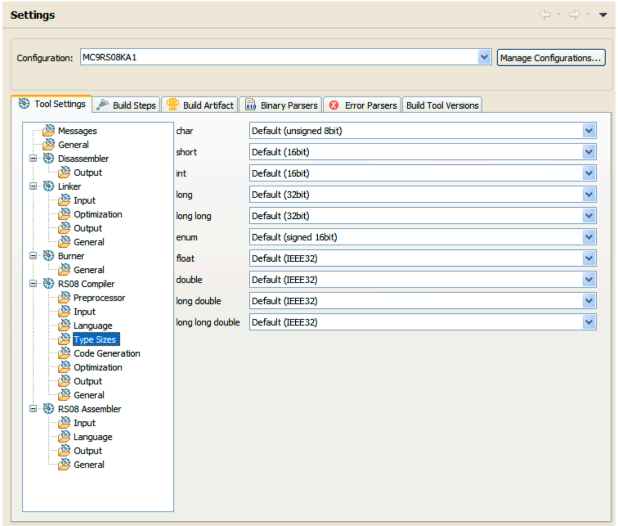


Table 3.53 lists and describes the type size options for RS08 Compiler.

Table 3.53 Tool Settings - RS08 Compiler > Type Sizes

Option	Description
char	Selects the size of the `char` type. Options are: • Default (unsigned 8bit) • unsigned 8bit (`-TuCC1`) • signed 8bit (`-TsCC1`) • signed 16bit (`-TsCC2`) • signed 32bit (`-TsCC4`)
short	Selects the size of the `short` type. Options are: • Default (16bit) • signed 8bit (`-TS1`) • signed 16bit (`-TS2`) • signed 32bit (`-TS4`)
int	Selects the size of the `int` type. Options are: • Default (16bit) • signed 8bit (`-TI1`) • signed 16bit (`-TI2`) • signed 32bit (`-TI4`)
long	Selects the size of the `long` type. Options are: • Default (32bit) • signed 8bit (`-TL1`) • signed 16bit (`-TL2`) • signed 32bit (`-TL4`)
long long	Selects the size of the `long long` type. Options are: • Default (32bit) • signed 8bit (`-TLL1`) • signed 16bit (`-TLL2`) • signed 32bit (`-TLL4`)

Table 3.53 Tool Settings - RS08 Compiler > Type Sizes (*continued*)

Option	Description
enum	Selects the size of the `enum` type. Options are: • Default (signed 16bit) • signed 8bit (`-TE1sE`) • signed 16bit (`-TE2sE`) • signed 32bit (`-TE4sE`) • unsigned 8bit (`-TE1uE`)
float	Selects the size of the `float` type. Options are: • Default (IEEE32) • IEEE32
double	Selects the size of the `double` type. Options are: • Default (IEEE32) • IEEE32
long double	Selects the size of the `long double` type. Options are: • Default (IEEE32) • IEEE32
long long double	Selects the size of the `long long double` type. Options are: • Default (IEEE32) • IEEE32

RS08 Compiler > Code Generation

Use this panel to specify code- and symbol-generation options for the RS08 Compiler

Figure 3.61 shows the **Code Generation** panel.

Figure 3.61 Tool Settings - RS08 Compiler > Code Generation

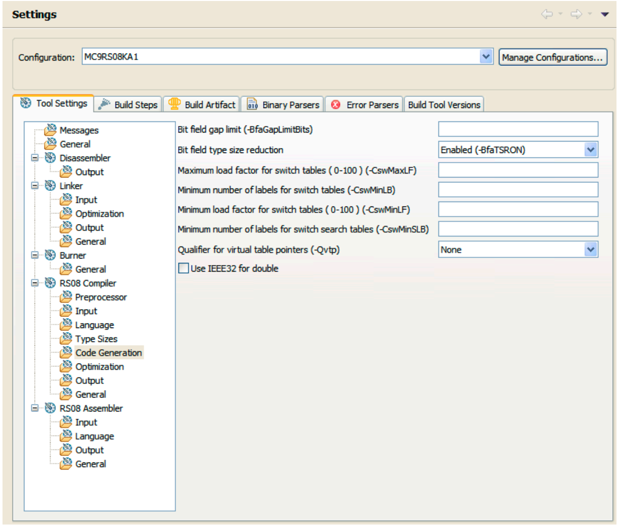


Table 3.54 lists and describes the code generation options for RS08 compiler.

Table 3.54 Tool Settings - RS08 Compiler > Code Generation Options

Option	Description
Bit field gap limits (-BfaGapLimitBits)	Check to affect the maximum allowable number of gap bits. The bitfield allocation tries to avoid crossing a byte boundary whenever possible. To optimize accesses, the compiler may insert some padding or gap bits.
Bit field type size reduction	This option is configurable whether or not the compiler uses type-size reduction for bitfields. Type-size reduction means that the compiler can reduce the type of an int bitfield to a char bitfield if it fits into a character. This allows the compiler to allocate memory only for one byte instead of for an integer. Options are: • **Enabled (-BfsTSRON)** • **Disabled (-BfsTSOFF)**

Table 3.54 Tool Settings - RS08 Compiler > Code Generation Options (*continued*)

Option	Description
Maximum load factor for switch tables (-100) (-CswMaxLF)	Allows changing the default strategy of the Compiler to use tables for switch statements; is only available if the compiler supports switch tables.
Minimum number of labels for switch tables (-CswMinLB)	Allows changing the default strategy of the Compiler using tables for switch statements; is only available if the compiler supports switch tables.
Minimum load factor for switch tables (100) (-CswMinLF)	Allows the Compiler to use tables for switch statements; is only available if the compiler supports switch tables.
Qualifier for virtual table pointers (-Qvtp)	Using a virtual function in C++ requires an additional pointer to virtual function tables. The Compiler cannot access the pointer and generates the pointer in every class object when virtual function tables are associated.
Use IEEE32 for double	Check to use IEEE32 for doubles instead of IEEE64 (default).

RS08 Compiler > Optimization

Use this panel to control compiler optimizations. The compiler's optimizer can apply any of its optimizations in either global or non-global optimization mode. You can apply global optimization at the end of the development cycle, after compiling and optimizing all source files individually or in groups.

Figure 3.62 shows the **Optimization** panel.

Figure 3.62 Tool Settings - RS08 Compiler > Optimization

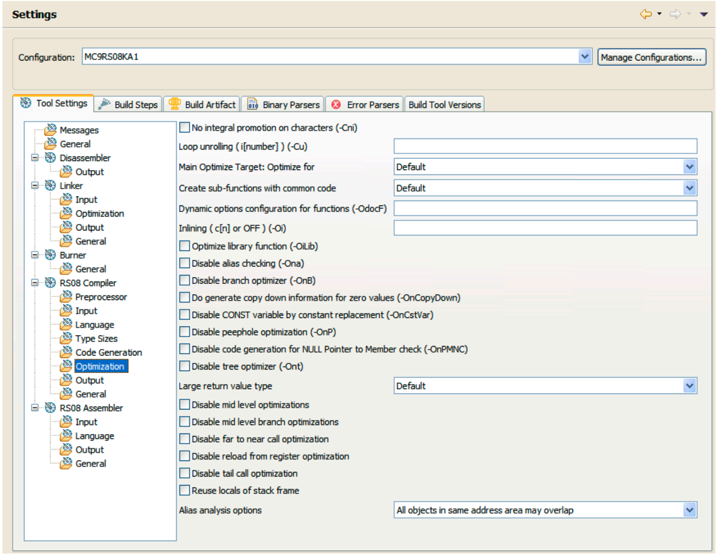


Table 3.55 lists and describes the optimization options for RS08 compiler.

Table 3.55 Tool Settings - RS08 Compiler > Output Options

Option	Description
No integral promotion on characters (-Cni)	Enhances character operation code density by omitting integral promotion. This option enables behavior that is not ANSI-C compliant. Code generated with this option set does not conform to ANSI standards. Code compiled with this option is not portable. Using this option is not recommended in most cases.
Loop unrolling i[number]) (-Cu)	Enables loop unrolling with the following restrictions: • Only simple for statements are unrolled, e.g., for (i=0; i<10; i++) • Initialization and test of the loop counter must be done with a constant. • Only <, >, <=, >= are permitted in a condition. • Only ++ or -- are allowed for the loop variable increment or decrement. • The loop counter must be integral. • No change of the loop counter is allowed within the loop. • The loop counter must not be used on the left side of an assignment. • No address operator (&) is allowed on the loop counter within the loop. • Only small loops are unrolled: Loops with few statements within the loop. Loops with fewer than 16 increments or decrements of the loop counter. The bound may be changed with the optional argument = i<number>. The -Cu=i20 option unrolls loops with a maximum of 20 iterations.

Table 3.55 Tool Settings - RS08 Compiler > Output Options (*continued*)

Option	Description
Main Optimize Target: Optimize for	There are various points where the Compiler has to select between two possibilities: it can either generate fast, but large code, or small but slower code. The Compiler generally optimizes on code size. It often has to decide between a runtime routine or an expanded code. The programmer can decide whether to select between the slower and shorter or the faster and longer code sequence by setting a command line switch. • The **Code Size (-Os)** option directs the Compiler to optimize the code for smaller code size. The Compiler trades faster-larger code for slower-smaller code. • The **Execution Time (-Ot)** option directs the Compiler to optimize the code for faster execution time. The Compiler replaces slower/smaller code with faster/larger code. This option only affects some special code sequences. This option has to be set together with other optimization options (e.g., register optimization) to get best results.
Create sub-functions with common code	Performs the reverse of inlining. It detects common code parts in the generated code. The Compiler moves the common code to a different place and replaces all occurrences with a JSR to the moved code. At the end of the common code, the Compiler inserts an RTS instruction. The Compiler increases all SP uses by an address size. This optimization takes care of stack allocation, control flow, and of functions having arguments on the stack. Inline assembler code is never treated as common code. Options are: • **Default** • **Disable (-Onf)** • **Enable (-Of)**

Table 3.55 Tool Settings - RS08 Compiler > Output Options (*continued*)

Option	Description
Dynamic options configuration for functions (-OdocF)	Allows the Compiler to select from a set of options to reach the smallest code size for every function. Without this feature, you must set fixed Compiler switches over the whole compilation unit. With this feature, the Compiler finds the best option combination from a user-defined set for every function.
Inlining (C[n] or OFF) (-Oi)	Enables inline expansion. If there is a #pragma INLINE before a function definition, all calls of this function are replaced by the code of this function, if possible. Using the -Oi=c0 option switches off inlining. Functions marked with the #pragma INLINE are still inlined. To disable inlining, use the -Oi=OFF option.
Optimize library function (-OiLib)	Enables the compiler to optimize specific known library functions to reduce execution time. The Compiler frequently uses small functions such as strcpy(), strcmp(), and so forth.
Disable alias checking (-Ona)	Prevents the Compiler from redefining these variables, which lets you reuse already-loaded variables or equivalent constants. Use this option only when you are sure no real writes of aliases to a variable memory location will occur.
Disable branch optimizer (-OnB)	Disables all branch optimizations.
Do generate copy down information for zero values (-OnCopyDown)	Restricts the compiler from generating a copy down for i. The initialization with zero optimization shown for the arr array only works in the HIWARE format. The ELF format requires initializing the whole array to zero.
Disable CONST variable by constant replacement (-OnCsfVar)	Lets you switch OFF the replacement of CONST variable by the constant value.
Disable peephole optimization (-OnP)	Disables the whole peephole optimizer. To disable only a single peephole optimization, use the optional syntax -OnP=<char>.

Table 3.55 Tool Settings - RS08 Compiler > Output Options (*continued*)

Option	Description
Disable code generation for NULL Pointer to Member check (-OnPMNC)	Before assigning a pointer to a member in C++, you must ensure that the pointer to the member is not NULL in order to generate correct and safe code. In embedded systems development, the difficulty becomes generating the denser code while avoiding overhead whenever possible (this NULL check code is a good example). This option enables you to switch off the code generation for the NULL check.
Disable tree optimizer (-Ont)	Disables the tree optimizer. Use this option for debugging and to force the Compiler to produce 'straightforward' code. Note that the optimizations below are just examples for the classes of optimizations.
Large return value type	Compiler supports this option even though returning a 'large' return value may be not as efficient as using an additional pointer. The Compiler introduces an additional parameter for the return value if the return value cannot be passed in registers. Options are: • **Default** • **Large return value pointer, always with temporary (-Rpt)** • **Large return value pointer and temporary elimination (-Rpe)**
Disable mid level optimizations	The backend of this compiler is based on the second generation intermediate code generator (SICG). All intermediate language and processor independent optimizations (cf. NULLSTONE) are performed by the SICG optimizer using the powerful static single assignment form (SSA form). The optimizations are switched off using -od. Currently four optimizations are implemented.
Disable mid level branch optimizations	Disables branch optimizations on the SSA form based on control flows. Label rearranging sorts all labels of the control flow to generate a minimum amount of branches.

Table 3.55 Tool Settings - RS08 Compiler > Output Options (*continued*)

Option	Description
Disable far to near optimization	Disables the JSR to BSR optimization. The compiler checks the range of the call to determine if a BSR can be generated instead of a JSR. If -Onbsr is used this optimization will be disabled.
Disable reload from register optimization	Disables the low level register trace optimizations. If you use the option the code becomes more readable, but less optimal.
Disable tail call optimizations	Allows the compiler to remove all the entry and exit code from the current function.By default, the compiler replaces trailing calls (JSR/BSR) with JMP instructions if the function does not contain any other function calls.
Reuse locals of stack frame	Instructs the compiler to reuse the location of local variables/temporaries whenever possible. When used, the compiler analyzes which local variables are alive simultaneously. Based on that analysis the compiler selects the best memory layout for for variables. Two or more variables may end up sharing the same memory location.
Alias analysis options	Allows the programmer to control the alias behavior of the compiler. The option -oaaddr is the default because it is safe for all C programs. Use option -oaansi if the source code follows the ANSI C99 alias rules. If objects with different types never overlap in your program, use option -oatype. If your program doesn't have aliases at all, use option -oanone (or the ICG option -ona, which is supported for compatibility reasons). Option are: • **All objects in same address area may overlap** • **Only objects in same address area with same type** • **Assume no objects do overlap** • **Use ANSI99 rules**

RS08 Compiler > Output

Use this panel to control how the compiler generates the output file, as well as error and warning messages. You can specify whether to allocate constant objects in ROM, generate debugging information, and strip file path information.

Figure 3.63 shows the **Output** panel.

Figure 3.63 Tool Settings - RS08 Compiler > Output

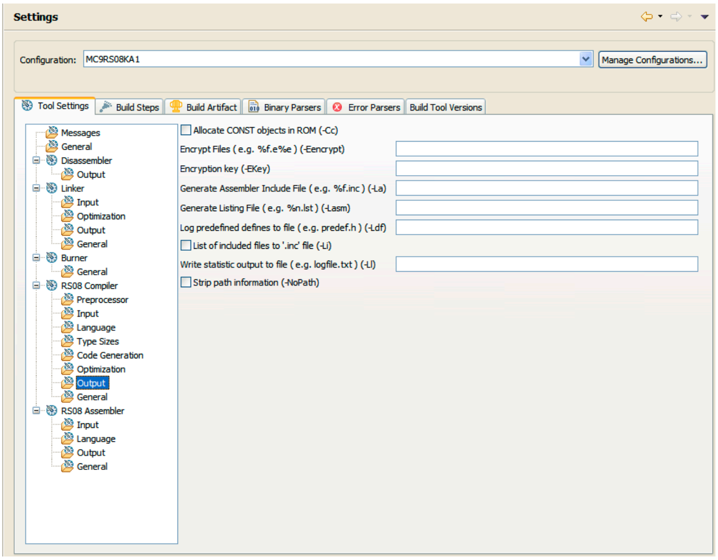


Table 3.56 lists and describes the output options for RS08 compiler.

Table 3.56 Tool Settings - RS08 Compiler > Output Options

Option	Description
Allocate CONST objects in ROM (-Cc)	Check to enables the Compiler assign const objects into the ROM_VAR segment, which the parameter file assigns to a ROM section.
Encrypt File (e.g. %f.e%e) (-Eencrypt)	Encrypts using the given key with the -Ekey: Encryption Key option.
Encryption key (-EKey)	Encrypt files with the given key number (-Eencrypt option).The default encryption key is 0. Using this default is not recommended.

Table 3.56 Tool Settings - RS08 Compiler > Output Options (*continued*)

Option	Description
General Assembler Include File (e.g. %f.inc) (-La)	Enables the Compiler to generate an assembler include file when the CREATE_ASM_LISTING pragma occurs. The name of the created file is specified by this option. If no name is specified, a default of %f.inc is taken. To put the file into the directory specified by the TEXTPATH: Text File Path environment variable, use the option -la=%n.inc. The %f option already contains the path of the source file. When %f is used, the generated file is in the same directory as the source file. The content of all modifiers refers to the main input file and not to the actual header file. The main input file is the one specified on the command line.
Generate Listing File (e.g. %n.lst) (-Lasm)	Enables the Compiler to generate an assembler listing file directly. The Compiler also prints all assembler-generated instructions to this file. The option specifies the name of the file. If no name is specified, the Compiler takes a default of %n.lst. If the resulting filename contains no path information the Compiler uses the TEXTPATH: Text File Path environment variable. The syntax does not always conform with the inline assembler or the assembler syntax. Therefore, use this option only to review the generated code. It cannot currently be used to generate a file for assembly.

Table 3.56 Tool Settings - RS08 Compiler > Output Options (*continued*)

Option	Description
Log predefined defines to file (e.g. predef.h) (-Ldf)	Enables the Compiler to generate a text file that contains a list of the compiler-defined #define. The default filename is predef.h, but may be changed (e.g., -Ldf="myfile.h"). The file is generated in the directory specified by the TEXTPATH: Text File Path environment variable. The defines written to this file depend on the actual Compiler option settings (e.g., type size settings or ANSI compliance). **Note: The defines specified by the command line (-D: Macro Definition option) are not included.** This option may be very useful for SQA. With this option it is possible to document every #define which was used to compile all sources. Note: This option only has an effect if a file is compiled. This option is unusable if you are not compiling a file.
List of included files to ‘.inc’ file (-Li)	Enables the Compiler to generate a text file which contains a list of the #include files specified in the source. This text file shares the same name as the source file but with the extension, *.inc. The files are stored in the path specified by the TEXTPATH: Text File Path environment variable. The generated file may be used in make files.

Table 3.56 Tool Settings - RS08 Compiler > Output Options (*continued*)

Option	Description
Write statistic output to file (e.g. logfile.txt) (-Ll)	Enables the Compiler append statistical information about the compilation session to the specified file. The information includes Compiler options, code size (in bytes), stack usage (in bytes) and compilation time (in seconds) for each procedure of the compiled file. The Compiler appends the information to the specified filename (or the file make.txt, if no argument given). Set the TEXTPATH: Text File Path environment variable to store the file into the path specified by the environment variable. Otherwise the Compiler stores the file in the current directory.
Strip path information	Check to enable the compiler remove both unreferenced path reference from your program. This reduces your program's memory footprint.

RS08 Compiler > General

Use this panel to specify other flags for the RS08 Compiler to use.

Figure 3.64 shows the **General** panel.

Figure 3.64 Tool Settings - RS08 Compiler > General

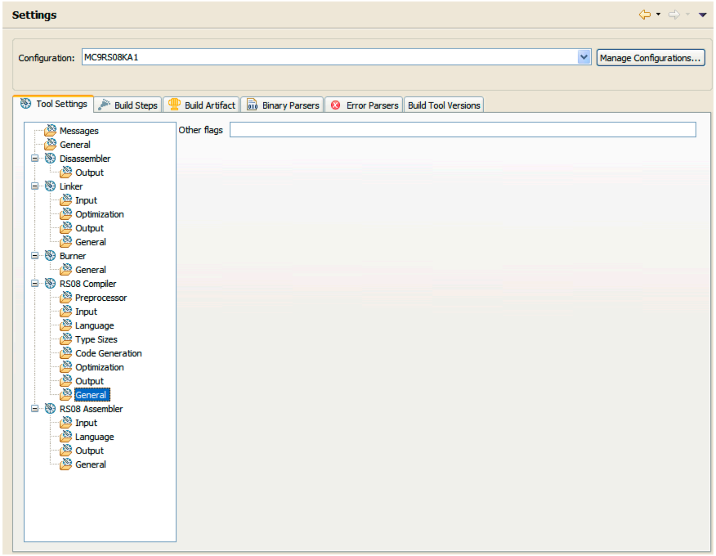


Table 3.57 lists and describes the general options for RS08 compiler.

Table 3.57 Tool Settings - RS08 Compiler > General Options

Option	Description
Other flags	Specify additional command line options for the compiler; type in custom flags that are not otherwise available in the UI.

RS08 Assembler

Use this panel to specify the command, options, and expert settings for the build tool assembler.

Figure 3.65 shows the **Assembler** settings.

Figure 3.65 Tool Settings - RS08 Assembler

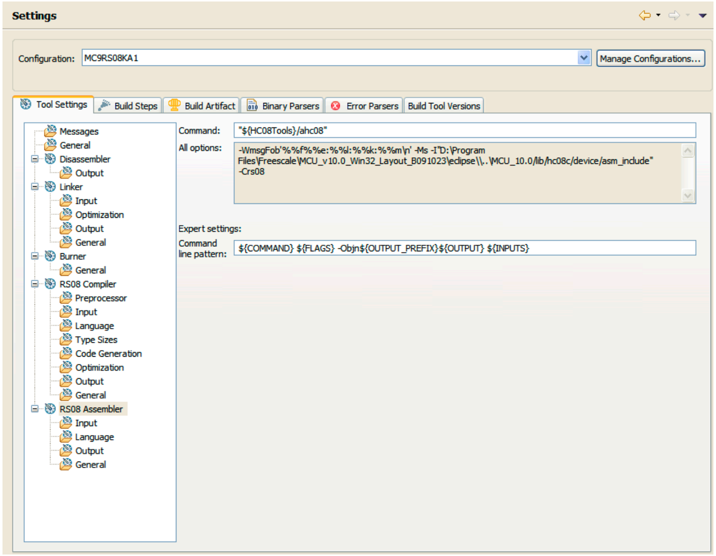


Table 3.58 lists and describes the assembler options for RS08.

Table 3.58 Tool Settings - Assembler Options

Option	Description
Command	Shows the location of the assembler executable file. Default value is: `"${HC08Tools}/ahc08.exe"`
All options	Shows the actual command line the assembler will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND}` `${COMMAND} ${FLAGS}-Objn${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`.

RS08 Assembler > Input

Use this panel to specify file search paths and any additional include files the **RS08 Assembler** should use. You can specify multiple search paths and the order in which you want to perform the search.

Figure 3.66 shows the **Input** panel.

Figure 3.66 Tool Settings - RS08 Assembler > Input

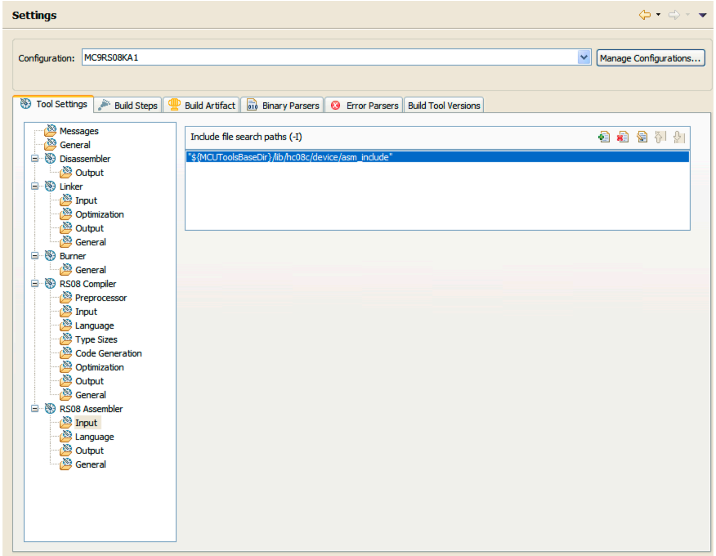


Table 3.59 lists and describes the toolbar buttons that help work with the file search paths.

Table 3.59 Search Paths Toolbar Buttons

Button	Description
	**Add —** Click to open the **Add directory path** dialog box (Figure 3.43) and specify the file search path.
	**Delete —** Click to delete the selected file search path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.

Table 3.59 Search Paths Toolbar Buttons (*continued*)

Button	Description
	**Edit —** Click to open the **Edit directory path** dialog box (Figure 3.44) and update the selected object file search path.
	**Move up —** Click to move the selected file search path one position higher in the list.
	**Move down —** Click to move the selected file search path one position lower in the list.

RS08 Assembler > Language

Use this panel to specify code- and symbol-generation options for the RS08 Compiler.

Figure 3.67 shows the **Language** panel.

Figure 3.67 Tool Settings - RS08 Assembler > Language

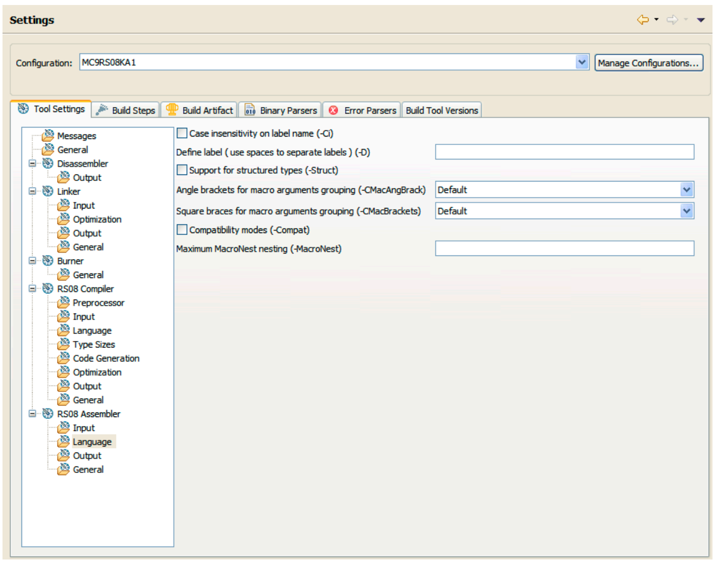


Table 3.29 lists and describes the language options for RS08 Assembler.

Table 3.60 Tool Settings - RS08 Assembler > Language Options

Option	Description
Case insensitivity on label name (-Ci)	Turns off case sensitivity on label names. When this option is activated, the Assembler ignores case sensitivity for label names. If the Assembler generates object files but not absolute files directly (-FA2 assembler option), the case of exported or imported labels must still match. Or, the -Ci assembler option should be specified in the linker as well.
Define label (use spaces to separate labels) (-D)	Lets you define labels and assign them values. The labels are used for conditional compilation, where a common source file can be used to generate code for different processor derivatives, based on the labels supplied here.
Support for structured types (-Struct)	Enables the Macro Assembler to support the definition and usage of structured types. This allows an easier way to access ANSI-C structured variable in the Macro Assembler.
Angle brackets for macro arguments grouping (-CMacAngBrack)	Controls whether the < > syntax for macro invocation argument grouping is available. When it is disabled, the Assembler does not recognize the special meaning for < in the macro invocation context. There are cases where the angle brackets are ambiguous. In new code, use the [? ?] syntax instead. Options are: • **Allow** • **Disallow**
Square braces for macro arguments grouping (-CMacBrackets)	Controls the availability of the [? ?] syntax for macro invocation argument grouping. When it is disabled, the Assembler does not recognize the special meaning for [?] in the macro invocation context. Options are: • **Allow** • **Disallow**
Compatibitlity modes (-Compat)	Controls some compatibility enhancements of the Assembler. The goal is not to provide 100% compatibility with any other Assembler but to make it possible to reuse as much as possible. Various suboptions control different parts of the assembly.
Maximum MacroNest nesting (-MacroNest)	Controls how deep macros calls can be nested. Its main purpose is to avoid endless recursive macro invocations.

RS08 Assembler > Output

Use this panel to control how the assembler generates the output file, as well as error and warning messages. You can specify whether to allocate constant objects in ROM, generate debugging information, and strip file path information.

Figure 3.68 shows the **Output** panel.

Figure 3.68 Tool Settings - RS08 Assembler > Output

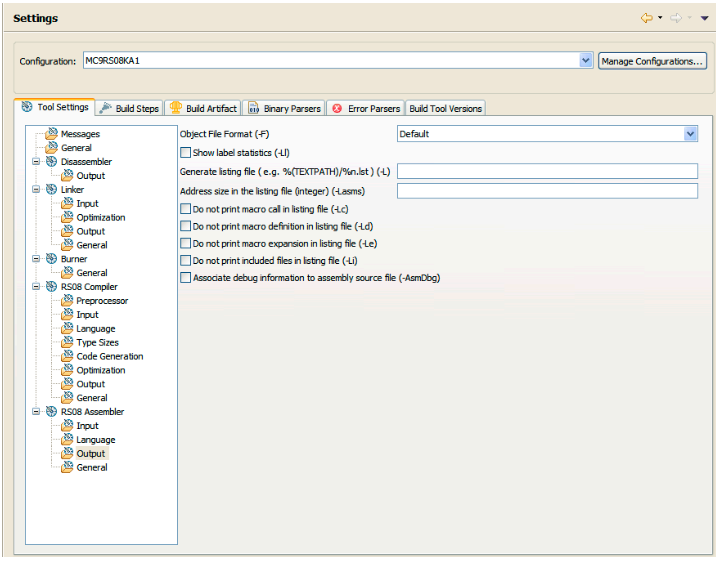


Table 3.30 lists and describes the output options for RS08 Assembler.

Table 3.61 Tool Settings - RS08 Assembler > Output Options

Option	Description
Object File Format	Defines the format for the output file generated by the Assembler.
Show label statistics (-Li)	Using the -Ll option, the Compiler appends statistical information about the compilation session to the specified file. The information includes Compiler options, code size (in bytes), stack usage (in bytes) and compilation time (in seconds) for each procedure of the compiled file. The Compiler appends the information to the specified filename (or the file make.txt, if no argument given). Set the TEXTPATH: Text File Path environment variable to store the file into the path specified by the environment variable. Otherwise the Compiler stores the file in the current directory.
Generate listing file (e.g. %(TEXTPATH)/ %n.lst) (-L)	The -Lasm option causes the Compiler to generate an assembler listing file directly. The Compiler also prints all assembler-generated instructions to this file. The option specifies the name of the file. If no name is specified, the Compiler takes a default of %n.lst. If the resulting filename contains no path information the Compiler uses the TEXTPATH: Text File Path environment variable. The syntax does not always conform with the inline assembler or the assembler syntax. Therefore, use this option only to review the generated code. It cannot currently be used to generate a file for assembly.
Address size in the listing file (-Lasms)	Specifies the size of the addresses displayed in the listing. Options are: • 1 to display addresses as xx • 2 to display addresses as xxxx • 3 to display addresses as xxxxxx • 4 to display addresses asf xxxxxxxx
Do not print macro call in listing file (-Lc)	Specifies whether macro calls encountered in the source code are expanded and appear in the listing file.
Do not print macro definition in listing file (-Ld)	Instructs the Assembler to generate a listing file but not including any macro definitions. The listing file contains macro invocation and expansion lines as well as expanded include files.

Table 3.61 Tool Settings - RS08 Assembler > Output Options (*continued*)

Option	Description
Do not print macro expansion in listing file (-Le)	Switches on the generation of the listing file, but macro expansions are not present in the listing file. The listing file contains macro definition and invocation lines as well as expanded include files.
Do not print included files in listing file (-Li)	Switches on the generation of the listing file, but include files are not expanded in the listing file. The listing file contains macro definition, invocation, and expansion lines.
Associate debug information to assembly source file (-AsmDbg)	Enables the Assembler to produce debugging information for the generated files and associate debug information to the assembly source file.

RS08 Assembler > General

Use this panel to specify the general assembler behavior. Figure 3.69 shows the **General** panel.

Figure 3.69 Tool Settings - RS08 Assembler > General

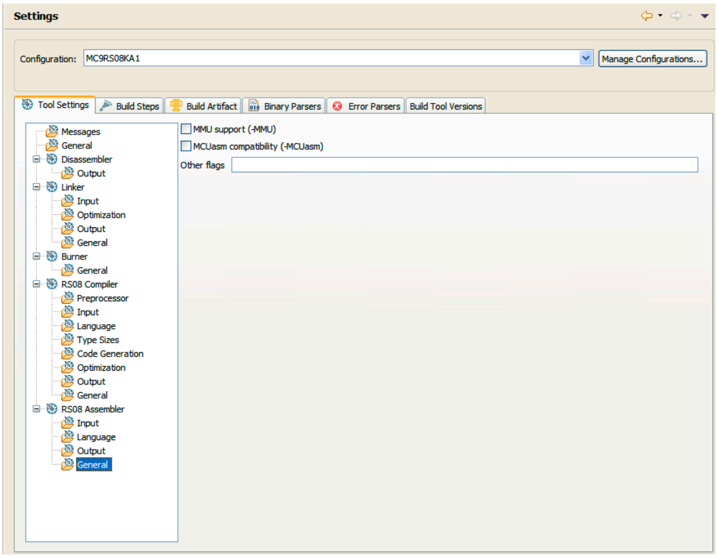


Table 3.31 lists and describes the general assembler options for RS08.

Table 3.62 Tool Settings - Assembler > General Options

Option	Description
MMU Support (-MMU)	Check to inform the compiler that CALL and RTC instructions are available, enabling code banking, and that the current architecture has extended data access capabilities, enabling support for `__linear` data types. This option can be used only when `-Cs08` is enabled.
MCUasm compatibility (-MCUasm)	Check to activate the compatibility mode with the MCUasm Assembler.
Other Flags	Specify additional command line options for the assembler; type in custom flags that are not otherwise available in the UI.

Build Properties for ColdFire

The **Properties for *<project>*** window shows the corresponding build properties for a ColdFire project (Figure 3.70).

Figure 3.70 Build Properties - ColdFire Debug

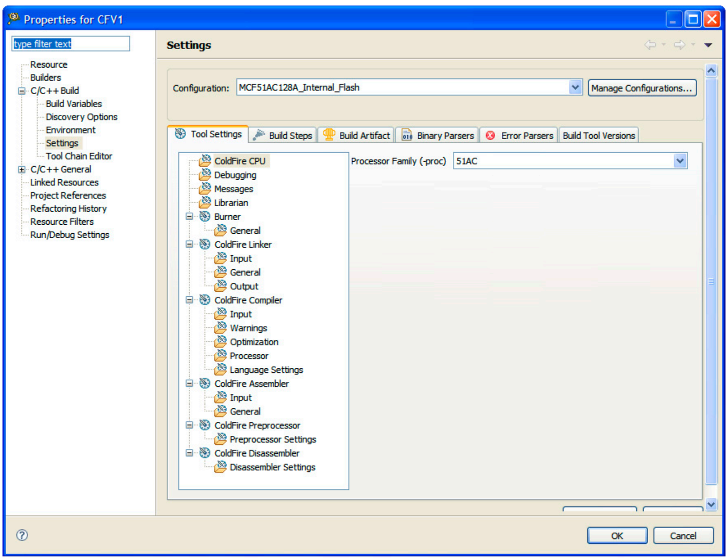


Table 3.63 lists the build properties specific to developing software for ColdFire Debug. The properties that you specify in these panels apply to the selected build tool on the **Tool Settings** page of the **Properties for *<project>*** window.

Table 3.63 Build Properties for ColdFire Debug

Build Tool	Build Properties Panels
ColdFire CPU	ColdFire CPU
Debugging	Debugging
Messages	Messages
Librarian	Librarian
Burner	Burner > General
ColdFire Linker	ColdFire Linker > Input
	ColdFire Linker > General
	ColdFire Linker > Output
ColdFire Compiler	ColdFire Compiler > Input
	ColdFire Compiler > Warnings
	ColdFire Compiler > Optimization
	ColdFire Compiler > Processor
	ColdFire Compiler > Language Settings
ColdFire Assembler	ColdFire Assembler > Input
	ColdFire Assembler > General
ColdFire Preprocessor	ColdFire Preprocessor > Preprocessor Settings
ColdFire Disassembler	ColdFire Disassembler > Disassembler Settings

ColdFire CPU

Use this panel to specify the CPU type, and the memory model that the architecture uses. The build tools (compiler, linker, and assembler) then use the properties set in this panel to generate CPU-specific code.

Figure 3.71 Tool Settings - ColdFire CPU

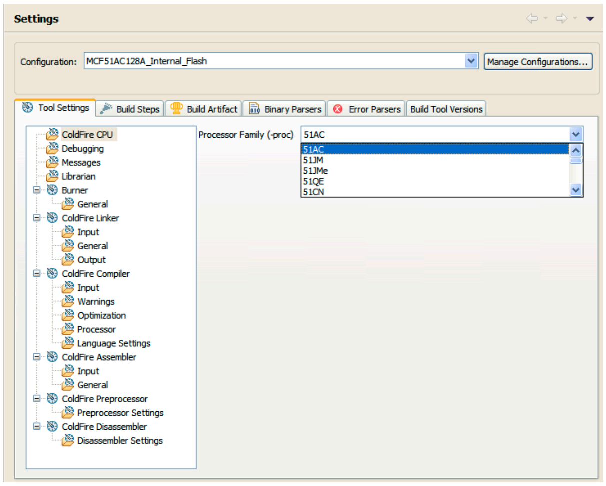


Table 3.64 lists and describes the ColdFire CPU options.

Table 3.64 Tool Settings - ColdFire CPU Options

Option	Description
Processor Family (-proc)	Lists the processor families supported by the ColdFire compiler. When you select a processor from this list, the compiler generates code that makes use of any of its hardware features or special instructions. For more detailed information on the features of each processor, consult its reference manual document.

Debugging

Use this panel to specify the whether to generate symbolic information for debugging the build target (Figure 3.72).

Figure 3.72 Tool Settings - Debugging

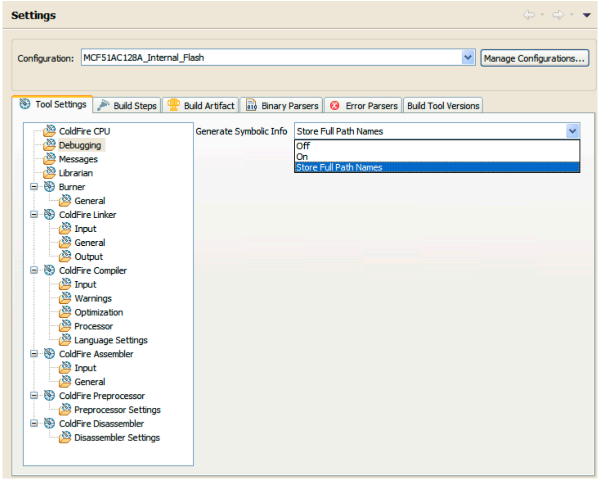


Table 3.65 lists and describes the debugging options.

Table 3.65 Tool Settings - Debugging Options

Option	Description
Generate Symbolic Info	Specify whether to generate symbolic information for debugging: • **Off -** Select if you do not want to generate symbolic information for debugging the build target. • **On -** Select to generate symbolic information for debugging the build target. • **Store Full Path Names -** Select to generate symbolic information and store full path names for debugging the build target.

Messages

Use this panel to specify the whether to generate symbolic information for debugging the build target (Figure 3.73).

Figure 3.73 Tool Settings - Messages

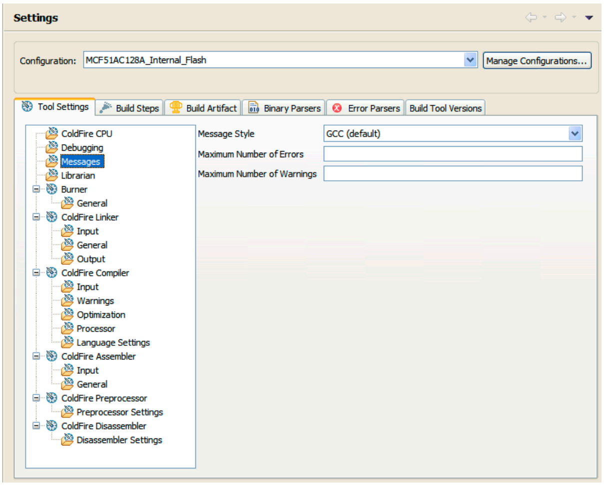


Table 3.66 lists and describes the message options.

Table 3.66 Tool Settings - Messages Options

Option	Description
Message Style	List options to select message style. • **GCC(default)** — Uses the message style of the Gnu Compiler Collection tools • **MPW** — Uses the Macintosh Programmer's Workshop (MPW®) message style • **Standard** — Uses the standard message style • **IDE** — Uses context-free machine parseable message style • **Enterprise-IDE —** Uses CodeWarrior's Integrated Development Environment (IDE) message style. • **Parseable** — Uses parseable message style.

Table 3.66 Tool Settings - Messages Options (*continued*)

Option	Description
Maximum Number of Errors	Specify the number of errors allowed until the application stops processing.
Maximum Number of Warnings	Specify the maximum number of warnings.

Librarian

Use this panel to select whether the linker will identify standard libraries (Figure 3.74).

Figure 3.74 Tool Settings - Librarian

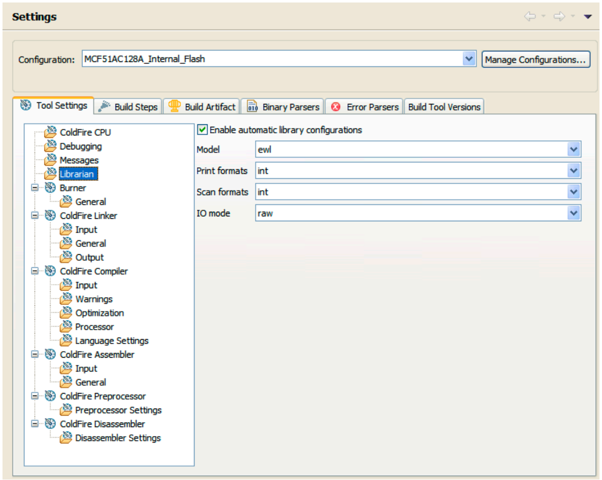


Table 3.67 lists and describes the librarian options.

Table 3.67 Tool Settings - Librarian Options

Option	Description
Enable automatic library configurations	Select to let the compiler identify standard libraries.
Model	Select a standard complying or EWL model from the drop-down list. EWL lets you precisely define the I/O operations. EWL drastically reduces the size of executables as you explicitly select the appropriate I/O behavior . Options are: `ewl`, `c9x`, `ewl_c++`, and `c9x_c++`.
Print formats	Select the print formats from the drop-down list. The available options are: `int`, `int_FP`, `int_LL`, and `int_LL_FP`.
Scan formats	Select the scan formats from the drop-down list. The available options are: `int`, `int_FP`, `int_LL`, and `int_LL_FP`.
IO Mode	Select the input-output mode from the drop-down list. The available options are: `raw` and `buffered`.

Burner

Use the Burner for ColdFire Preference Panel to map *.bbl (batch burner language) files to the Burner Plug-In. When the project folder contains a *.bbl file, *.bbl file processing during the post-link phase uses the settings in the Burner preference panel.

Figure 3.75 shows the ColdFire Burner settings.

Figure 3.75 Tool Settings > Burner

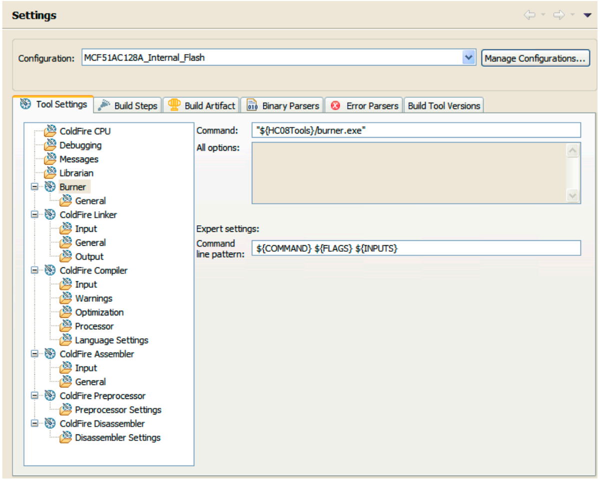


Table 3.68 lists and describes the burner options for ColdFire.

Table 3.68 Tool Settings - Burner Options

Option	Description
Command	Shows the location of the linker executable file. Default value is: `"${HC08Tools}/burner.exe"`
All options	Shows the actual command line the burner will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} ${INPUTS}`.

Burner > General

Use this panel to specify other flags for the ColdFire Burner to use.

Figure 3.76 shows the **General** panel.

Figure 3.76 Tool Settings - Burner > General

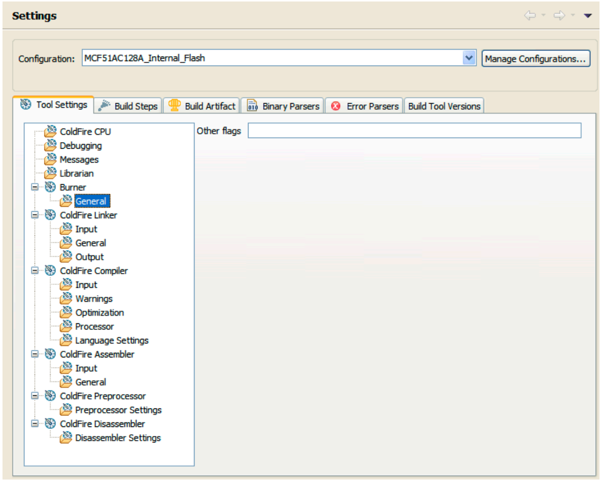


Table 3.69 lists and describes the general options for ColdFire burner.

Table 3.69 Tool Settings - Burner > General Options

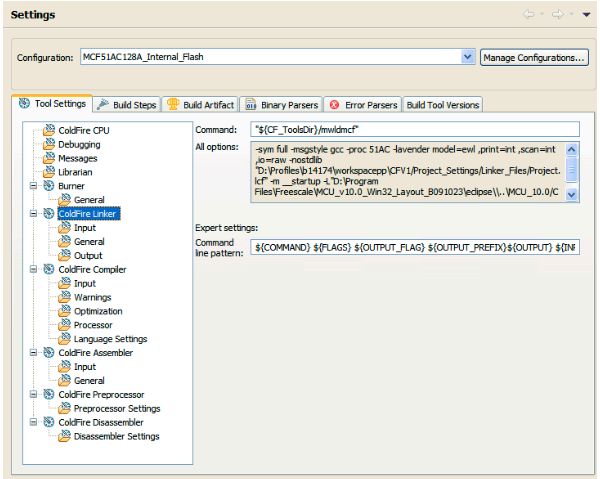
Option	Description
Other flags	Specify additional command line options for the burner; type in custom flags that are not otherwise available in the UI.

ColdFire Linker

Use this panel to specify ColdFire linker behavior. You can specify the command, options, and expert settings for the build tool linker. Additionally, the Linker tree control includes the input, general, and output settings.

Figure 3.77 shows the **ColdFire Linker** settings.

Figure 3.77 Tool Settings - ColdFire Linker



[Table 3.70](#) lists and describes the linker options for ColdFire.

Table 3.70 Tool Settings - ColdFire Linker Options

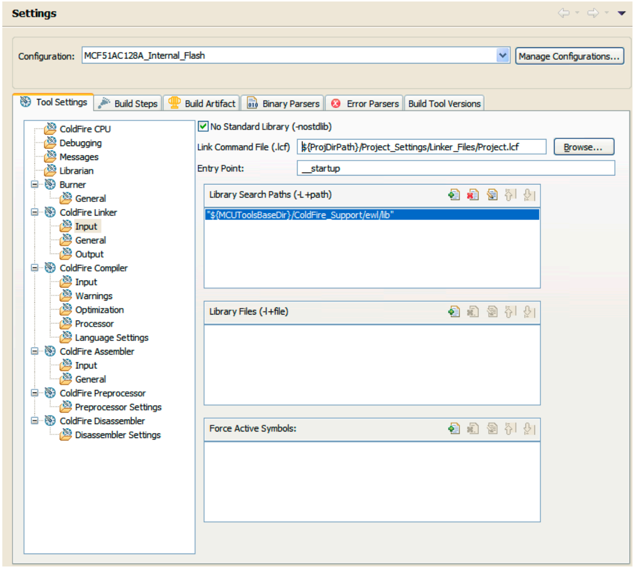
Option	Description
Command	Shows the location of the linker executable file. Default value is: `"${CF_ToolsDir}/mwldmcf"`.
All options	Shows the actual command line the ColdFire linker will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} ${OUTPUT_FLAG} ${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`.

ColdFire Linker > Input

Use this panel to specify files the **ColdFire Linker** should use. You can specify multiple additional libraries and library search paths. Also, you can change the order in which the IDE uses or searches the libraries.

[Figure 3.78](#) shows the **Input** panel.

Figure 3.78 Tool Settings - ColdFire Linker > Input



[Table 3.71](#) lists and describes the input options for ColdFire.

Table 3.71 Tool Settings - ColdFire Linker > Input Options

Option	Description
No Standard Library (-nostdlib)	Select if there is no standard library attached
Link Command File (.lcf)	Consists of three kinds of segments, which must be in this order: • A memory segment, which begins with the MEMORY{} directive • Optional closure segments, which begin with the FORCE_ACTIVE{}, KEEP_SECTION{}, or REF_INCLUDE{} directives • A sections segment, which begins with the SECTIONS{} directive

Table 3.71 Tool Settings - ColdFire Linker > Input Options (*continued*)

Option	Description
Entry Point	Specifies the program starting point: the first function the debugger uses upon program start; default: __start. This default function is in file ColdFire__startup.c. It sets up the ColdFire EABI environment before code execution. Its final task is calling main().
Library Search Paths (-L +path)	Specifies the search pathname of libraries or other resources related to the project. Type the pathname into this text box. Alternatively, click **Workspace** or **File system**, then use the subsequent dialog box to browse to the correct location.
Library Files ?(-l +file)	Specifies the pathname of libraries or other resources related to the project. Type the pathname into this text box. Alternatively, click **Workspace** or **File system**, then use the subsequent dialog box to browse to the correct location.
Force Active Symbols	Disables deadstripping for particular symbols, enter the symbol names in the Force Active Symbols text box of the ColdFire Linker Panel.

ColdFire Linker > General

Use this panel to specify the general linker behavior.

Figure 3.79 shows the **General** panel.

Figure 3.79 Tool Settings - ColdFire Linker > General

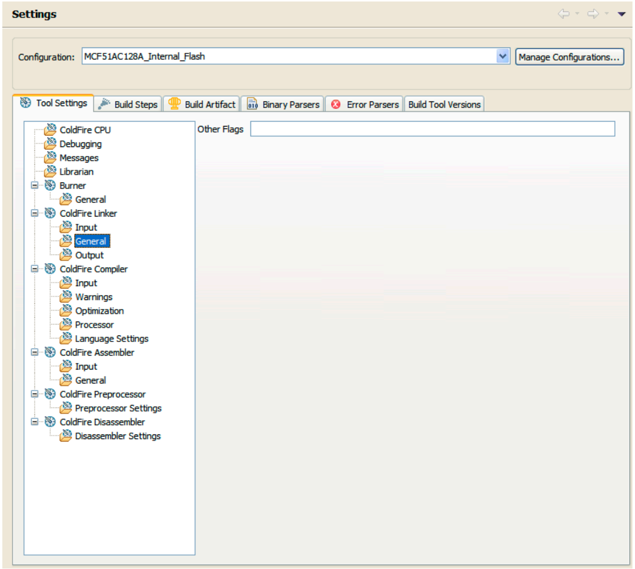


Table 3.72 lists and describes the general linker options for ColdFire.

Table 3.72 Tool Settings - ColdFire Linker > General Options

Option	Description
Other Flags	Specify additional command line options for the linker; type in custom flags that are not otherwise available in the UI.

ColdFire Linker > Output

Use this panel to specify the output settings for the ColdFire linker.

Figure 3.80 shows the **Output** panel.

Figure 3.80 Tool Settings - ColdFire Linker > Output

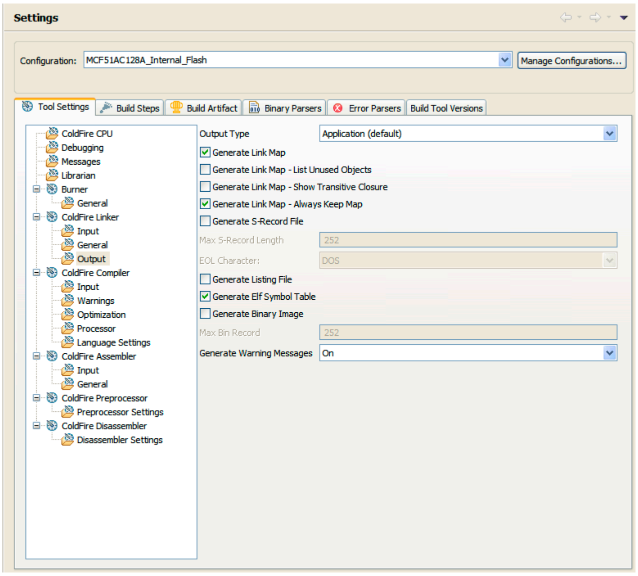


Table 3.73 lists and describes the output settings for ColdFire linker.

Table 3.73 Tool Settings - ColdFire Linker > Output Options

Option	Description
Output Type	Select application as Application (default), Static Library, or Shared Library.
Generate Link Map	Check to generate link map.
Generate Link Map - List Inused Objects	Check to generate link map and list unused objects; appears grayed out if the Generate Link Map checkbox is not checked.
Generate Link Map -Show Transitive Closure	Check to generate link map and show transitive closure; appears grayed out if the Generate Link Map checkbox is not checked.
Generate Link Map -Always Keep Map	Check to generate link map and always keep the map; appears grayed out if the Generate Link Map checkbox is not checked.
Generate Link Map - Generate S-Record File	Check to generate link map and generate a S-record file.

Table 3.73 Tool Settings - ColdFire Linker > Output Options (*continued*)

Option	Description
Max S-Record Length	Specify the maximum length for S-record; appears grayed out if the Generate S-Record File checkbox is not checked. The default value is 252.
EOL Character	Specify the end-of-line character; appears grayed out if the Generate S-Record File checkbox is not checked. The default value is DOS.
Generate Listing File	Check to generate a listing file named lstfil.lst.
Generate Elf Symbol Table	Check to generate an ELF symbol table.
Generate Binary Image	Check to generate a binary image.
Max Bin Record	Specify the maximumvalue for bin record; appears grayed out if the Generate Binary Image checkbox is not checked. The default value is 252.
Generate Warning Messages	Select whether you want to generate warning messages, warn superseded definitions, or treat warnings as errors.

ColdFire Compiler

Use this panel to specify the command, options, and expert settings for the build tool compiler. Additionally, the ColdFire Compiler tree control includes the general, include file search path settings.

Figure 3.81 shows the ColdFire Compiler settings.

Figure 3.81 Tool Settings - ColdFire Compiler

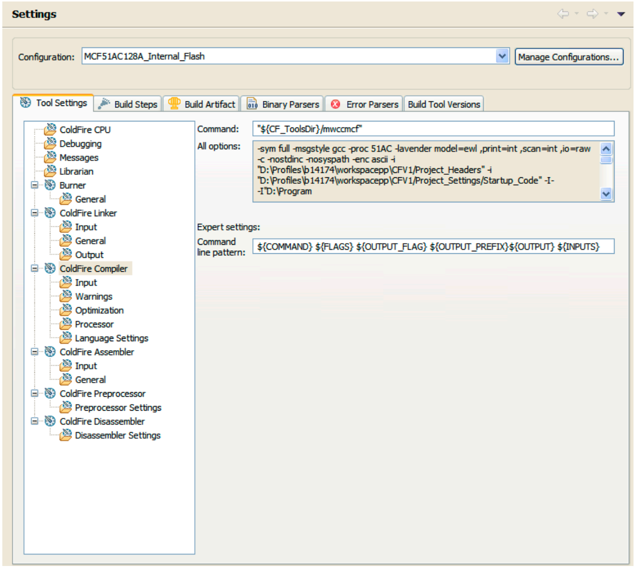


Table 3.74 lists and describes the compiler options for ColdFire.

Table 3.74 Tool Settings - Compiler Options

Option	Description
Command	Shows the location of the linker executable file. Default value is: `"${CF_ToolsDir}/mwccmcf"`.
All options	Shows the actual command line the ColdFire compiler will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} ${OUTPUT_FLAG} ${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`.

ColdFire Compiler > Input

Use this panel to specify additional files the **ColdFire Compiler** should use. You can specify multiple additional libraries and library search paths. Also, you can change the order in which the IDE uses or searches the libraries.

Figure 3.82 shows the **Input** panel.

Figure 3.82 Tool Settings - ColdFire Compiler > Input

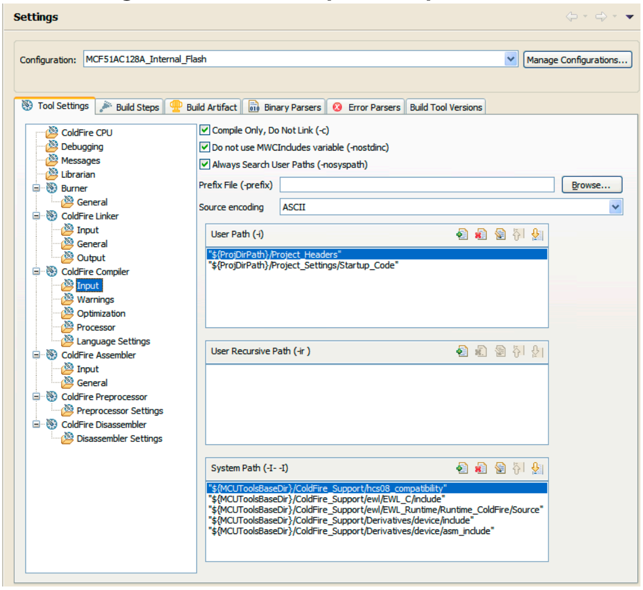


Table 3.75 lists and describes the input options for ColdFire compiler.

Table 3.75 Tool Settings - ColdFire Compiler > Input Options

Option	Description
Compile only, So Nt Link (-c)	Check if you want to compile only and do not want to link the file.
Do not use MWCIncludes variable (-nostdinc)	Check if you do not want to use MWCIncludes variable.
Always Search User Paths (-nosyspath)	Check if you want to always search user paths.
User Path (-i)	Lists the available user paths.
System Path	Lists the available system paths.

Table 3.76 lists and describes the toolbar buttons that help work with the user and system search paths.

Table 3.76 Search Paths Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add directory path** dialog box (Figure 3.83) and specify the search path.
	**Delete** — Click to delete the selected search path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit directory path** dialog box (Figure 3.84) and update the selected search path.
	**Move up** — Click to move the selected search path one position higher in the list
	**Move down** — Click to move the selected search path one position lower in the list

Figure 3.83 shows the **Add directory path** dialog box.

Figure 3.83 Add directory path Dialog Box

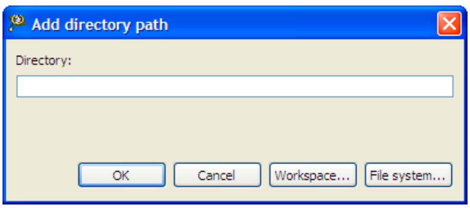
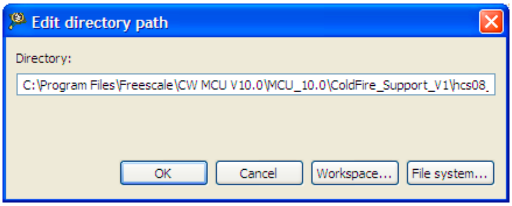


Figure 3.84 shows the **Edit directory path** dialog box.

Figure 3.84 Edit directory path Dialog Box



The buttons in the **Add directory path and Edit directory path** dialog boxes help work with the object file search paths.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel —** Click to cancel the action and exit the dialog box.
- **Workspace —** Click to display the **Folder Selection** dialog box and specify the object file search path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system —** Click to display the **Browse for Folder** dialog box and specify the object file search path. The resulting path appears in the appropriate list.

ColdFire Compiler > Warnings

Use this panel to control how the ColdFire compiler formats the listing file, as well as error and warning messages.

Figure 3.85 shows the **Warnings** panel.

Figure 3.85 Tool Settings - ColdFire Compiler > Warnings

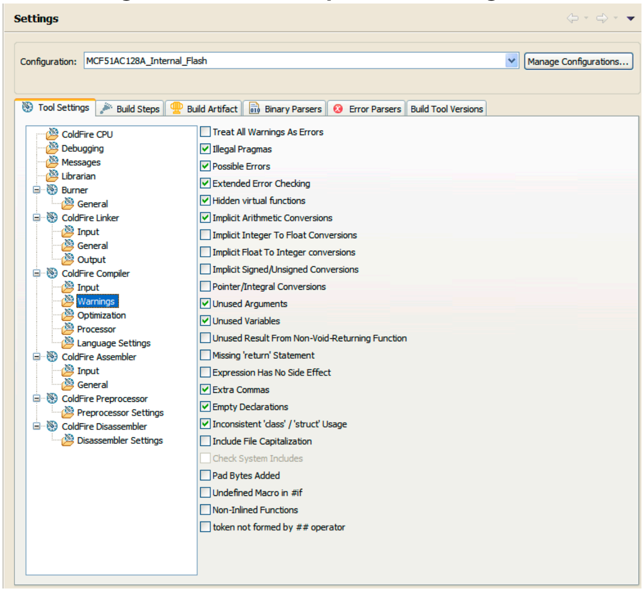


Table 3.77 lists and describes the warnings options for ColdFire compiler.

Table 3.77 Tool Settings - ColdFire Compiler > Warnings Options

Option	Description
Treat All Warnings As Errors	Check to treat all warnings as errors. The compiler will stop if it generates a warning message.
Illegal Pragmas	Check to notify the presence of illegal pragmas.
Possible Errors	Check to suggest possible errors.
Extended Error Checking	Check if you want to do an extended error checking.

Table 3.77 Tool Settings - ColdFire Compiler > Warnings Options (*continued*)

Option	Description
Hidden virtual functions	Check to generate a warning message if you declare a non-virtual member function that prevents a virtual function, that was defined in a superclass, from being called and is equivalent to pragma `warn_hidevirtual` and the command-line option `-warnings hidevirtual`.
Implicit Arithmentic Conversions	Check to warn of implict arithmetic conversions.
Implicit Integer to Float Conversions	Check to warn of implict conversion of an integer variable to floating-point type.
Implicit Float to Integer Conversions	Check to warn of implict conversions of a floating-point variable to integer type.
Implicit Signed/Unsigned Conversion	Check to enable warning of implict conversions between signed and unsigned variables.
Pointer/Integral Conversions	Check to enable warnings of conversions between pointer and integers.
Unused Arguments	Check to warn of unused arguments in a function.
Unused Variables	Check to warn of unused variables in the code.
Unused Result From Non-Void-Returning Function	Check to warn of unused result from non-void-returning functions.
Missing 'return' Statement	Check to warn of when a function lacks a return statement.
Expression Has No Side Effect	Check to issue a warning message if a source statement does not change the program's state. This is equivalent to the pragma `warn_no_side_effect`, and the command-line option `-warnings unusedexpr`.

Table 3.77 Tool Settings - ColdFire Compiler > Warnings Options (*continued*)

Option	Description
Extra Commas	Check to issue a warning message if a list in an enumeration terminates with a comma. The compiler ignores terminating commas in enumerations when compiling source code that conforms to the ISO/IEC 9899-1999 ("C99") standard and is equivalent to pragma `warn_extracomma` and the command-line `option -warnings extracomma`.
Empty Declarations	Check to warn of empty declarations.
Inconsistent ‘class’ / ‘struct’ Usage	Check to warn of inconsistent usage of class or struct.
Include File Capitalization	Check to issue a warning message if the name of the file specified in a #include "file" directive uses different letter case from a file on disk and is equivalent to pragma `warn_filenamecaps` and the command-line option `-warnings filecaps`.
Check System Includes	Check to issue a warning message if the name of the file specified in a #include <file> directive uses different letter case from a file on disk and is equivalent to pragma `warn_filenamecaps_system` and the command-line option `-warnings sysfilecaps`.
Pad Bytes Added	Check to issue a warning message when the compiler adjusts the alignment of components in a data structure and is equivalent to pragma `warn_padding` and the command-line option `-warnings padding`.
Undefined Macro in #if	Check to issues a warning message if an undefined macro appears in #if and #elif directives and is equivalent to pragma `warn_undefmacro` and the command-line option `-warnings undefmacro`.

Table 3.77 Tool Settings - ColdFire Compiler > Warnings Options (*continued*)

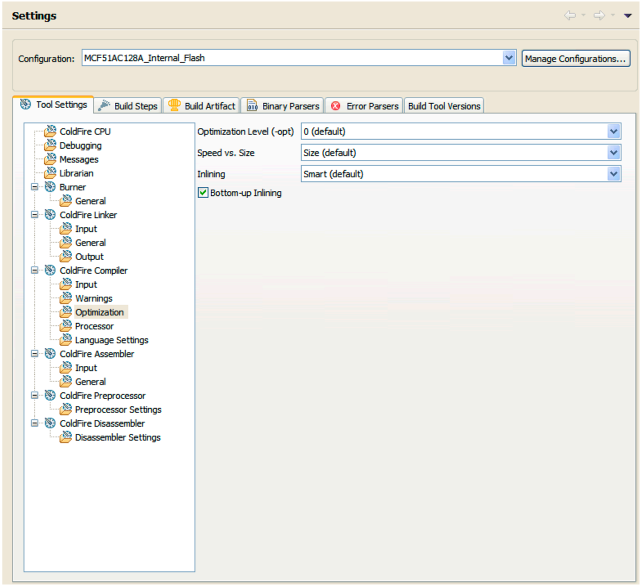
Option	Description
Non-Inlined Functions	Check to issue a warning message if a call to a function defined with the inline, __inline__, or __inline keywords could not be replaced with the function body and is equivalent to pragma `warn_notinlined` and the command-line option `-warnings notinlined`.
Token not formed by ## operator	Check to enable warnings for the illegal uses of the preprocessor's token concatenation operator (##). It is equivalent to the pragma `warn_illtokenpasting on`.

ColdFire Compiler > Optimization

Use this panel to control compiler optimizations. The compiler's optimizer can apply any of its optimizations in either global or non-global optimization mode. You can apply global optimization at the end of the development cycle, after compiling and optimizing all source files individually or in groups.

Figure 3.86 shows the **Optimization** panel.

Figure 3.86 Tool Settings - ColdFire Compiler > Optimization



[Table 3.78](#) lists and defines each option of the **Optimization** panel.

Table 3.78 Tool Settings - ColdFire Compiler > Optimization Options

Option	Description
Optimization Level (-opt)	Specify the optimizations that you want the compiler to apply to the generated object code: • **0—**Disable optimizations. This setting is equivalent to specifying the `-O0` command-line option. The compiler generates unoptimized, linear assembly-language code. • **1—**The compiler performs all target-independent (that is, non-parallelized) optimizations, such as function inlining. This setting is equivalent to specifying the `-O1` command-line option. The compiler omits all target-specific optimizations and generates linear assembly-language code. • **2—**The compiler performs all optimizations (both target-independent and target-specific). This setting is equivalent to specifying the `-O2` command-line option. The compiler outputs optimized, non-linear, parallelized assembly-language code. • **3—**The compiler performs all the level **2** optimizations, then the low-level optimizer performs global-algorithm register allocation. This setting is equivalent to specifying the `-O3` command-line option. At this optimization level, the compiler generates code that is usually faster than the code generated from level **2** optimizations.
Speed Vs Size	Use to specify an **Optimization Level** greater than **0**. • **Speed—**The compiler optimizes object code at the specified **Optimization Level** such that the resulting binary file has a faster execution speed, as opposed to a smaller executable code size. • **Size—**The compiler optimizes object code at the specified **Optimization Level** such that the resulting binary file has a smaller executable code size, as opposed to a faster execution speed. This setting is equivalent to specifying the `-Os` command-line option.

Table 3.78 Tool Settings - ColdFire Compiler > Optimization Options (*continued*)

Option	Description
Inlining	Enables inline expansion. If there is a #pragma INLINE before a function definition, all calls of this function are replaced by the code of this function, if possible. Using the -Oi=c0 option switches off inlining. Functions marked with the #pragma INLINE are still inlined. To disable inlining, use the -Oi=OFF option.
Bottom-up Inlining	Check to control the bottom-up function inlining method. When active, the compiler inlines function code starting with the last function in the chain of functions calls, to the first one.

ColdFire Compiler > Processor

Use this panel to specify processor behavior. You can specify the file paths and define macros.

Figure 3.87 shows the **Processor** panel.

Figure 3.87 Tool Settings - ColdFire Compiler > Processor

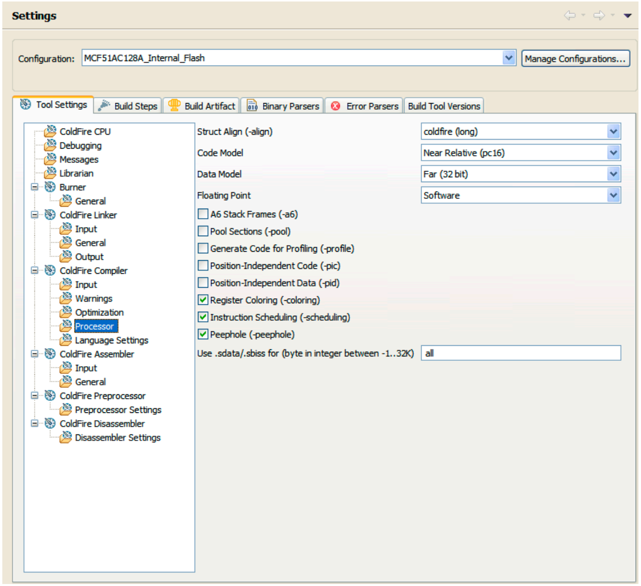


Table 3.79 lists and defines each option of the **Processor** panel.

Table 3.79 Tool Settings - ColdFire Compiler > Processor Options

Option	Description
Struct Align (-align)	Specifies record and structure alignment in memory: • **Byte** — Aligns all fields on 1 byte boundaries • **68k (word)** — Aligns all fields on word boundaries • **coldfire (long)** — Aligns all fields on long word boundaries • **Default —** Coldfire (long). This panel element corresponds to the options align pragma. **Note**: When you compile and link, ensure that alignment is the same for all files and libraries.
Code Model	Specifies access addressing for data and instructions in the object code: • **Smart** — Relative (16-bit) for function calls in the same segment; otherwise absolute (32-bit) • **Near (16 bit)** — Relative for all function calls • **Far (32 bit)** — Absolute for all function calls
Data Model	Specifies global-data storage and reference: • **Far (32 bit)** — Storage in far data space; available memory is the only size limit. • **Near (16 bit)** — Storage in near data space; size limit is 64K. • **Default** — Far (32 bit). This panel element corresponds the far_data pragma

Table 3.79 Tool Settings - ColdFire Compiler > Processor Options (*continued*)

Option	Description
Floating Point	Specifies handling method for floating point operations: • **Software** — C runtime library code emulates floating-point operations. • **Hardware** — Processor hardware performs floating point operations; only appropriate for processors that have floating-point units. • **None** Default: Software For software selection, your project must include the appropriate FP_ColdFire C runtime library file. Grayed out if your target processor lacks an FPU.
A6 Stack Frame (-a6)	Clear to disable call-stack tracing; generates faster and smaller code. By default, the option is checked.
Pool Sections (-pool)	Check to collect all string constants into a single data object so your program needs one data section for all of them.
Generate Code for Profiling (-profile)	Check to enable the processor generate code for use with a profiling tool. Checking this box corresponds to using the command-line option `-profile`. Clearing this checkbox is equivalent to using the command-line option `-noprofile`
Position-Independent Code (-pic)	Check to generate position independent code (PIC) that is non relocatable.
Position-Independent Data (-pid)	Check to generate non-relocatable position-independent data (PID). PID is available with 16- and 32-bit addressing.
Register Coloring (-coloring)	Clear to enable the Compiler force all local variables to be stack-based except for compiler generated temporaries.

Table 3.79 Tool Settings - ColdFire Compiler > Processor Options (*continued*)

Option	Description
Instruction Scheduling (-scheduling)	Clear to prevent from scheduling instructions.
Peephole (-peephole)	Clear to prevent the compiler from compiling long instruction sequences into compact ones. By default, the option is checked. When on (default setting) it does not affect debugging unless the resulting instruction is a memory-to-memory operation which might make a variable used as temporary disappear.
Use .sdata.sbiss for (byte in integer between -1.32K)	The options are: • All data — Select this option button to store all data items in the small data address space • All data smaller than — Select this option button to specify the maximum size for items stored in the small data address space; enter the maximum size in the text box. Using the small data area speeds data access, but has ramifications for the hardware memory map. The default settings specify not using the small data area. By default,All data smaller than is checked.

ColdFire Compiler > Language Settings

Use this panel direct the ColdFire compiler to apply specific processing modes to the language source code. You can compile source files with just one collection at a time. To compile source files with multiple collections, you must compile the source code sequentially. After each compile iteration change the collection of settings that the ColdFire compiler uses.

Figure 3.88 shows the **Language Settings** panel.

Figure 3.88 Tool Settings - ColdFire Compiler > Language Settings

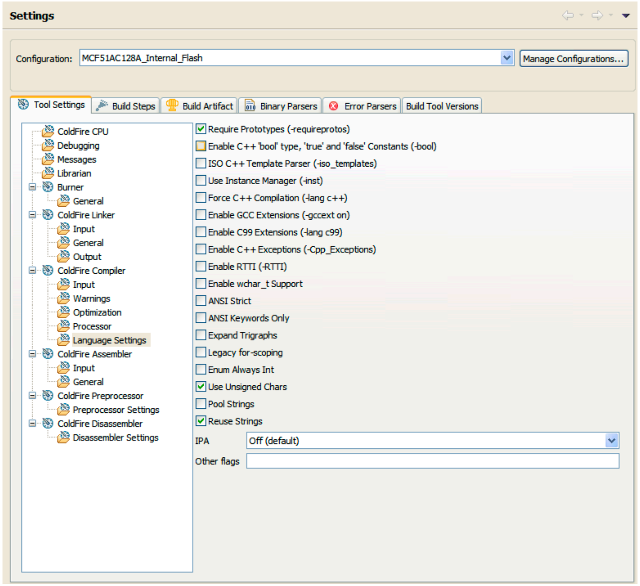


Table 3.80 lists and defines each option of the **Language Settings** panel.

Table 3.80 Tool Settings - ColdFire Compiler > Language Settings Options

Option	Description
Require Prototypes (-requireprotos)	Check to enforce the requirement of function prototypes. the compiler generates an error message if you define a previously referenced function that does not have a prototype. If you define the function before it is referenced but do not give it a prototype, this setting causes the compiler to issue a warning message.
Enable C++ ‘bool’ type, ‘true’ and ‘false’ Constants (-bool)	**Check to enable the** C++ compiler recognize the bool type and its true and false values specified in the ISO/IEC 14882-1998 C++ standard; is equivalent to pragma `bool` and the command-line option `-bool`.

Table 3.80 Tool Settings - ColdFire Compiler > Language Settings Options (*continued*)

Option	Description
ISO C++ Template Parser (-iso_templates)	**Check to** follow the ISO/IEC 14882-1998 standard for C++ to translate templates, enforcing more careful use of the typename and template keywords. The compiler also follows stricter rules for resolving names during declaration and instantiation and is equivalent to pragma `parse_func_templ` and the command-line `option -iso_templates`.
Use Instance Manager (-inst)	**Check to r**educe compile time by generating any instance of a C++ template (or non-inlined inline) function only once.
Force C++ Compilation (-lang c99)	**Check to** translates all C source files as C++ source code and is equivalent to pragma `cplusplus` and the command-line option `-lang c++`.
Enable GCC extensions (-gcc)	**Check to** recognize language features of the GNU Compiler Collection (GCC) C compiler that are supported by CodeWarrior compilers; is equivalent to pragma `gcc_extensions` and the command-line option `-gcc_extensions`.
Enable C99 Extensions (-lang c99)	**Check to r**ecognize ISO/IEC 9899-1999 ("C99") language features; is equivalent to pragma `c99` and the command-line option `-dialect c99`.
Enable C++ Exceptions (-Cpp_Exceptions)	**Check to** generate executable code for C++ exceptions; is equivalent to pragma `exceptions` and the command-line option `-cpp_exceptions`.
Enable RTTI (-RTTI)	Check to allow the use of the C++ runtime type information (RTTI) capabilities, including the `dynamic_cast` and `typeid` operators; is equivalent to pragma RTTI and the command-line option -RTTI.

Table 3.80 Tool Settings - ColdFire Compiler > Language Settings Options (*continued*)

Option	Description
Enable wchar_tSupport	**Check to enable** C++ compiler recognize the wchar_t data type specified in the ISO/IEC 14882-1998 C++ standard; is equivalent to pragma `wchar_type` and the command-line option `-wchar_t`.
ANSI Strict	Check to enable C compiler operate in strict ANSI mode. In this mode, the compiler strictly applies the rules of the ANSI/ISO specification to all input files. This setting is equivalent to specifying the `- ansi` command-line option. The compiler issues a warning for each ANSI/ISO extension it finds.
ANSI Keywords Only	**Check to** generate an error message for all non-standard keywords (ISO/IEC 9899-1990 C, §6.4.1). If you must write source code that strictly adheres to the ISO standard, enable this setting; is equivalent to pragma `only_std_keywords` and the command-line option `-stdkeywords`.
Expand Trigraphs	**Check to** recognize trigraph sequences (ISO/IEC 9899-1990 C, §5.2.1.1); is equivalent to **pragma** `trigraphs` **and the command-line option** `-trigraphs`.
Legacy for-scoping	**Check to g**enerate an error message when the compiler encounters a variable scope usage that the ISO/IEC 14882-1998 C++ standard disallows, but is allowed in the C++ language specified in The Annotated C++ Reference Manual ("ARM"); is equivalent to pragma `ARM_scoping` and the command-line option `-for_scoping`.
Enum Always Int	**Check to u**se signed integers to represent enumerated constants and is equivalent to pragma `enumsalwaysint` and the command-line option `-enum`.
Use Unsigned Chars	**Check to t**reat char declarations as unsigned char declarations and is equivalent to pragma `unsigned_char` and the command-line option `-char unsigned`.

Table 3.80 Tool Settings - ColdFire Compiler > Language Settings Options (*continued*)

Option	Description
Pool Strings	**Check to** collect all string constants into a single data section in the object code it generates and is equivalent to pragma `pool_strings` and the command-line `option -strings pool`.
Reuse Strings	**Check to** store only one copy of identical string literals and is equivalent to opposite of the pragma `dont_reuse_strings` and the command-line `option -string reuse`.
IPA	Specifies the Interprocedural Analysis (IPA) policy. • **Off** — No interprocedural analysis, but still performs function-level optimization. Equivalent to the "no deferred inlining" compilation policy of older compilers. • **File** — Completely parse each translation unit before generating any code or data. Equivalent to the "deferred inlining" option of older compilers. Also performs an early dead code and dead data analysis in this mode. Objects with unreferenced internal linkages will be dead-stripped in the compiler rather than in the linker. • **Program** —Completely parse the entire program before optimizing and generating code, providing many optimization benefits. For example, the compiler can auto-inline functions that are defined in another translation unit.
Other flags	Specify additional command line options for the compiler; type in custom flags that are not otherwise available in the UI.

ColdFire Assembler

Use this panel to specify the command, options, and expert settings for the build tool assembler. Additionally, the Assembler tree control includes the general and include file search path settings.

Figure 3.89 shows the **Assembler** settings.

Figure 3.89 Tool Settings - ColdFire Assembler

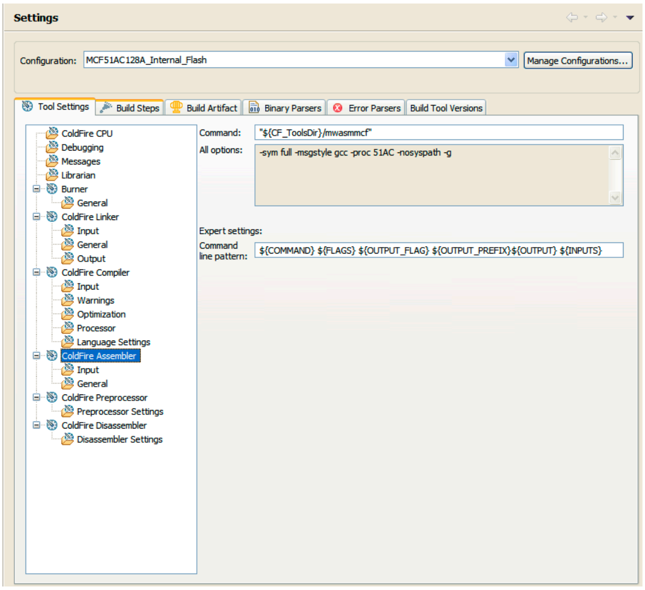


Table 3.81 lists and defines each option of the **ColdFire Assembler** panel.

Table 3.81 Tool Settings - ColdFire Assembler Options

Option	Description
Command	Shows the location of the assembler executable file.
All options	Shows the actual command line the assembler will be called with.
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is `${COMMAND} ${FLAGS} ${OUTPUT_FLAG} ${OUTPUT_PREFIX}${OUTPUT} ${INPUTS}`.

ColdFire Assembler > Input

Use this panel to specify additional files the **ColdFire Assembler** should use. You can specify multiple additional libraries and library search paths. Also, you can change the order in which the IDE uses or searches the libraries.

Figure 3.90 shows the **Input** panel.

Figure 3.90 Tool Settings - ColdFire Assembler > Input

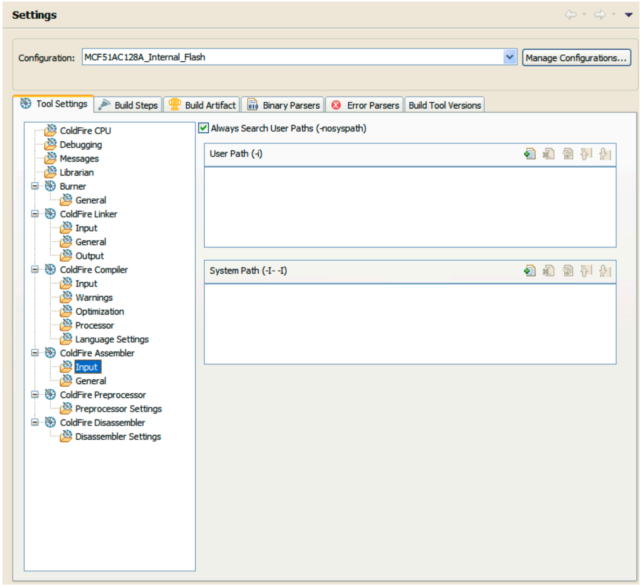


Table 3.82 lists and describes the input options for ColdFire assembler.

Table 3.82 Tool Settings - ColdFire Compiler > Input Options

Option	Description
User Path (-i)	Lists the available user paths.
System Path	Lists the available system paths.

Table 3.83 lists and describes the toolbar buttons that help work with the user and system search paths.

Table 3.83 Search Paths Toolbar Buttons

Button	Description
	**Add** — Click to open the **Add directory path** dialog box (Figure 3.91) and specify the search path.
	**Delete** — Click to delete the selected search path. To confirm deletion, click **Yes** in the **Confirm Delete** dialog box.
	**Edit** — Click to open the **Edit directory path** dialog box (Figure 3.92) and update the selected search path.
	**Move up** — Click to move the selected search path one position higher in the list
	**Move down** — Click to move the selected search path one position lower in the list

Figure 3.91 shows the **Add directory path** dialog box.

Figure 3.91 Add directory path Dialog Box

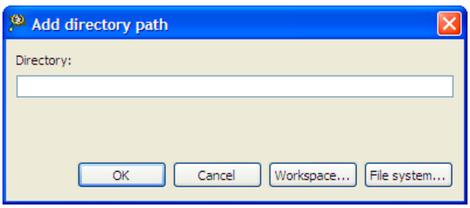
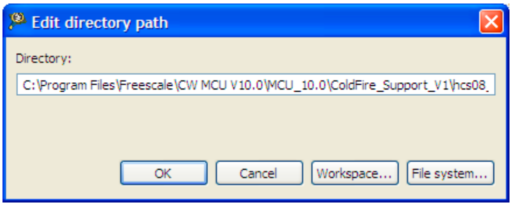


Figure 3.92 shows the **Edit directory path** dialog box.

Figure 3.92 Edit directory path Dialog Box



The buttons in the **Add directory path and Edit directory path** dialog boxes help work with the object file search paths.

- OK — Click to confirm the action and exit the dialog box.
- **Cancel —** Click to cancel the action and exit the dialog box.
- **Workspace —** Click to display the **Folder Selection** dialog box and specify the object file search path. The resulting path, relative to the workspace, appears in the appropriate list.
- **File system —** Click to display the **Browse for Folder** dialog box and specify the object file search path. The resulting path appears in the appropriate list.

ColdFire Assembler > General

Use this panel to specify the general assembler behavior.

Figure 3.93 shows the **General** panel.

Figure 3.93 Tool Settings - ColdFire Assembler > General

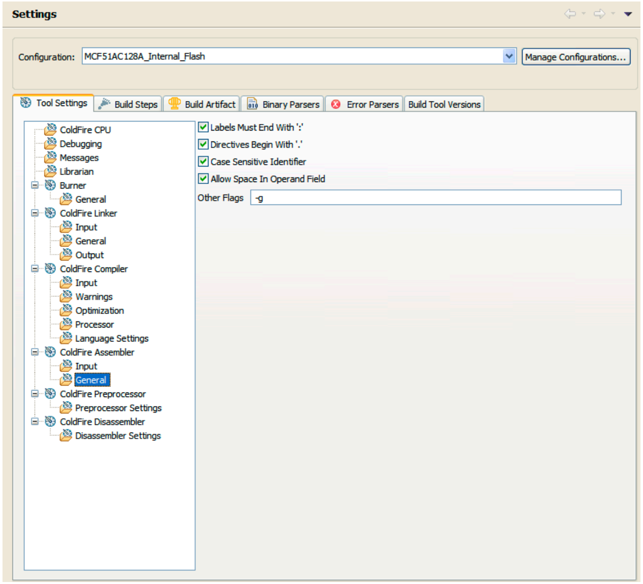


Figure 3.85 lists and describes the general assembler options for ColdFire.

Table 3.84 Tool Settings - Assembler > General Options

Option	Description
Label Must End With ‘:’	Clear if system does not require labels to end with colons. By default, the option is checked.
Directives Begin With ‘.’	Clear if the system does not require directives to start with periods. By default, the option is checked.
Case Sensitive Identifier	Clear to instruct the assembler to ignore case in identifiers. By default, the option is checked.
Allow Space In Operand Field	Clear to restrict the assembler from adding spaces in operand fields. By default, the option is checked.
Other Flags	Specify additional command line options for the assembler; type in custom flags that are not otherwise available in the UI.

ColdFire Preprocessor

Use this panel to specify preprocessor behavior and define macros.

Figure 3.94 shows the **Preprocessor** panel.

Figure 3.94 Tool Settings - ColdFire Preprocessor

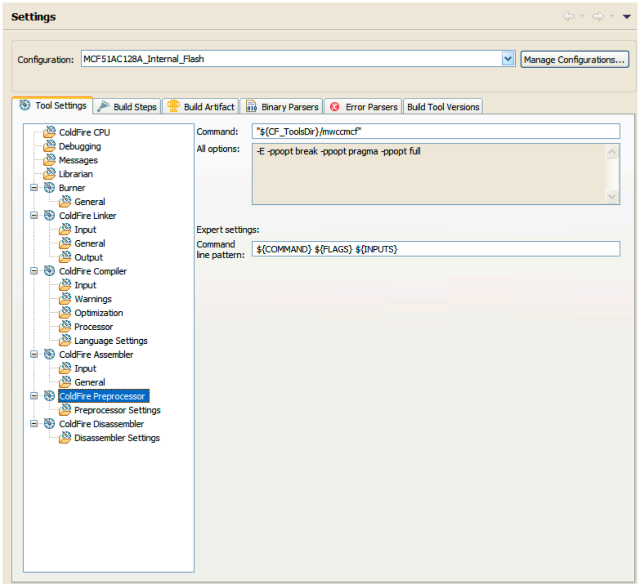


Figure 3.46 lists and describes the preprocessor options for ColdFire.

Table 3.85 Tool Settings - ColdFire Preprocessor Options

Option	Description
Command	Shows the location of the disassembler executable file
All options	Shows the actual command line the preprocessor will be called with
Expert Settings Command line pattern	Shows the expert settings command line parameters; default `${COMMAND} ${FLAGS} ${INPUTS}`

ColdFire Preprocessor > Preprocessor Settings

Use this panel to specify preprocessor behavior.

Figure 3.95 shows the **Preprocessor** panel.

Figure 3.95 Tool Settings - ColdFire Preprocessor> Preprocessor Settings

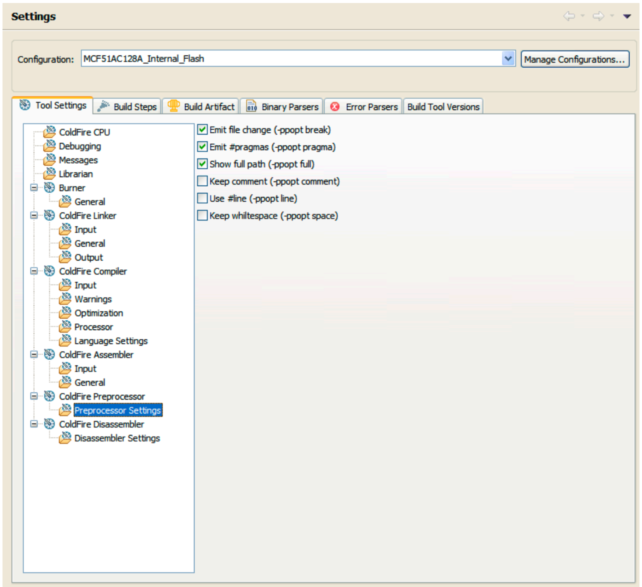


Table 3.86 lists and describes the preprocessor options for ColdFire.

Table 3.86 Tool Settings - ColdFire Compiler > Preprocessor Options

Option	Description
Emit file change (-ppopt break)	Check to notify file changes (or #line changes) appear in the output.
Emit #pragmas (-ppopt pragma)	Check to show pragma directives in the preprocessor output. Essential for producing reproducible test cases for bug reports.
Show full path (-ppopt full)	Check to display file changes in comments (as before) or in #line directives.
Keep comment (-ppopt comment)	Check to display comments in the preprocessor output.

Table 3.86 Tool Settings - ColdFire Compiler > Preprocessor Options (*continued*)

Option	Description
Use #include line (-ppopt line)	Check to display file changes in comments (as before) or in #line directives.
Keep whitespace (-ppopt nospace)	Check to copy whitespaces in preprocessor output. This is useful for keeping the starting column aligned with the original source, though the compiler attempts to preserve space within the line. This does not apply when macros are expanded.

ColdFire Disassembler

Use this panel to specify the command, options, and expert settings for **ColdFire Disassembler.**

Figure 3.96 shows the **ColdFire Disassembler** page.

Figure 3.96 Tool Settings - ColdFire Disassembler

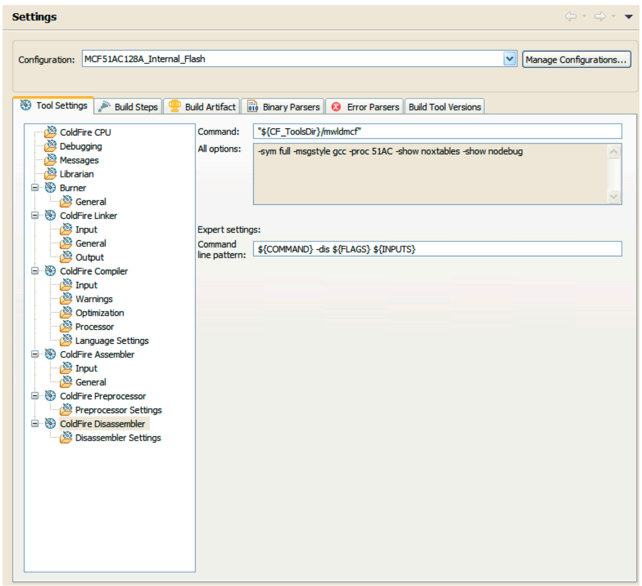


Table 3.87 lists and describes the ColdFire disassembler options.

Table 3.87 Tool Settings - Linker Options

Option	Description
Command	Shows the location of the disassembler executable file
All options	Shows the actual command line the linker will be called with
Expert Settings Command line pattern	Shows the expert settings command line parameters; default is`${COMMAND} -dis ${FLAGS} ${INPUTS}`

ColdFire Disassembler > Disassembler Settings

Use this panel to control how the disassembler formats the listing file, as well as error and warning messages. You can specify verbosity of messages, whether to show headers, core modules, extended mnemonics, addresses, object or source code, ldata modules, exception tables, and debug information.

Figure 3.97 shows the **ColdFire Disassembler** settings.

Figure 3.97 Tool Settings - ColdFire Disassembler Settings

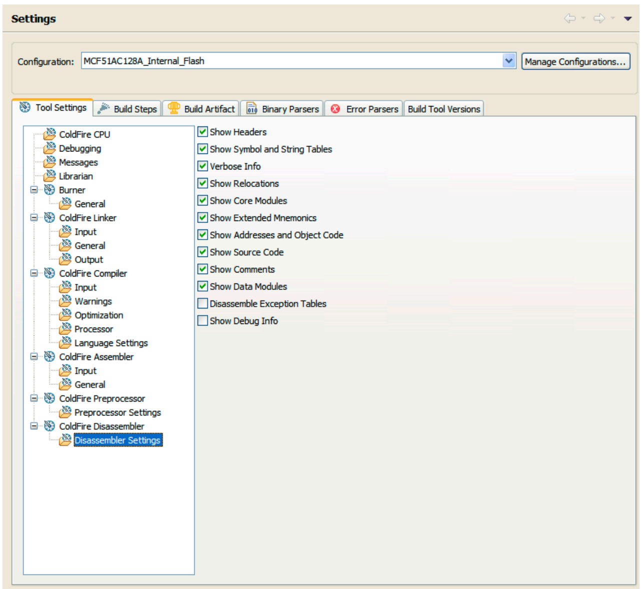


Table 3.88 lists and describes the ColdFire disassembler settings.

Table 3.88 Tool Settings - ColdFire Disassembler Options

Option	Description
Show Headers	Check to display headers in the listing file; disassembler writes listing headers, titles, and subtitles to the listing file
Show Symbol and String Tables	Check to display symbol and string tables directives to the listing file
Verbose Info	Check to shows each command line that it passes to the shell, along with all progress, error, warning, and informational messages that the tools emit
Show Core Modules	Check to show core modules in the listing file
Show Extended Mnemonics	Check to show the extended mnemonics in the listing file
Show Addresses and Object Code	Check to show the addresses and object code in the listing file
Show Source Code	Check to show the source code in the listing file
Show Comments	Check to show the comments in the listing file
Show Data Modules	Check to show the data modules in the listing file
Disassemble Exception Tables	Check to disassemble exception tables in the listing file
Show Debug Info	Check to generate symbolic information for debugging the build target

4 Working with Debugger

This chapter explains how to use the CodeWarrior™ development tools to debug the bare board and externally built executable files for microcontrollers.

This chapter also documents debugger features that are specific to the CodeWarrior Development Studio for Microcontrollers product. For documentation of debugger features that are common in all CodeWarrior products, refer to the *Freescale Eclipse Extensions Guide*.

The topics in this chapter are:

- Standard Debugging Features
- Debugging Bare Board Software
- Debugging Externally Built Executable Files

Standard Debugging Features

This topic describes debugging features that apply to all of the microcontrollers:

- CodeWarrior Debugger Settings
- Debugging Code
- Attaching Processes
- Connecting Target

CodeWarrior Debugger Settings

A CodeWarrior project can have multiple associated launch configurations. A launch configuration is a named collection of settings that the CodeWarrior tools use.

The CodeWarrior project wizard generates launch configurations with names that follow the pattern ***projectname*** - ***configtype*** - ***targettype***, where:

- ***projectname*** represents the name of the project
- ***configtype*** represents the type of launch configuration
- ***targettype*** represents the type of target software or hardware on which the launch configuration acts

Launch configurations for debugging code let you specify settings, such as:

- the files that belong to the launch configuration
- behavior of the debugger and the related debugging tools

Editing Debugger Settings

When you use the CodeWarrior wizard to create a new project, the wizard sets the debugger settings of the project's launch configurations to default values. You can change these default values based on your program's requirements.

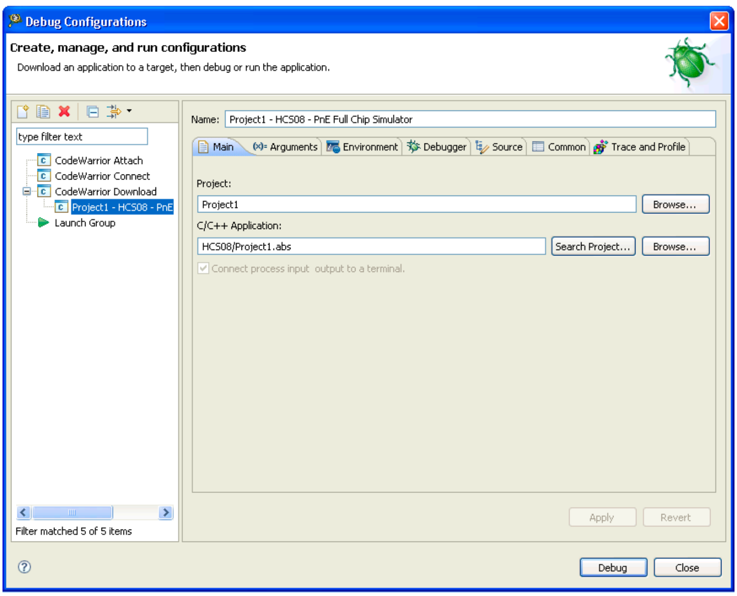
To modify the debugger settings:

1. Start the CodeWarrior IDE.
2. From the main menu bar of the IDE, select **Run** > **Debug Configurations**.

   The **Debug Configurations** dialog box appears. The left side of this window has a list of debug configurations that apply to the current application.
3. Expand the **CodeWarrior Download** configuration.
4. From the expanded list, select the debug configuration that you want to modify.

   Figure 4.1 shows the **Debug Configurations** dialog box with the settings for the debug configuration you selected.

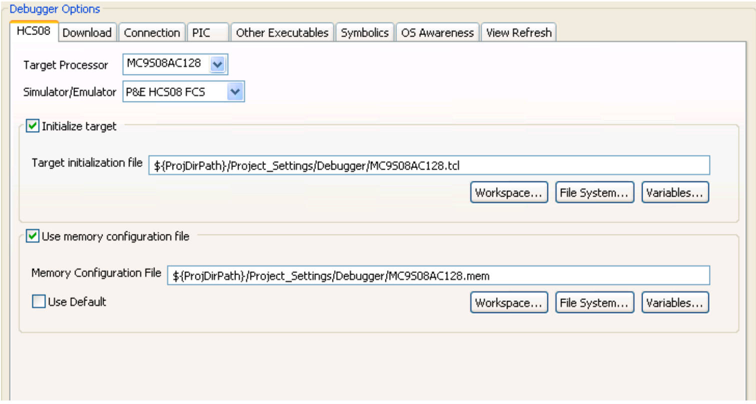
Figure 4.1 Debug Configurations Dialog Box



5. In the group of tabs in the upper-right side of the window, click the **Debugger** tab.

   The debugger setting page appears in the area beneath the tabs (Figure 4.2.)

Figure 4.2 Debugger Page



6. Change the settings on this page as per your requirements. Refer Table 4.1 for details on the various settings of this page.
7. Click **Apply** to save the new settings.
8. Click **Revert** to undo any of the unsaved changes.

   The IDE restores the last set of saved settings to all pages of the **Debug Configurations** dialog box. Also, the IDE disables **Revert** until you make new pending changes.

Reverting Debugger Settings

As you modify a launch configuration's debugger settings, you create pending, or unsaved, changes to that launch configuration.

- To save the pending changes, you must click the **Apply** button of the **Debug Configurations** dialog box, or click the **Close** button and then the **Yes** button.

You can revert pending changes and restore their last saved settings:

- To undo pending changes, click the **Revert** button at the bottom of the **Debug Configurations** dialog box.

The IDE restores the last set of saved settings to all pages of the **Debug Configurations** dialog box. Also, the IDE disables the **Revert** button until you make new pending changes.

Debugger Settings for Supported Microcontrollers

You select the debugger to use from the Debugger list box at the top of the **Debugger** page. These are the debugger types:

- CodeWarrior Debugger for HCS08
- CodeWarrior Debugger for RS08
- CodeWarrior Debugger for ColdFire
- CodeWarrior Linux Application Debugger for ColdFire.

After you have selected the debugger, you next use the settings tabs within the **Debugger Options** area to modify its settings.

This topic covers the settings tabs for the CodeWarrior Debugger for the various microcontrollers. Table 4.1 lists the settings for the various debuggers.

The tabs are also organized into sub-topics whose settings apply only to specific microcontrollers. There is also a sub-section whose settings apply to all of them. These sub-topics are:

- HCS08-specific Settings
- RS08-specific Settings
- ColdFire-specific Settings
- Settings Common to all Microcontrollers

Table 4.1 Debugger Setting Tabs

Debugger	Debugger Settings
CodeWarrior Debugger for HCS08	HCS08 Tab
	Download Tab
	Connection Tab — HCS08
	PIC Tab
	Other Executables Tab
	Symbolics Tab

Table 4.1 Debugger Setting Tabs (*continued*)

Debugger	Debugger Settings
CodeWarrior Debugger for RS08	RS08 Tab
	Download Tab
	Connection Tab — RS08
	PIC Tab
	Other Executables Tab
	Symbolics Tab
CodeWarrior Debugger for ColdFire	ColdFire Tab
	Exceptions Tab — ColdFire
	Reset Tab — ColdFire
	Interrupts Tab — ColdFire
	Download Tab
	Connection Tab — ColdFire
	PIC Tab
	Remote Tab — ColdFire
	Other Executables Tab
	Symbolics Tab
	OS Awareness Tab — ColdFire
CodeWarrior Linux Application Debugger for ColdFire	ColdFire — Linux Applications Tab
	Connection Tab — ColdFire Linux
	Remote Tab — ColdFire
	Other Executables Tab
	Symbolics Tab

HCS08-specific Settings

The following debugger tab manages the settings specific to the HCS08 microcontroller.

HCS08 Tab

Use this tab to specify the processor derivative, simulator/emulator option, target initialization files, and memory configuration files. Figure 4.3 shows the **HCS08** tab.

Figure 4.3 HCS08 Tab

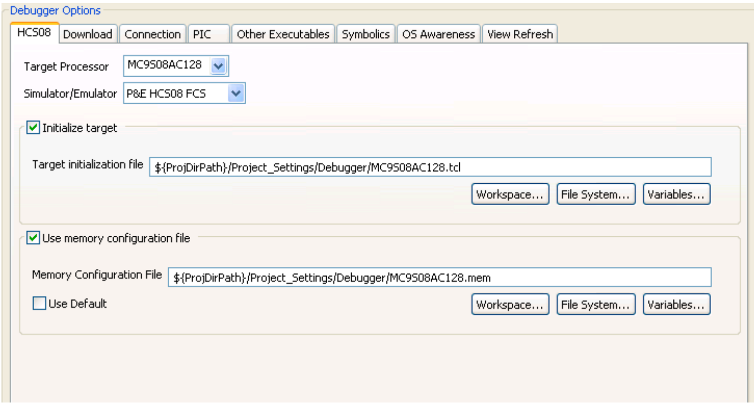


Table 4.2 describes the debugger settings for the **HCS08** tab.

Table 4.2 HCS08 Tab — Debugger Settings

Option	Description
Target Processor	Specifies the target hardware on which you debug the generated binary file.
Simulator/Emulator	Specifies the simulator or emulator to be used to debug the program. Select the appropriate option from the listbox.

Table 4.2 HCS08 Tab — Debugger Settings (*continued*)

Option	Description
Initialize Target	Specifies the target initialization file to be used by the debugger at the start of each debugging session Check this option to activate the Target Initialization File text box where you can specify the path of the initialization file. Alternatively, you can specify the file path by using any of the buttons listed below: • **Workspace** — Opens a dialog box where you can specify the initialization file in terms of a location relative to the IDE's workspace directory. After you select the file, the path to that file appears in the Target Initialization File text box, relative to the path of the variable `workspace_loc`. The IDE resolves this variable to the absolute file system path of the workspace directory root. • **File System** — Opens a dialog box where you can browse for the initialization file. After you select the file, the absolute path to that file appears in the Target Initialization File text box. • **Variables** — Opens a dialog box where you can specify the initialization file in terms of IDE path variables. After you specify the file, the path to that file appears in the Target Initialization File text box, relative to the path variables that you use. The IDE resolves each path variable as explained in the Variable Description box at the bottom of the **Select Variable** dialog box. Clear this option if you want the debugger to use a default target initialization file.

Table 4.2 HCS08 Tab — Debugger Settings (*continued*)

Option	Description
Use Memory Configuration File	Specifies the memory configuration file to be used by the debugger at the start of each debugging session. Check this option to activate the Memory Configuration File text box where you can specify the path of the configuration file. Alternatively, you can specify the file path by using any of the buttons listed below: • **Workspace** — Opens a dialog box where you can specify the initialization file in terms of a location relative to the IDE's workspace directory. After you specify the file, the path to that file appears in the Memory Configuration File text box, relative to the path of the variable `workspace_loc`. The IDE resolves this variable to the absolute file system path of the workspace directory root. • **File System** — Opens a dialog box where you can browse for the initialization file. After you specify the file, the absolute path to that file appears in the Memory Configuration File text box. • **Variables** — Opens a dialog box where you can specify the initialization file in terms of IDE path variables. After you specify the file, the path to that file appears in the Memory Configuration File text box, relative to the path variables that you use. The IDE resolves each path variable as explained in the Variable Description box at the bottom of the **Select Variable** dialog box. Check the Use Default option to use the default memory configuration file and to deactivate the Memory Configuration File text box and the three buttons.
Use Default	Check this checkbox to use the default memory configuration file.

Connection Tab — HCS08

Use this tab to specify the connection interface that the debugger uses to communicate with the HCS08 on the target hardware. Figure 4.4 shows the **Connection** tab.

Figure 4.4 Connection Tab — HCS08

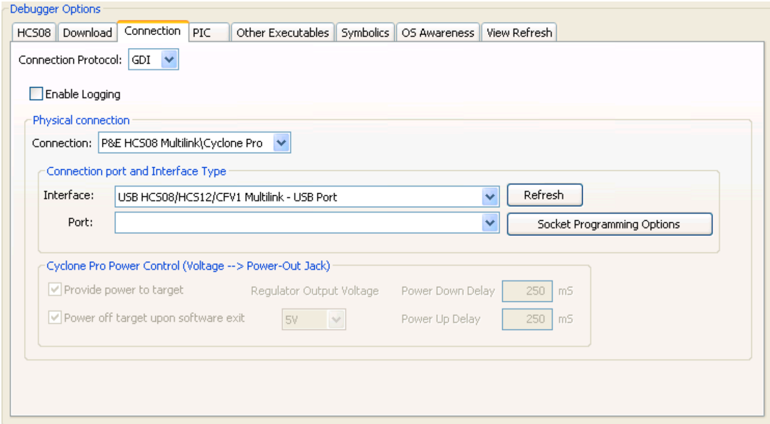


Table 4.3 describes the debugger settings on the **Connection** tab.

Table 4.3 Connection Tab — HCS08 Settings

Option	Description
Connection Protocol	Specifies the protocol used to manage communications between the debugger and the target.
Enable Logging	Specifies if the debugger's communications is logged. Check this option to have the debugger's communications session logged to the **Console** in the **Debug** view. Clear this option to disable logging.

Table 4.3 Connection Tab — HCS08 Settings (*continued*)

Option	Description
Connection	Specifies the hardware interface used to connect the workstation to the target. The Connection drop-down list contains the following values: • **Generic** — Use this setting if you manually launch and configure the connection-protocol service (such as CCS), or if you are debugging code with a simulator. It is used to communicate with the instruction set simulator and to configure hardware probes not pre-defined in the Physical Connection option. The Connection tab displays a table of named attributes and their assigned values. These attribute/value pairs are used to configure the characteristics of the interface. For more information, refer to the topic Softec. • **SofTec** — Use this setting to connect a SofTec HCS08 probe with the target hardware. When the debugger runs the SofTec HCS08 connection, it can communicate and debug HCS08 core-based hardware connected through the SofTec in-circuit debugger/programmer units — SofTec Microsystems HCS08 ISP Debuggers/ Programmers (inDART Series) and Starter Kits (PK and newer Series). For more information, refer to the topic Softec. **Note:** Refer to the inDART®-HCS08 In-Circuit Debugger/Programmer for Freescale HCS08 Family FLASH Devices User's Manual from SofTec for communication hardware requirements and SofTec product installation.
Connection	• **P&E HCS08 Multilink/Cyclone Pro** — Use this setting to connect a P&E Multilink/Cyclone Pro probe with the target hardware. For more information, refer to the topics P&E HCS08 Multilink\Cyclone Pro and P&E HCS08 Multilink\Cyclone Pro Connection-Specific Options. • **OSBDM** — The 8/16 bits debugger (and then the CodeWarrior IDE) can be connected to HCS08 hardware using the HCS08 OSBDM (Open Source BDM) cable. When the debugger runs the HCS08 Open Source BDM connection, it can communicate and debug HCS08 core-based hardware connected through the Open Source BDM Interface as described at the Freescale Semiconductor web site: http://www.freescale.com (keyword: OSBDM08). For more information, refer to the topic Open Source BDM.

Table 4.3 Connection Tab — HCS08 Settings (*continued*)

Option	Description
Attribute	Specifies an interface characteristic or option.
Value	Describes the current value or setting applied to the attribute.
Add	Click to add a new attribute/value pair. For more information, refer to the topic Add Attribute/Value.
Remove	Click to remove an existing attribute/value pair. For more information, refer to the topic Remove Attribute/Value.

The following topics explain how to add, modify, and delete entries in the Attribute/Value table:

- Add Attribute/Value
- Edit Existing Attribute/Value
- Remove Attribute/Value

Add Attribute/Value

To add a new attribute/value pair, perform these steps.

1. Click **Add**.

   The default entry `New attribute` appears in the **Attribute** column of the table, and the default entry `value` appears in the **Value** column. The new attribute's name is highlighted.

2. Type in a name for an attribute into this field, using alphanumeric characters only. The text replaces the default name.
3. Click on `value`.

   The text in this text box is highlighted.

4. Type in a value to replace the default value.
5. To save the changes, click **Apply**.

Edit Existing Attribute/Value

To modify an attribute/value pair already in the table:

1. Click on an attribute name in the **Attribute** column of the table.

   The attribute name is highlighted.

2. Type in the name of the new attribute into this field, using alphanumeric characters only.

   The text replaces the previous name.

3. Click on the value field.

   The text in this text box is highlighted.

4. Type in a value to replace the previous value.
5. To save the changes, click **Apply**.

Remove Attribute/Value

To delete an existing attribute/pair in the table:

1. Double-click on the row of an attribute/pair in the table.

   The row is highlighted.

2. Click **Remove**.

   The row containing the selected attribute/value is deleted.

3. Click **Apply** to save any changes.

NOTE For more information on the physical connection options presented with the option of probe, refer to the chapter Connections — HCS08.

RS08-specific Settings

The following debugger tabs manage the settings specific to the RS08 microcontroller.

RS08 Tab

Use this tab to specify the target processor, simulator/emulator option, target initialization files, and memory configuration files. Figure 4.5 shows the **RS08** tab.

Figure 4.5 RS08 Tab

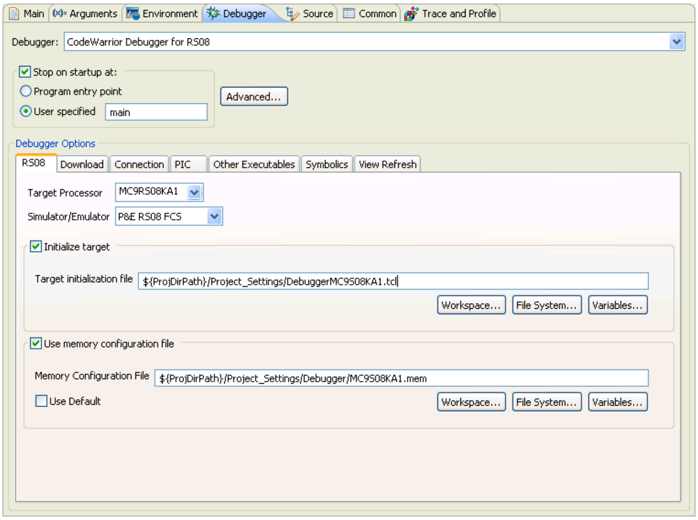


Table 4.4 describes the debugger settings on the **RS08** tab.

Table 4.4 RS08 Tab — Debugger Settings

Option	Description
Target Processor	Specifies the target hardware on which you debug the generated binary file.
Simulator/Emulator	Specifies the simulator or emulator to be used to debug the program. Select the appropriate option from the drop-down list.

Table 4.4 RS08 Tab — Debugger Settings (*continued*)

Option	Description
Initialize Target	Specifies the target initialization file to be used by the debugger at the start of each debugging session Check this option to activate the Target Initialization File text box where you can specify the path of the initialization file. Alternatively, you can specify the file path by using any of the buttons listed below: • **Workspace** — Opens a dialog box where you can specify the initialization file in terms of a location relative to the IDE's workspace directory. After you select the file, the path to that file appears in the Target Initialization File text box, relative to the path of the variable `workspace_loc`. The IDE resolves this variable to the absolute file system path of the workspace directory root. • **File System** — Opens a dialog box where you can browse for the initialization file. After you select the file, the absolute path to that file appears in the Target Initialization File text box. • **Variables** — Opens a dialog box where you can specify the initialization file in terms of IDE path variables. After you specify the file, the path to that file appears in the Target Initialization File text box, relative to the path variables that you use. The IDE resolves each path variable as explained in the Variable Description box at the bottom of the **Select Variable** dialog box. Clear this option if you want the debugger to use a default target initialization file.

Table 4.4 RS08 Tab — Debugger Settings (*continued*)

Option	Description
Use Memory Configuration File	Specifies the memory configuration file to be used by the debugger at the start of each debugging session. Check this option to activate the Memory Configuration File text box where you can specify the path of the configuration file. Alternatively, you can specify the file path by using any of the buttons listed below: • **Workspace** — Opens a dialog box where you can specify the initialization file in terms of a location relative to the IDE's workspace directory. After you specify the file, the path to that file appears in the Memory Configuration File text box, relative to the path of the variable `workspace_loc`. The IDE resolves this variable to the absolute file system path of the workspace directory root. • **File System** — Opens a dialog box where you can browse for the initialization file. After you specify the file, the absolute path to that file appears in the Memory Configuration File text box. • **Variables** — Opens a dialog box where you can specify the initialization file in terms of IDE path variables. After you specify the file, the path to that file appears in the Memory Configuration File text box, relative to the path variables that you use. The IDE resolves each path variable as explained in the Variable Description box at the bottom of the **Select Variable** dialog box. Check the Use Default option to use the default memory configuration file and to deactivate the Memory Configuration File text box and the three buttons.
Use Default	Check this checkbox to use the default memory configuration file.

Connection Tab — RS08

Use this tab to specify the connection interface that the debugger uses to communicate with the RS08 on the target hardware. Figure 4.6 shows the **Connection** tab.

Figure 4.6 Connection Tab — RS08

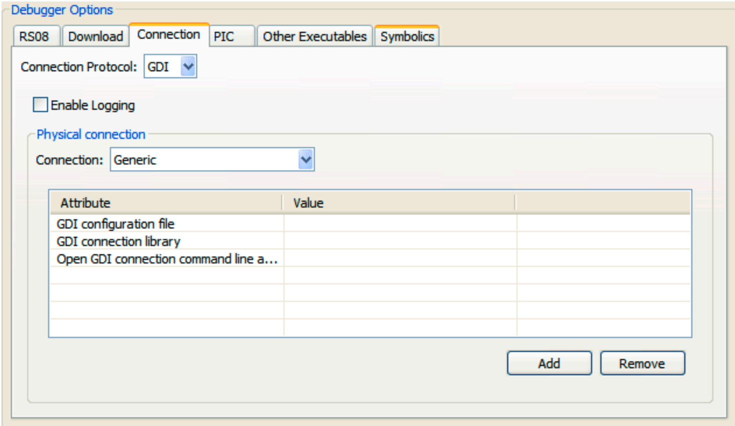


Table 4.5 describes the debugger settings on the **Connection** tab.

Table 4.5 Connection Tab — RS08 Settings

Option	Description
Connection Protocol	Specifies the protocol used to manage communications between the debugger and the target.
Enable Logging	Specifies if the debugger's communications is logged. Check this option to have the debugger's communications session logged to the **Console** in the **Debug** view. Clear this option to disable logging.

Table 4.5 Connection Tab — RS08 Settings

Option	Description
Connection	Specifies the hardware interface used to connect the workstation to the target. The Connection list box contains the following values: • **Generic** — Use this setting if you manually launch and configure the connection-protocol service (such as CCS), or if you are debugging code with a simulator. For more information, refer to the topic P&E Full Chip Simulation. • **SofTec** — Use this setting to connect a SofTec HCS08 probe with the target hardware. When the debugger runs the SofTec RS08 connection, it can communicate and debug RS08 core based hardware connected through the SofTec in-circuit debugger/programmer units SofTec Microsystems HCS08 ISP Debuggers/Programmers (inDART Series) and Starter Kits (PK and newer Series). For more information, refer to the topic Softec. **Note:** Refer to the inDART®-HCS08 In-Circuit Debugger/ Programmer for Freescale HCS08 Family FLASH Devices User’s Manual from SofTec for communication hardware requirements and SofTec product installation. • **P&E RS08 Multilink/Cyclone Pro** — Use this setting to connect a P&E Multilink/Cyclone Pro probe with the target hardware. For information refer to the topics P&E RS08 Multilink\Cyclone Pro and P&E RS08 Multilink\Cyclone Pro Connection-Specific Options. • **OSBDM** — The 8/16 bits debugger (and then the CodeWarrior IDE) can be connected to HCS08 hardware using the HCS08 OSBDM (Open Source BDM) cable. When the debugger runs the HCS08 Open Source BDM connection, it can communicate and debug HCS08 core-based hardware connected through the Open Source BDM Interface as described at the Freescale Semiconductor web site: http://www.freescale.com (keyword: OSBDM08). For information refer to the topic Open Source BDM.
Attribute	Specifies an interface characteristic or option.
Value	Describes the current value or setting applied to the attribute.
Add	Click to add a new attribute/value pair. For more information, refer to the topic Add Attribute/Value.
Remove	Click to remove an existing attribute/value pair. For more information, refer to the topic Remove Attribute/Value.

The following topics explain how to add, modify, and delete entries in the Attribute/Value table:

- Add Attribute/Value
- Edit Existing Attribute/Value
- Remove Attribute/Value

Add Attribute/Value

To add a new attribute/value pair, perform these steps.

1. Click **Add**.

   The default entry `New attribute` appears in the **Attribute** column of the table, and the default entry `value` appears in the **Value** column. The new attribute's name is highlighted.

2. Type in a name for an attribute into this field, using alphanumeric characters only. The text replaces the default name.
3. Click on `value`.

   The text in this text box is highlighted.

4. Type in a value to replace the default value.
5. To save the changes, click **Apply**.

Edit Existing Attribute/Value

To modify an attribute/value pair already in the table:

1. Click on an attribute name in the **Attribute** column of the table.

   The attribute name is highlighted.

2. Type in the name of the new attribute into this field, using alphanumeric characters only.

   The text replaces the previous name.

3. Click on the value field.

   The text in this text box is highlighted.

4. Type in a value to replace the previous value.
5. To save the changes, click **Apply**.

Remove Attribute/Value

To delete an existing attribute/pair in the table:

1. Double-click on the row of an attribute/pair in the table.

   The row is highlighted.

2. Click **Remove**.

   The row containing the selected attribute/value is deleted.

3. Click **Apply** to save any changes.

NOTE For more information on the physical connection options presented with the option of probe, consult the chapter, Connections — RS08.

ColdFire-specific Settings

The following debugger tab manage the settings specific to the ColdFire microcontroller.

ColdFire Tab

Use this tab to specify the target processor, simulator/emulator option, target initialization files, and memory configuration files. Figure 4.7 shows the **ColdFire** tab.

Figure 4.7 ColdFire Tab

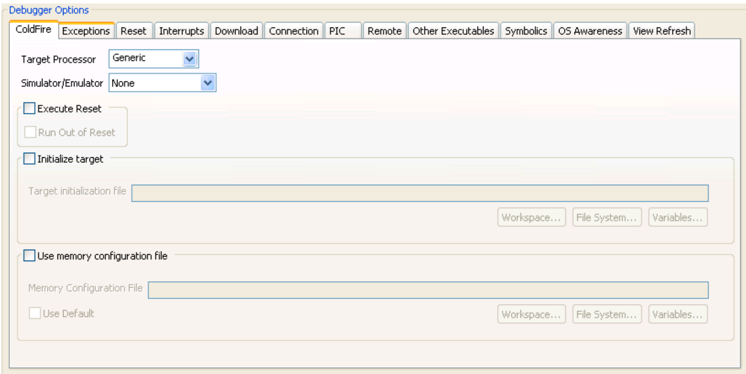


Table 4.6 describes the debugger settings on the **ColdFire** tab.

Table 4.6 ColdFire Tab — Debugger Settings

Option	Description
Target Processor	Specifies the target hardware on which you debug the generated binary file. The options are: • **Generic** — The debugger uses those hardware features that are common to all ColdFire processors. • **ColdFire derivative** — The debugger uses the hardware features available on the selected processor.
Simulator/Emulator	Specifies the simulator or emulator to be used to debug the program. Select the appropriate option from the listbox. The options are: • **None** — No special protocol is used to connect to the target. • **CCSIM2 ISS** — The debugger uses the CodeWarrior Connection Protocol (CCS) to connect to the Instruction Sect Simulator (ISS).
Execute Reset	Specifies that the debugger resets the target hardware before downloading a program for debugging purposes. Check this option to have the debugger reset the target before downloading the program to it. Clear this option to have the debugger download a program to the target without resetting that target.
Run Out of Reset	Determines what the ColdFire Microcontroller does after it is reset. Check this option to have the Microcontroller begin executing the program after it is reset. Clear this option to have the Microcontroller remain in debug mode after it it reset.

Table 4.6 ColdFire Tab — Debugger Settings (*continued*)

Option	Description
Initialize Target	Specifies the target initialization file to be used by the debugger at the start of each debugging session Check this option to activate the Target Initialization File text box where you can specify the path of the initialization file. Alternatively, you can specify the file path by using any of the buttons listed below: • **Workspace** — Opens a dialog box where you can specify the initialization file in terms of a location relative to the IDE's workspace directory. After you select the file, the path to that file appears in the Target Initialization File text box, relative to the path of the variable `workspace_loc`. The IDE resolves this variable to the absolute file system path of the workspace directory root. • **File System** — Opens a dialog box where you can browse for the initialization file. After you select the file, the absolute path to that file appears in the Target Initialization File text box. • **Variables** — Opens a dialog box where you can specify the initialization file in terms of IDE path variables. After you specify the file, the path to that file appears in the Target Initialization File text box, relative to the path variables that you use. The IDE resolves each path variable as explained in the Variable Description box at the bottom of the **Select Variable** dialog box. Clear this option if you want the debugger to use a default target initialization file.

Table 4.6 ColdFire Tab — Debugger Settings (*continued*)

Option	Description
Use Memory Configuration File	Specifies the memory configuration file to be used by the debugger at the start of each debugging session. Check this option to activate the Memory Configuration File text box where you can specify the path of the configuration file. Alternatively, you can specify the file path by using any of the buttons listed below: • **Workspace** — Opens a dialog box where you can specify the initialization file in terms of a location relative to the IDE's workspace directory. After you specify the file, the path to that file appears in the Memory Configuration File text box, relative to the path of the variable `workspace_loc`. The IDE resolves this variable to the absolute file system path of the workspace directory root. • **File System** — Opens a dialog box where you can browse for the initialization file. After you specify the file, the absolute path to that file appears in the Memory Configuration File text box. • **Variables** — Opens a dialog box where you can specify the initialization file in terms of IDE path variables. After you specify the file, the path to that file appears in the Memory Configuration File text box, relative to the path variables that you use. The IDE resolves each path variable as explained in the Variable Description box at the bottom of the **Select Variable** dialog box. Check the Use Default option to use the default memory configuration file and to deactivate the Memory Configuration File text box and the three buttons.

ColdFire — Linux Applications Tab

Use this tab to specify the target processor that the Linux application executes on. Figure 4.8 shows the **ColdFire** tab for debugging Linux applications.

NOTE For this release of the tools, Linux application debugging is not supported.

Figure 4.8 ColdFire — Linux Applications Tab

Table 4.7 describes the debugger settings on the **ColdFire** tab.

Table 4.7 ColdFire — Linux Application Tab — Debugger Settings

Option	Description
Target Processor	Specifies the target hardware on which you debug the generated binary file. The options are: • **Generic** — The debugger uses those hardware features that are common to all ColdFire processors. • **ColdFire derivative** — The debugger will use the hardware features available on the selected processor.

Exceptions Tab — ColdFire

The **Exceptions tab** (Figure 4.9) is available with P&E Microcomputer Systems, simulator, and Freescale USB and Ethernet TAP remote connections.

Use this tab to specify hardware exceptions that you want the debugger to catch.

Before you load and run the program, the debugger inserts its own exception vector for each exception you check in tab. To use your own exception vectors instead, clear the corresponding checkboxes.

If you check any options, the debugger reads the Vector_Based_Register (VBR), finds the corresponding existing exception vector and then writes a new vector at that register location. The address of this new vector is offset 0x408 from the VBR address. For example, if the VBR address is 0x0000 0000, the new vector at address 0x0000 0408 catches and handles the checked exceptions.

The debugger writes a Halt instruction and a Return from Exception instruction at this same location.

NOTE If your exceptions are in Flash or ROM, do not check any boxes in the **CF Exceptions** panel. Abatron ignores this tab, using instead the exception definitions in the Abatron firmware.

Figure 4.9 Exceptions Tab — ColdFire

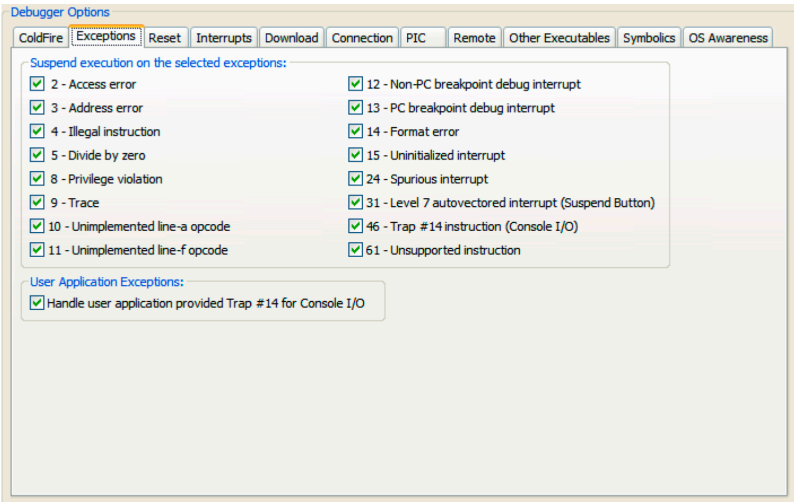


Table 4.8 describes the exceptions settings on the **ColdFire** tab.

Table 4.8 Exceptions Settings — ColdFire

Option	Purpose
2 — Access Error	Determines whether the debugger handles the access error exception. Check this option to catch and display access errors. Clear this option to ignore access errors.
3 — Address error	Determines whether the debugger handles the address error exception. Check this option to catch and display address errors. Clear this option to ignore address errors.
4 — Illegal instruction	Determines whether the debugger handles an invalid instruction exception. Check this option to catch and display invalid instructions. Clear this option to ignore invalid instructions.
5 — Divide by zero	Determines whether the debugger handles a divide by zero exception. Check this option to catch and display any attempt to divide by zero. Clear this option to ignore divide by zero attempts.
8 — Privilege Violation	Determines whether the debugger handles a privilege violation exception. Check this option to catch and display privilege violations. Clear this option to ignore privilege violations.
9 — Trace	Determines whether the debugger handles a Trace exception. Check this option to catch and display trace exceptions. Clear this option to ignore trace exceptions.

Table 4.8 Exceptions Settings — ColdFire (*continued*)

Option	Purpose
10 — Unimplemented line-a opcode	Determines whether the debugger handles a unimplemented line-A opcode exception. Check this option to catch and display unimplemented line-A opcodes Clear this option to ignore unimplemented line-A opcodes.
11— Unimplemented line-f opcode	Determines whether the debugger handles a unimplemented line-F opcode exception. Check this option to catch and display unimplemented line-F opcodes Clear this option to ignore unimplemented line-F opcodes.
12 — Non-PC breakpoint debug interrupt	Determines whether the debugger handles non-PC breakpoint debug interrupts. Check this option to catch and display non-PC breakpoint debug interrupts. Clear this option to ignore non-PC breakpoint debug interrupts.
13 — PC breakpoint debug interrupt	Determines whether the debugger handles PC breakpoint debug interrupts. Check this option to catch and display PC breakpoint debug interrupts. Clear this option to ignore PC breakpoint debug interrupts.
14 — Format error	Determines whether the debugger handles format error exceptions. Check this option to catch and display format errors. Clear this option to ignore format errors.
15 — Uninitialized interrupt	Determines whether the debugger handles uninitialized interrupts. Check this option to catch and display uninitialized interrupts. Clear this option to ignore uninitialized interrupts.

Table 4.8 Exceptions Settings — ColdFire (*continued*)

Option	Purpose
24 — Spurious interrupt	Determines whether the debugger handles spurious interrupts. Check this option to catch and display spurious interrupts. Clear this option to ignore spurious interrupts.
31 — Level 7 autovectored interrupt (Suspend Button)	Determines whether the debugger handles level 7 suspend button exceptions. Check this option to catch and display the use of the level 7 interrupts. Clear this option to ignore level 7 interrupts.
46 — Trap #14 instruction (Console I/O)	Determines whether the debugger handles trap # 14 instructions, which implement console I/O. Clear this option to ignore trap 14 instructions. Check this option to catches and display uses of trap 14 instructions.
61 — Unsupported instruction	Determines whether the debugger handles the unsupported instruction exception. Check this options to catch and display unsupported instructions. Clear this option to ignore unsupported instructions.
Handle user application provided Trap #14 for console I/O	Determines whether the debugger handles trap # 14 exceptions when they occur in an application. Clear this option to ignore trap 14 instructions. Check this option to catches and display uses of trap 14 instructions.

Reset Tab — ColdFire

The Reset tab Figure 4.10) specifies the setup actions that the microcontroller takes when it comes out of a reset.

Figure 4.10 Reset Tab — ColdFire

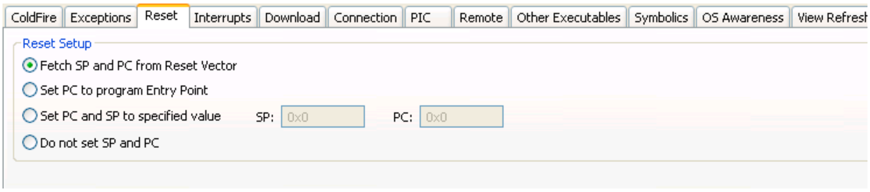


Table 4.9 describes the behavior of each option.

Table 4.9 Reset Tab — ColdFire Settings

Option	Description
Fetch SP and PC from Reset Vector	When selected, the debugger fetches the base of the stack and the start address from the reset vector, and loads them into the Microcontroller's SP and PC, respectively. Used for ROM build targets.
Set PC to program Entry Point	When selected, the debugger sets the Microcontroller's PC to the program's start address. Used to emulate reset for RAM build targets.
Set PC and SP to specified value	When selected, the debugger takes the user-supplied values for the SP and PC and loads them the corresponding Microcontroller registers. Used to reference the entry point of a boot loader. When selected, the `SP:` and `PC:` text entry boxes are active. Enter the hexadecimal addresses for the SP and PC in these boxes.
Do not set SP or PC	When selected, the debugger takes no action and the Microcontroller uses the default addresses in the PC and SP.

Interrupts Tab — ColdFire

Debugging an application involves single-stepping through code. However, if you do not modify the behavior of interrupts that are part of normal code execution, an interrupt may occur and the debugger jumps to the interrupt handler code, rather than single-stepping to the next instruction. Therefore, you must mask, or inhibit, certain interrupt levels to prevent the interrupts from happening. The interrupt levels that you inhibit varies, depending upon the microcontroller.

Use this tab to inhibit or allow interrupts. When inhibiting interrupts, you can mask interrupts below a level that you specify. Figure 4.11 shows the Interrupts tab.

Figure 4.11 Interrupts Tab — ColdFire

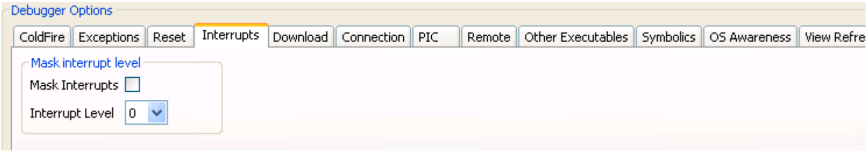


Table 4.10 explains each option.

Table 4.10 Interrupts Tab — ColdFire

Option	Description
Mask Interrupts	Determines whether the debugger inhibits or allows interrupts Check this option to inhibit interrupts, using the level specified in the `Interrupt Level` option. Uncheck this option to permit all interrupts.
Interrupt Level	Use this option to specify the interrupt level that the debugger inhibits. Level 0 corresponds to the lowest priority interrupt, while level 7 is the highest. If you specify a level of 4, then the debugger inhibits interrupts of level 0 through 4, while interrupts at levels 5 through 7 execute.

NOTE The exact definitions of interrupt levels are different for each target microcontroller, and masking all interrupts can cause erratic behavior. This means that finding the best interrupt level to mask can involve trial and error. Be alert for any code statements that change the interrupt mask; stepping over such a statement can modify the settings in the tab.

Connection Tab — ColdFire

Use this tab to specify the type of connection between the CodeWarrior debugger and the target hardware, settings for the target hardware, and the type of physical connection. Figure 4.12 shows the **Connection** tab.

Figure 4.12 Connection Tab — ColdFire

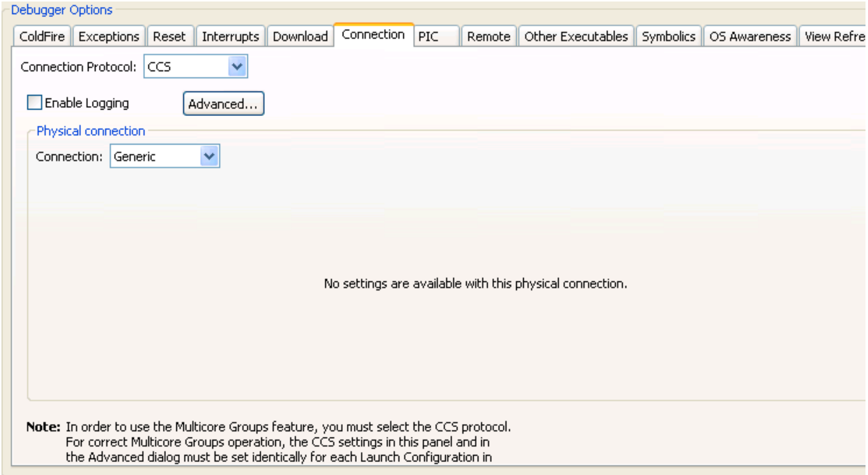


Table 4.11 describes the settings available on the **Connection Settings** tab.

Table 4.11 Connection Tab — ColdFire Settings

Option	Description
Connection Protocol	Specify the method by which the CodeWarrior debugger communicates with the target hardware. For example, specify CCS to have the debugger use the CodeWarrior Connection Server to communicate with the target hardware. Available connection protocols are: • **Generic Debug Instrument Interface (GDI)** — GDI is an open standard interface that enables debugger communications and control between a debugger and run control hardware. It is used to configure and communicate with hardware probes not pre-defined in the Physical Connection option. • **Abatron BDI** — A communications protocol used with Abatron BDI probes. • **CodeWarrior Connection Server (CCS**) — A communications protocol used with P&E Microcomputer Systems probes, USB and EtherTAP run control probes, and the instruction set simulator (ISS). For more information, refer to the topic CCS Advanced Settings.
Enable Logging	Check this option to have the debugger output connection-protocol activity to a console in the Console view. Clear this option if you do not want the debugger to output connection-protocol activity to a console.
Advanced	Click this button to configure additional options for the specified Connection Protocol.
Physical Connection	Specify the type of physical connection between the debugger and the target hardware. Depending on the selected connection protocol, the options in the **Connection** drop-down list change.

Table 4.11 Connection Tab — ColdFire Settings (*continued*)

Option	Description
<When the connection protocol is CCS>	For the CCS option, the Connection drop-down list contains the following values: • Generic — The debugger does not configure the connection protocol for any particular physical connection. Use this setting if you manually launch and configure the connection-protocol service (such as CCS), or if you are debugging code with a simulator. • USB TAP — The debugger uses a USB TAP probe to connect to the target hardware. If you have multiple USB TAP probes available, check the USB TAP Serial Number checkbox and enter the serial number (in hexadecimal notation) of the probe to which you want the debugger to connect. • Ethernet TAP — The debugger uses an Ethernet TAP probe to connect to the target hardware. Enter in the Hostname/IP Address text box the host name or Internet Protocol address of the probe to which you want the debugger to connect By default, the Ethernet TAP probe uses Dynamic Host Configuration Protocol (DHCP) to acquire an IP address, netmask, and default gateway settings. If your network has a DHCP server which registers host names to the network's name server, you can use the default host name to access the Ethernet TAP probe. Access is available when the HEARTBEAT LED starts flashing green.

Table 4.11 Connection Tab — ColdFire Settings (*continued*)

Option	Description
<When the connection protocol is GDI>	For the GDI option, the Connection drop-down list contains the following values: • Generic — The debugger does not configure the connection protocol for any particular physical connection. Use this setting if you manually launch and configure the connection-protocol service (such as CCS), or if you are debugging code with a simulator. • Software ColdFire V1 in-DART — This option specifies a hardware connection of a SofTec inDART debugger/programmer using the BDM interface. The Connection tab displays a table of named attributes and their assigned values . These attribute/value pairs are used to configure the connection parameters for the interface. • OSBDM - JM60 ColdFire V2\3\4 — This option specifies a hardware connection for OSBDM - JM60 ColdFire V2\3\4. • P&E ColdFire V1 Multilink\Cyclone Pro — This option specifies that the hardware connection is either a P&E Microsystems Multilink or a P&E Multisystems Cyclone Pro. • P&E ColdFire V234 Multilink\Cyclone Max — This option specifies that the hardware connection is either a P&E Microsystems Multilink or a P&E Multisystems Cyclone Max.
<When the connection protocol is Abraton BDI>	For the Abraton BDI option, the Connection drop-down list contains the following values: • TCP/IP — This option specifies that the physical connection uses TCP/IP as the interface for debugging communications. • Serial — This option specifies that the physical connection uses a serial connection as the interface for debugging communications.
Attribute	Specifies an interface characteristic or option.
Value	Describes the current value or setting applied to the attribute.
Add	Click to add a new attribute/value pair. For more information, refer to the topic Add Attribute/Value.
Remove	Click to remove an existing attribute/value pair. For more information, refer to the topic Remove Attribute/Value.

The following topics explain how to add, modify, and delete entries in the Attribute/Value table:

- Add Attribute/Value
- Edit Existing Attribute/Value
- Remove Attribute/Value

Add Attribute/Value

To add a new attribute/value pair, perform these steps.

1. Click **Add**.

   The default entry `New attribute` appears in the **Attribute** column of the table, and the default entry `value` appears in the **Value** column. The new attribute's name is highlighted.

2. Type in a name for an attribute into this field, using alphanumeric characters only. The text replaces the default name.
3. Click on `value`.

   The text in this text box is highlighted.

4. Type in a value to replace the default value.
5. To save the changes, click **Apply**.

Edit Existing Attribute/Value

To modify an attribute/value pair already in the table:

1. Click on an attribute name in the **Attribute** column of the table.

   The attribute name is highlighted.

2. Type in the name of the new attribute into this field, using alphanumeric characters only.

   The text replaces the previous name.

3. Click on the value field.

   The text in this text box is highlighted.

4. Type in a value to replace the previous value.
5. To save the changes, click **Apply**.

Remove Attribute/Value

To delete an existing attribute/pair in the table:

1. Double-click on the row of an attribute/pair in the table.

   The row is highlighted.

2. Click **Remove**.

   The row containing the selected attribute/value is deleted.

3. Click **Apply** to save any changes.

NOTE For more information on the physical connection options presented with the option of probe, consult the chapter, Connections — ColdFire V1.

CCS Advanced Settings

After you use the Connection Protocol list box to specify CCS, click **Advanced** to open the **CCS Advanced Settings** dialog box as seen in Figure 4.13. Use this dialog box to specify additional CodeWarrior Connection Server parameters.

Figure 4.13 CCS Advanced Settings Dialog Box

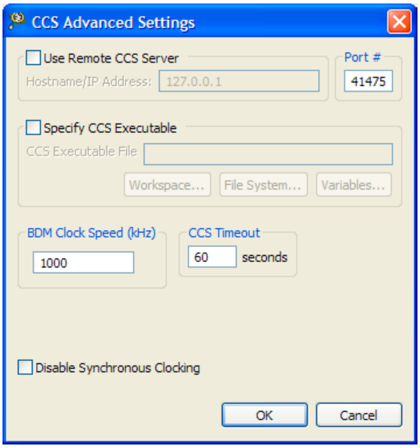


Table 4.12 describes the CCS Advanced settings.

Table 4.12 CCS Advanced Settings

Option	Description
Use Remote CCS Server	Check this option to specify the Hostname/IP Address of the remote CCS instance with which you want the debugger to communicate. Clear this option if you want the debugger to communicate with a CCS instance that runs on your own computer.
Port#	Specifies the port number through which the debugger communicates with the CCS instance.

Table 4.12 CCS Advanced Settings (*continued*)

Option	Description
Specify CCS Executable	Check this option to specify the path to the CCS executable file (other than the default executable file) that the debugger launches if no CCS service is running at the time you start a debugging session. Enter the full path in the text box, or, you can specify the file path by using any of the buttons listed below: • **Workspace** — Opens a dialog box where you can specify the CCS executable file in terms of a location relative to the IDE's workspace directory. After you select the file, the path to that file appears in the CCS Executable File text box, relative to the path of the variable `workspace_loc`. The IDE resolves this variable to the absolute file system path of the workspace directory root. • **File System** — Opens a dialog box where you can browse for the executable file. After you select the file, the absolute path to that file appears in the CCS Executable File text box. • **Variables** — Opens a dialog box where you can specify the executable file in terms of IDE path variables. After you specify the file, the path to that file appears in the CCS Executable File text box, relative to the path variables that you use. The IDE resolves each path variable as explained in the Variable Description box at the bottom of the **Select Variable** dialog box. Clear this option if you want the debugger to launch the default CCS executable file if no CCS service is running at the time you start a debugging session. This setting holds true only when no CCS service is running at the time the debugging session starts. For example, if you check this checkbox and specify `C:\ccs\ccs.exe`, but you have `C:\otherccs\ccs.exe` already running when you start a debugging session, this setting has no effect. The IDE uses this setting just when it cannot find a local running CCS session.
BDM Clock Speed	Use the text box to specify the default clock speed (in kilohertz) of the connection between your computer and the BDM header of the target-hardware chain.

Table 4.12 CCS Advanced Settings (*continued*)

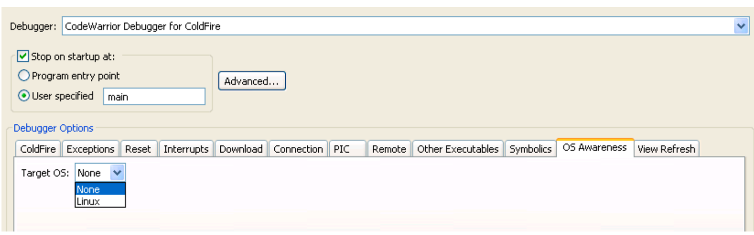
Option	Description
CCS Timeout	Enter the number of seconds after which you want the debugger to treat CCS as unresponsive. The debugger treats the time interval that you specify as a window of validity in which CCS must complete debugger requests. If CCS does not complete the requests during the specified time interval, the debugger treats CCS as unresponsive. For example, you might specify 30 seconds to give intensive CCS operations enough time to succeed during a debugging session. You don't want to wait 30 seconds for the initial connect operation, however, if you mistyped the Ethernet TAP probe's IP address, or if you forgot to turn on the target hardware. For these reasons, the debugger treats the specified value differently for initial-connect operations.
Disable Synchronous Clocking	Check this option to have the debugger use a standard (slow) procedure to write to memory on the target system. Clear this option to have the debugger use an optimized (fast) download procedure to write to memory on the target system. The fast download mechanism is used by default when writing to target memory. Check this option if the fast download procedure results in load failures.

OS Awareness Tab — ColdFire

Use this tab to specify the operating system (OS) that resides on the target device. Figure 4.14 shows the **OS Awareness** tab view.

NOTE Linux support is not implemented for this release.

Figure 4.14 OS Awareness Tab — ColdFire



Use the `Target OS` list box to specify the OS that runs on the target device, or specify None to have the debugger use the bare board.

Remote Tab — ColdFire

When debugging a Linux application, use this tab to specify where the debugger downloads the program for debug on the Linux host system, and whether to launch any optional applications while debugging. Figure 4.15 shows the **Remote** tab view.

Figure 4.15 Remote Tab — ColdFire

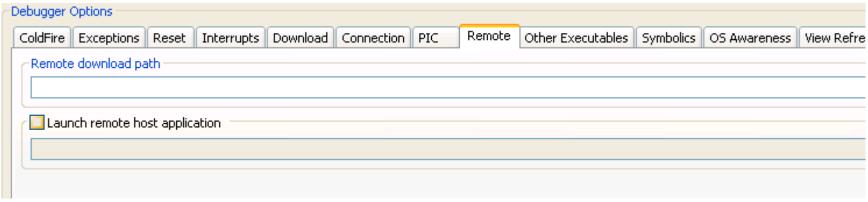


Table 4.13 describes the **Remote** tab settings.

Table 4.13 Remote Tab settings

Option	Description
Remote download path	Specifies the directory path that the debugger downloads the test program into.
Launch remote host application	Specifies the directory path of a Linux program that is to be launched along with the test program.

Connection Tab — ColdFire Linux

Use this tab (Figure 4.16) to specify how the debugger communicates with a Linux application under debug control.

Figure 4.16 Connection Tab — ColdFire Linux

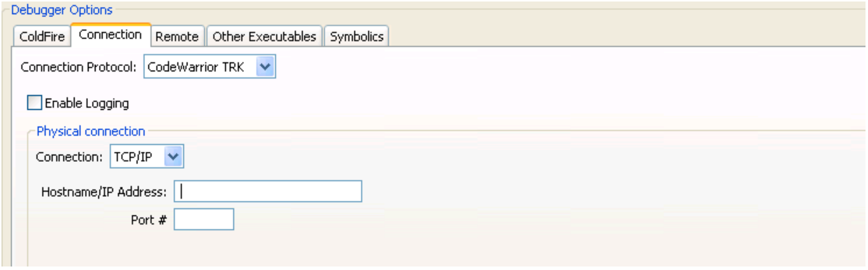


Table 4.14 describes the various options.

Table 4.14 Connection Tab settings — ColdFire Linux

Option	Description
Connection Protocol	Specifies the communications protocol used to control the application under debug on the Linux system.
Enable Loggings	Specifies if the debugger's communications is logged. Check this option to have the debugger's communications session logged to the **Console** in the **Debug** view. Clear this option to disable logging.
Connection	Specifies the physical connection used to connect the debugger to the host Linux system. The options are: • **Serial** — A serial cable connects the host computer to the target Linux system. • **TCP/IP** — The host computer communicates with the target Linux system over a TCP/IP connectione.
Hostname/IP address	Use this option to specify the IP address of the target Linux system. Available only when using the TCP/IP connection.

Table 4.14 Connection Tab settings — ColdFire Linux (*continued*)

Option	Description
Port #	Use this option to specify the IP port used to communicate with the target Linux system. Available only when using the TCP/IP connection.
Port	Specifies the serial port the host system uses. Options are: • COM1 • COM2 • COM3 • COM4
Rate	Specifies the bit-rate of the serial interface. Options are: • 300 • 1200 • 2400 • 4800 • 9600 • 19200 • 34800 • 57600 • 115200 • 230400
Data Bits	Specifies the bit size of the characters sent through the serial interface. Options are: • 4 • 5 • 6 • 7 • 8

Table 4.14 Connection Tab settings — ColdFire Linux (*continued*)

Option	Description
Parity	Specifies if a parity bit is included with the character for error-correction. Options are: • None • Odd • Even
Stop Bits	Specifies if a termination bit is appended to the character. Options are: • • 1.5 • 2
Flow Control	Specifies how the serial transfer of characters is controlled to prevent data over-runs. Options are: • None • Hardware (RTS/CTS) • Software (XON/XOFF)

Settings Common to all Microcontrollers

The following tab views manage debugger settings that apply to all of the microcontrollers.

Download Tab

Use this tab to specify which program sections the debugger downloads to the target, and whether the debugger should read back those sections and verify them.

NOTE Checking all checkboxes in the Program Download Options group significantly increases download time.

Figure 4.17 shows the Download tab. Briefly, the section data types are:

- Executable — These sections contain your program's code.
- Constant Data — These sections contain your program's constants. These values can not be modified
- Initialized Data — Initialized data sections contain your program's modifiable data.

- Uninitialized Data — Uninitialized data sections contain your program's uninitialized variables.

Table 4.15 explains each option.

Initial Launch options apply to the first debugging session. Successive Runs options apply to subsequent debugging sessions. The Download options control whether the debugger downloads the specified Section Data type to the target hardware. The Verify options control whether the debugger reads the specified Section Data type from the target hardware and compares the read data against the data written to the device.

Figure 4.17 Download Tab

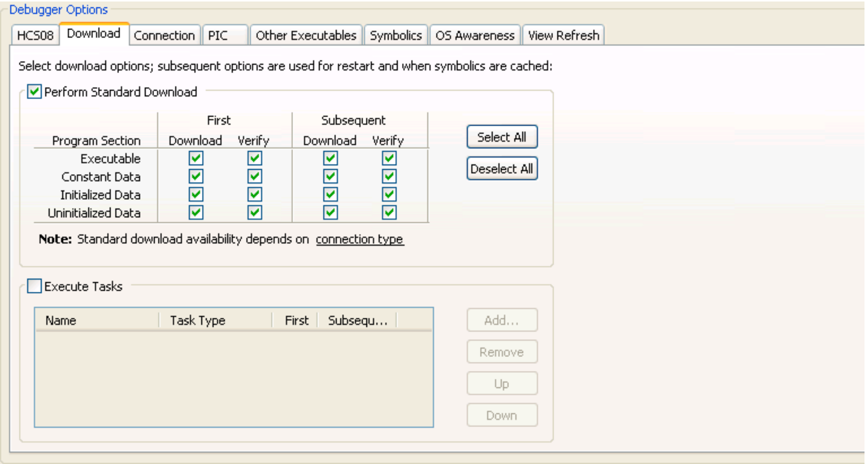


Table 4.15 Download Tab Settings

Section Data Type	DescriptionDescription
Executable	Controls downloading and verification for executable sections. Check appropriate checkboxes to specify downloading and verifications, for initial launch and for successive runs.
Constant Data	Controls downloading and verification for constant-data sections. Check appropriate checkboxes to specify downloading and verifications, for initial launch and for successive runs.

Table 4.15 Download Tab Settings (*continued*)

Section Data Type	DescriptionDescription
Initialized Data	Controls downloading and verification for initialized-data sections. Check appropriate checkboxes to specify downloading and verifications, for initial launch and for successive runs.
Uninitialized Data	Controls downloading and verification for uninitialized-data sections. Check appropriate checkboxes to specify downloading and verifications, for initial launch and for successive runs.
Select All	Selects all of the options available for downloading and verifying the program.
Deselect All	The debugger will not download or verify any program sections.

PIC Tab

Use this tab to specify an alternate address for the debugger to load a PIC module on a target board. Usually, Position Independent Code (PIC) is linked in such a way that the entire image starts at address 0x00000000. The **PIC** tab lets you specify an alternate address at which the debugger will load the PIC module in target memory. Figure 4.18 shows the PIC tab.

Figure 4.18 PIC Tab

Check the Alternate Load Address option and then enter the address (in hexadecimal notation) in the corresponding text box. The address that you specify is the starting address at which the debugger loads your program. You can also use this setting when you have an application which is built with ROM addresses and then relocates itself to RAM (such as U-Boot). Specifying a relocation address lets the debugger map the symbolic debugging information contained in the original ELF file (built for ROM addresses) to the relocated application image in RAM.

NOTE The debugger does not verify whether your code can execute at the specified address. As a result, the PIC generation settings of the compiler, linker and your program's startup routines must correctly set any base registers and perform any required relocations.

Clear the Alternate Load Address option to have the debugger load your program at a default starting address.

Other Executables Tab

Use this tab to specify additional ELF files to download or debug in addition to the main executable file associated with the launch configuration.

Figure 4.19 shows the **Other Executables** tab view.

Figure 4.19 Other Executables Tab

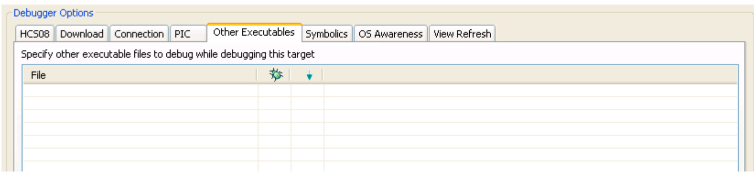


Table 4.16 describes the **Other Executables** debugger settings.

Table 4.16 Other Executables Tab Settings

Option	Description
File list	Shows files and projects that the debugger uses during each debug session The Debug column () — If this option is checked the debugger loads symbolics for the file. If you clear this option, the IDE does not load symbolics for the file. The Download column () — If this option is checked the debugger downloads the file to the target device. If you clear this option, the debugger does not download the file to the target device.
Add	Click to open the **Debug Other Executable** dialog box. Use the dialog box to specify the following settings: • Specify the location of the additional executable — Enter the path to the executable file that the debugger controls in addition to the current project's executable file. Alternatively, click **Browse** to specify the file path. • Load symbols — Check this option to have the debugger load symbols for the specified file. Clear to prevent the debugger from loading the symbols. The Debug column of the File list corresponds to this setting. • Download to device — Check this option to have the debugger download the specified file to the target device. Clear this option to prevent the debugger from downloading the file to the device. The Download column of the File list corresponds to this setting. • OK — Click to add the information that you specify in the **Debug Other Executable** dialog box to the **File** list.
Change	Click to open the **Debug Other Executable** dialog box. The dialog box shows the current settings for selected executable file in the File list column. Change this information as required and click **OK** to update the entry in the File list.
Remove	Click to remove the entry currently selected in the File list.

Symbolics Tab

Use this tab to specify whether the debugger keeps symbolics in memory. Symbolics represent an application's debugging and symbolic information. Keeping symbolics in memory, known as caching symbolics, is beneficial when you debug a large-size application. Figure 4.20 shows the Symbolics tab.

Consider a situation in which the debugger loads symbolics for a large application, but does not download content to a hardware device and the project uses custom makefiles with several build steps to generate this application. In such a situation, caching symbolics helps speed up the debugging process. The debugger uses the readily available cached symbolics during subsequent debugging sessions. Otherwise, the debugger spends significant time creating an in-memory representation of symbolics during subsequent debugging sessions.

NOTE Caching symbolics provides significant benefit for large applications, where doing so speeds up application-launch time. If you debug a small application, caching symbolics does not significantly improve the launch time.

Figure 4.20 Symbolics Tab

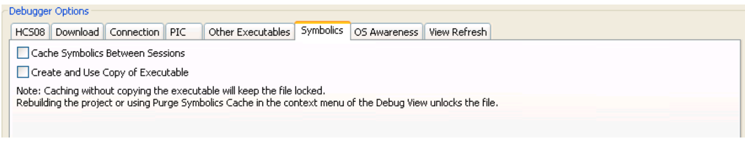


Table 4.17 describes the **Symbolics** debugger settings.

Table 4.17 Symbolics Tab Settings

Option	Description
Cache Symbolics Between Sessions	Check this option to have the debugger cache symbolics between debugging sessions. If you check this checkbox and clear the Create and Use Copy of Executable checkbox, the executable file remains locked after the debugging session ends. In the **Debug** view, right-click on the locked file and select **Un-target Executables** to have the debugger delete its symbolics cache and release the file lock. The IDE enables this menu command when there are currently unused cached symbolics that it can purge. Clear this option so that the debugger does not cache symbolics between debugging sessions.
Create and Use Copy of Executable	Check this option to have the debugger create and use a copy of the executable file. Using the copy helps avoid file-locking issues with the build system. If you check this checkbox, the IDE can build the executable file in the background during a debugging session. Clear this option so that the debugger does not create and use a copy of the executable file.

Debugging Code

This section explains how to use the CodeWarrior™ debugger to debug source-code features specific to Freescale microcontrollers.

Using the CodeWarrior debugger to debug an application follows this overall process:

1. Configure the target.
2. Download program to the target.
3. Load symbolics into the debugger.
4. Start a debugging session.

You can use the default CodeWarrior launch configurations to perform or skip specific steps of the overall process. Table 4.18 shows the steps of the debugging process that each default launch configuration supports. Yes indicates that the launch configuration supports the step. No indicates that the launch configuration does not support the step.

NOTE The CodeWarrior Attach launch configuration does not support restarting a debugging session.

Table 4.18 CodeWarrior™ Launch Configurations—Supported Debugging Steps

Debugging Step	Debug (CodeWarrior Download)	Run (CodeWarrior Download)	CodeWarrior Attach	CodeWarrior Connect
Configure the target	Yes	Yes	No	Yes
Download code to the target	Yes	Yes	No	No
Load symbolics into the debugger	Yes	No	Yes	No
Start a debugging session	Yes	No	Yes	Yes

Ways to Initiate Debug Session

The CodeWarrior debugger provides three ways to initiate a debug session:

- Attach to Process
- Connect
- Debug

NOTE These commands are available in the **Debug Configurations** dialog box. Select **Run** > **Debug Configurations** to open the **Debug Configurations** dialog box.

These commands differ in these ways:

- The **Attach to Process** command assumes that code is already running on the board and therefore does not run a target initialization file. The state of the running program is undisturbed. The debugger loads symbolic debugging information for the current build target's executable. The result is that you have the same source-level debugging facilities you have in a normal debug session (the ability to view source code and variables, and so on). The **Attach to Process** function does not reset the target, even if the launch configuration specifies this action. Further, the command loads symbolics, does not stop the target, run an initialization script, download an ELF file, or modify the program counter (PC).

NOTE The debugger assumes that the current build target's generated executable matches the code currently running on the target.

- The **Connect** command runs the target initialization file specified in the HCS08, RS08, or ColdFire tab of the **Debug Configurations** dialog box. This file is responsible for setting up the board before connecting to it. The **Connect** function does not load any symbolic debugging information for the current build target's executable. You therefore do not have access to source-level debugging and variable display. The **Connect** command resets the target if the launch configuration specifies this action. Further, the command stops the target, (optionally) runs an initialization script, does not load symbolics, download an ELF file, or modify the program counter (PC).
- The **Debug** command resets the target if the launch configuration specifies the action. Further, the command stops the target, (optionally) runs an initialization script, downloads the specified ELF file, and modifies the PC.

Table 4.19 Effect of Each Launch Configuration Type

Launch Configuration Type	Resets Target on Launch	Stops Target	Runs Init Script	Uses Symbolics	Modifies Entry PC	Downloads Application
Attach	Never	No	No	Yes	No	Never
Connect	Per Remote Connection setting: Usually set to Yes	Only if Reset on Launch	Per debugger Global Setting panel	No	Yes	Never
Debug	Per Remote Connection setting: Usually set to Yes	Only if Reset on Launch	Per debugger Global Setting panel	Yes	Yes	Per HCS08/ RS08/ ColdFire Debugger Settings

Table 4.20 Connection Type: Use Cases

Connection Type	Typical Use Example
Attach	Debug a target system without modifying its state at all initially, but allow use of symbolics during actual debug. Useful for debugging a system that is already up and running.
Connect	Raw debug of a board without any software or symbolics. Useful during hardware bring up, and often combined with scripts for checking various aspects of the hardware.
Debug	Develop code that gets downloaded to the system on debugger launch. Useful for bare board code development without a working bootloader.

NOTE The default debugger configuration causes the debugger to cache symbolics between sessions. However, the **Connect** command invalidates this cache. If you must preserve the contents of the symbolics cache, and you plan to use the **Connect** command, uncheck the **Cache Symbolics Between Sessions** checkbox in the **Symbolics page** of the **Debug Configurations** dialog box just before you issue the **Connect** command.

Attaching Processes

In a debugging session, the CodeWarrior Attach launch configuration skips setting up the target hardware, and downloading the program image to that target hardware. The code image might reside on the target hardware already, or you might want to skip setting up the target hardware. Like the CodeWarrior Connect launch configuration, the settings in the Arguments and Environment panels do not apply.

Although similar to a debugging session, the goal of attaching the debugger to a process is to get insight into the current state of that process, and to do so with minimal disturbance to its state of execution. Having the debugger attach to a process skips most of the state-altering steps involved in starting a debugging session, such as resetting the target, initializing the target, and downloading code. When the debugger finishes attaching to the process, you have many of the debugging capabilities that you would have in a debugging session (such as source-level debugging, line breakpoints, watchpoints, console input/output, and so on).

NOTE The debugger does not support restarting debugging sessions that you start by attaching the debugger to a process.

A process is an active program and related resources:

- Executing program code
- An address space
- One or more threads of execution. A thread is a unit of activity that has a program counter and a set of processor registers
- A data section
- A set of resources, such as open files and pending signals

On a bare board (without an operating system), a given core has one process: one thread of execution executing one program in one address space. With an operating system, there can be several processes on a given core (with one active at any given moment).These processes either run different programs in different address spaces or even execute the same program, sharing an address space, open files, and so on.

You use the CodeWarrior **Debug Configurations** dialog box to view and attach to processes. To attach to a process:

1. In the **CodeWarrior Projects** view, select the project for which you want to start a debugging session in which you will attach to a process.
2. Select **Run** > **Debug Configurations**

   The **Debug Configurations** dialog box appears.
3. Expand the **CodeWarrior Attach** group.
4. Select an existing configuration from the expanded **CodeWarrior Attach** group.

NOTE If the CodeWarrior Attach group does not yet have any existing configuration, select the CodeWarrior Attach title and click the **New launch configuration** toolbar button of the **Debug Configurations** dialog box to create a new configuration.

5. Click the **Debugger** tab.
6. In the **Debugger** page, specify parameters for the debugger and the target simulator or device.
7. If you want to specify source lookup paths, click the **Source** tab and then use that page to specify the path information.
8. Click **Apply** to save your changes.
9. Click **Debug** to start the debugging session.

You just finished starting a debugging session and attaching the debugger to a process.

Connecting Target

In a debugging session, the CodeWarrior Connect launch configuration skips downloading the code image to the target hardware, and loading symbolics into the debugger. Skipping these steps is useful for board initialization and bringup. The code might reside on the target hardware already, or you might want to skip loading symbolics into the debugger.

Like the CodeWarrior Attach launch configuration, the settings in the **Arguments** and **Environment** panels do not apply. The **Source** tab is available, however, so that you can specify source paths in order to load an image after connecting the debugger to the target. Similar to starting a debugging session, you use the **Debug Configurations** dialog box to connect to a target:

1. In the C/C++ Projects view, select **Run** > **Debug Configurations**.
2. Expand the CodeWarrior Connect group.
3. Select an existing configuration from the expanded CodeWarrior Connect group.

NOTE If the CodeWarrior Connect group does not yet have any existing configuration, select the CodeWarrior Connect title and click the **New launch configuration toolbar** button of the **Debug Configurations** dialog box to create a new configuration.

4. Click the **Debugger** tab.
5. In the **Debugger** panel, specify parameters for the debugger and the target device.
6. If you want to specify source lookup paths, click the **Source** tab and then use that page to specify the path information.
7. Click **Debug** to start the debugging session.

You just finished starting a debugging session and connecting the debugger to the target.

Debugging Bare Board Software

This topic applies to debugging software on bare board systems, that is, for hardware that is not running an operating system.

The topics are:

- Displaying Register Contents
- Using Register Details Window
- Setting Watchpoints
- Removing Watchpoints
- Setting Breakpoints

- Removing Breakpoints
- Setting Stack Crawl Depth
- Hard Resetting

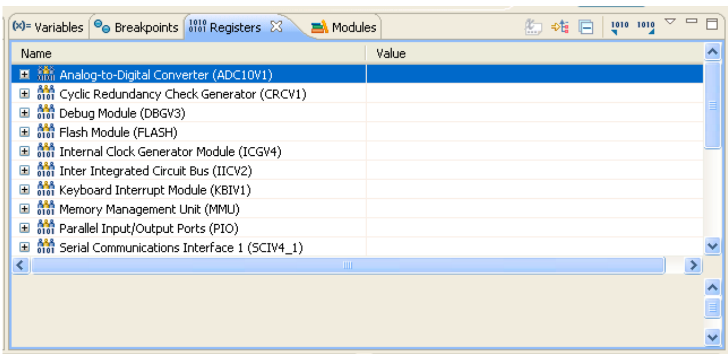
Displaying Register Contents

Use the **Registers** view to display and modify the contents of the registers of the processor on your target board. To display this view from the **Debug** perspective, Select **Window > Show View > Registers**, and the **Registers** view appears.

The **Registers** view displays categories of registers in a tree format. To display the contents of a particular category of registers, expand the tree element of the register category of interest. Figure 4.21 shows the **Registers** view with the General Purpose Registers tree element expanded.

TIP You can also view and update registers by issuing the `reg`, `change`, and `display` commands in the CodeWarrior **Debugger Shell** view.

Figure 4.21 Registers View



Adding Register Group

The default display of the **Registers** view groups related registers into a tree structure. You can add a custom group of registers to the default tree structure. To add a new register group:

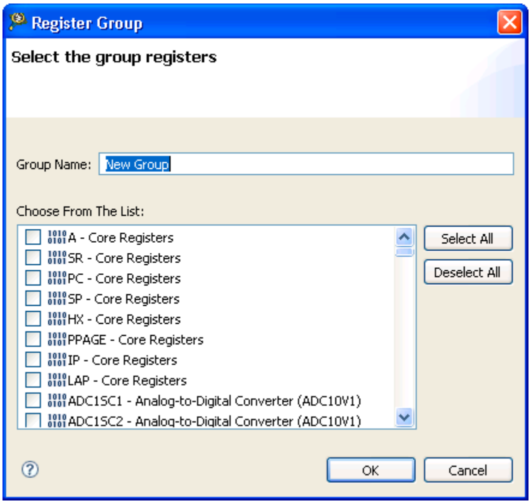
1. Right-click in the **Registers** view.

   A context menu appears.

2. Select **Add Register Group**.

   The **Register Group** dialog box appears (Figure 4.22).

Figure 4.22 Register Group Dialog Box



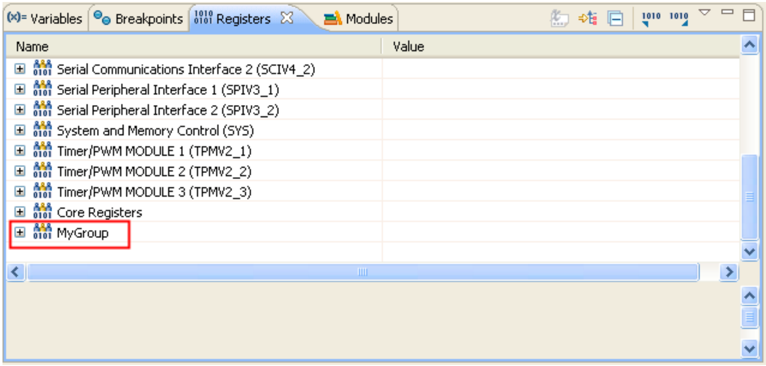
3. Enter in the **Group Name** text box a descriptive name for the new group. For example, *MyGroup*.
4. Check the checkbox adjacent to each register you want to appear in the new group.

TIP Click **Select All** to check all of the checkboxes. Click **Deselect All** to clear all the checkboxes.

5. Click **OK**.

   The **Register Group** dialog box closes. The new group name appears in the **Registers** view.

Figure 4.23 New Register Group



Editing Register Group

In the **Registers** view, you can edit both the default register groups and the groups that you add. To do so:

1. In the **Register** view, right-click on the name of the register group you want to edit. For example, right-click on *MyGroup*.

   A context menu appears.

2. Select **Edit Register Group**.

   The **Register Group** dialog box appears (Figure 4.22).

3. If required, enter a new name for the group in the **Group Name** text box.
4. Check the checkbox adjacent to each register you want to appear in the group.

TIP Click **Select All** to check all of the checkboxes. Click **Deselect All** to clear all the checkboxes.

5. Click **OK**.

   The **Register Group** dialog box closes. The new group name appears in the **Registers** view.

Removing Register Group

In the **Registers** view, you can remove register groups. To remove a register group:

1. In the **Registers** view, right-click on the register group you want to remove.

   A context menu appears.

2. Select **Remove Register Group**.

   The selected register group is removed from the **Registers** view.

Changing Register's Bit Value

To change a bit value in a register, first switch the IDE to the **Debug** perspective, start a debugging session and perform these steps.

1. Open the **Registers** view by selecting **Window > Show View > Registers**.
2. Expand the register group that contains the register with the bit value that you want to change.
3. Click on the register's current bit value in the view's **Value** column.

   The value appears editable.
4. Type in the new value.
5. Press the Enter key.

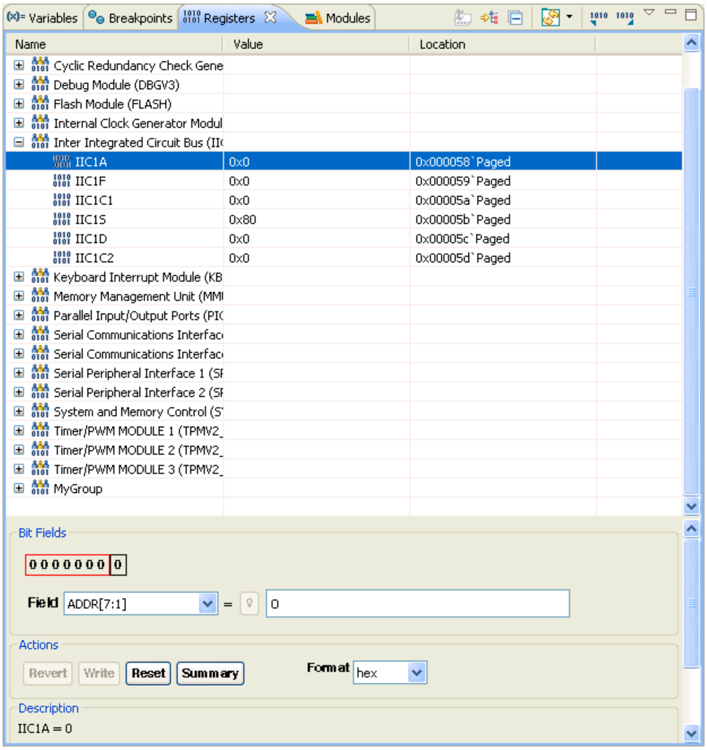
   The debugger updates the bit value. The bit value in the **Value** column changes to reflect your modification.

NOTE Modified values are highlighted in yellow.

Using Register Details Window

The default state of the **Registers** view is to provide details on the processor's registers (Figure 4.24).

Figure 4.24 Register View — Detailed Information



The **Registers** view displays several types of register details:

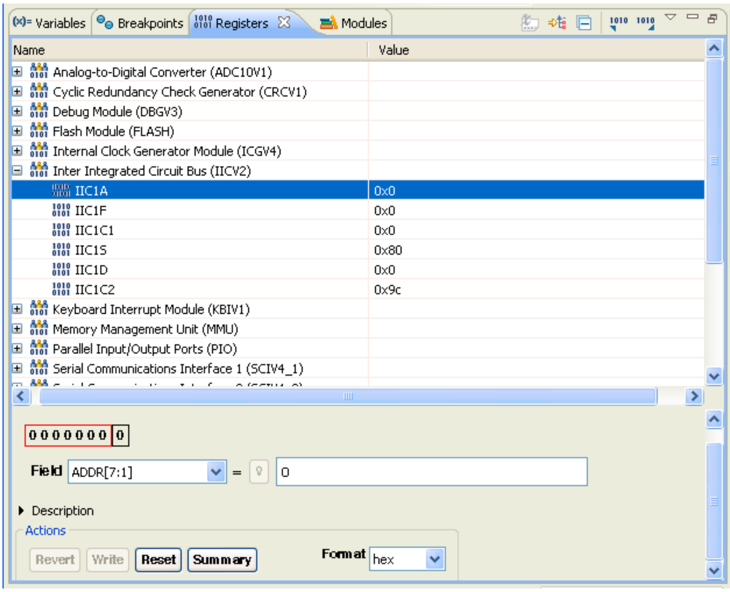
- Bit Fields
- Description
- Actions

NOTE To display the register details, first you have to select a register, then expand the view by clicking and dragging the areas at the bottom of the **Registers** view to reveal the Bit Field, Description, and Actions portions of the view.

Bit Fields

The Bit Fields group of the **Registers** view (Figure 4.25) shows a graphical representation of the selected register's bit values. This graphical representation shows how the register organizes bits. You can use this representation to select and change the register's bit values. Hover the cursor over each part of the graphical representation in order to see additional information.

Figure 4.25 Register Details — Bit Fields Group



TIP You can also view register details by issuing the `reg` command in the **Debugger Shell** view.

A *bit field* is either a single bit or a collection of bits within a register. Each bit field has a mnemonic name that identifies it. You can use the **Field** list box to view and select a particular bit field of the selected register. The list box shows the mnemonic name and bit-value range of each bit field. In the Bit Fields graphical representation, a box surrounds each bit field. A red box surrounds the bit field shown in the **Field** list box.

After you use the **Field** list box to select a particular bit field, you see its current value in the **=** text box. If you change the value shown in the text box, the **Registers** view shows the new bit-field value.

The minimum resolution of bit-field descriptions is 2 bits. Consequently, register details are not available for single-bit overflow registers.

The maximum resolution of bit-field descriptions is 32 bits.

Changing Bit Field

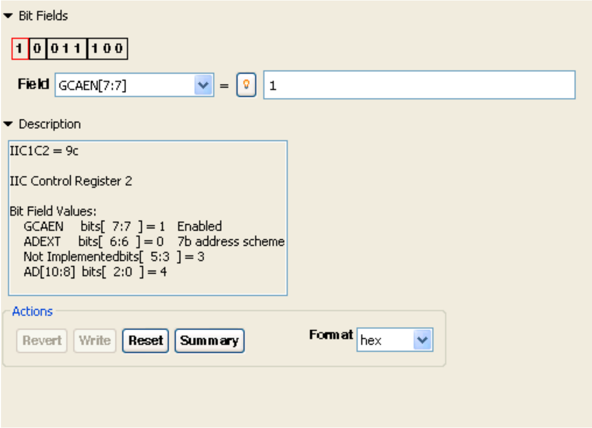
To change a bit field in a register, you must first start a debugging session and then open the **Registers** view.

To change a bit field, perform these steps.

1. In the **Registers** view, view register details.
2. Expand the register group that contains the bit field you want to change.
3. Expand the **Bit Field** and **Description** groups.

   Register details appear (Figure 4.26) in the **Registers** view.

Figure 4.26 Registers View — Register Details



4. From the expanded register group above the register details, select the name of the register that contains the bit field that you want to change.

   The **Bit Fields** group displays a graphical representation of the selected bit field. The **Description** group displays explanatory information about the selected bit field and parent register.

5. In the **Bit Fields** group, click the bit field that you want to change. Alternatively, use the **Field** list box to specify the bit field that you want to change.
6. In the **=** text box, type the new value that you want to assign to the bit field.
7. In the **Action** group, click the **Write** button.

NOTE The **Revert** and **Write** buttons appear enabled if the value in the **=** field is changed or you reset the values.

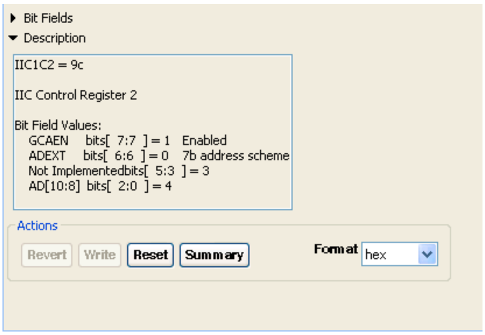
The debugger updates the bit-field value. The bit values in the **Value** column and the **Bit Fields** group change to reflect your modification.

NOTE Click the **Reset** button to discard your changes and restore the original bit-field value. Click the **Revert** button to revert to the last changes made.

Description

The Description group of the **Registers** view (Figure 4.27) shows explanatory information for the selected register.

Figure 4.27 Register View — Description Group



The registers information covers:

- Name
- Current Value
- Description
- Bit field explanations and values

Some registers have multiple modes (meaning that the register’s bits can have multiple meanings, depending on the current mode). If the register you examine has multiple modes, you must select the appropriate mode.

Actions

Use the Actions group of the **Registers** view (Figure 4.28) to perform various operations on the selected register's bit-field values.

Figure 4.28 Register View — Actions Group

Table 4.21 lists each item in the **Actions** group and explains the purpose of each.

Table 4.21 Actions Group Items

Item	Description
Revert	Discard your changes to the current bit-field value and restore the last change you made. The debugger disables this button if you have not made any changes to the bit-field value.
Write	Save your changes to the current bit-field value and write those changes into the register's bit field. The debugger disables this button after writing the new bit-field value, or if you have not made any changes to that value.
Reset	Change each bit of the bit-field value to its register-reset value. The register takes on this value after a target-device reset occurs. To confirm the bit-field change, click **Write**. To cancel the change, click **Reset.**
Summary	Display **Description** group content in a pop-up window. Press the Esc key to close the pop-up window.
Format	Specify the data format of the displayed bit-field values.

Register Details Context Menu

To display the **Register Details** context menu, right-click on a bit-field value in the **Registers** view. This menu's commands duplicate capabilities available in the **Register Details** view.

Table 4.22 lists each command in the **Registers** view and explains the purpose of each.

Table 4.22 Register Details Context Menu

Menu Command	Description
Select All	Selects the entire contents of the current bit-field value
Copy Registers	Copies to selected bit fields content to the system clipboard
Enable	Lets the debugger to access the selected bit fields
Disable	Prevents the debugger from accessing the selected bit fields
Display as Array	Opens a dialog box that you can use to display the selected bit fields as an array of bit values
Cast to Type	Opens a dialog box that you can use to cast the selected bit field values to a different data type
Restore Original Type	Reverts the selected bit-field values to their default data types
Find	Opens a dialog box that you can use to select a particular register or bit field
Change Value	Opens a dialog box that you can use to change the current bit field value
Show Details As	Lets you specify how the debugger displays the register's contents. The options are: **Register Details Pane** — The register's values are display in a bit format, along with a description of their purpose. **Default Viewer** — The register's contents are displayed as a hexadecimal value
Add Register Group	Opens a dialog box that you can use to create a new collection of registers to display in the **Registers** view
Edit Register Group	Opens a dialog box that you can use to modify the collection of registers that the **Registers** view displays for the selected register group
Remove Register Group	Deletes the selected register group from the **Registers** view

Table 4.22 Register Details Context Menu (*continued*)

Menu Command	Description
Format	Use to specify the displayed data format of the selected bit field values: • Natural—default data format • Binary—binary data format • Decimal—decimal data format • Hexadecimal—hexadecimal data format
Create Watch Expression	Adds a new watch-expression entry to the Expressions view

Viewing Register Details

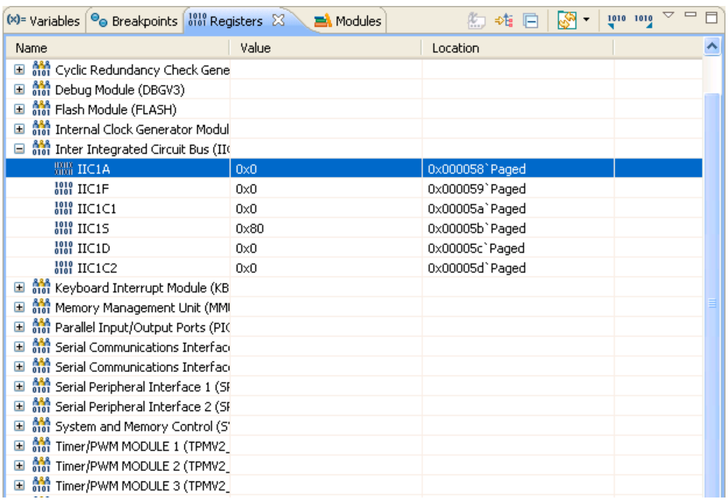
To open the **Registers** view, you must first start a debugging session.

To see the registers and their descriptions, perform these steps.

1. In the **Debug** perspective, click the **Registers** tab.

   The **Registers** view (Figure 4.29) appears.

Figure 4.29 Registers View, Register Details



2. Click the toolbar’s menu button (the inverted triangle highlighted in Figure 4.29).
3. Select **Layout > Vertical View Orientation** or **Layout > Horizontal View Orientation** to see the register details.

NOTE Selecting **Layout > Registers View Only** hides the register details.

4. Expand a register group to see individual registers.
5. Select a specific register by clicking on it.

   The debugger enables the appropriate buttons in the Actions group of the **Registers** view.

NOTE Use the **Format** list box to specify the format of data that appears in the **Registers** view.

6. Use the **Register** view to examine register details.

   For example, examine register details in these ways:

   - Expand the **Bit Fields** group to see a graphical representation of the selected register's bit fields. You can use this graphical representation to select specific bits or bit fields.
   - Expand the **Description** group to see an explanation of the selected register, bit field, or bit value.

TIP To enlarge the **Registers** view, click **Maximize** of the view's toolbar. After you finish looking at the register details, click **Restore** of the view's toolbar to return the view to its previous size. Alternatively, right-click the **Registers** tab and select **Detached**. The **Registers** view becomes a floating window that you can resize. After you finish looking at the register details, right-click the **Registers** tab of the floating window and select **Detached** again. You can rearrange the re-attached view by dragging its tab to a different collection of view tabs.

Viewing Cache

NOTE Cache not supported at this time.

Cache View Toolbar Menu

NOTE Cache not supported at this time.

Using Cache Coherency Switch

NOTE Cache not supported at this time.

Setting Watchpoints

A watchpoint is another name for a data breakpoint. The debugger halts execution each time the watchpoint location is read, written, or accessed (read *or* written). The debugger lets you set a watchpoint on an address or range of addresses in memory.

NOTE The debugger does not support setting a watchpoint on a stack variable or a register variable. Watchpoint set on a local variable may result in halt of execution at unexpected locations.

You can set the watchpoint from the:

- **Add Watchpoint** dialog box
- **Breakpoints** view
- **Memory** view
- **Variables** view

Setting the watchpoint type defines the conditions under which the debugger halts execution.

The debugger handles both watchpoints and breakpoints in a similar way. You use the **Breakpoints** view to manage both types. For example, you use the **Breakpoints** view to add, remove, enable, and disable both watchpoints and breakpoints. The debugger attempts to set the watchpoint if a session is in progress based on the active debugging context (the active context is the selected project in the **Debug** view).

If the debugger sets the watchpoint when no debugging session is in progress, or when re-starting a debugging session, the debugger attempts to set the watchpoint at startup as it does for breakpoints. The **Problems** view displays error messages when the debugger fails to set a watchpoint. For example, if you set watchpoints on overlapping memory ranges, or if a watchpoint falls out of execution scope, an error message appears in the **Problems** view. You can use this view to see additional information about the error.

Add Watchpoint Dialog Box

Use the **Add Watchpoint** dialog box to create a watchpoint for a memory range. You can specify these parameters for a watchpoint:

- an address (including memory space)
- an expression that evaluates to an address

- a memory range
- an access type on which to trigger

To open the **Add Watchpoint** dialog box:

1. Open the **Debug** perspective.
2. Click one of these tabs:
   - Breakpoints
   - Memory
   - Variables

   The corresponding view appears.
3. Right-click the appropriate content inside the view as mentioned in Table 4.23.

Table 4.23 Opening Add Watchpoint Dialog Box

In the View...	Right-Click...
Breakpoints	an empty area inside the view.
Memory	the cell or range of cells on which you want to set the watchpoint.
Variables	a global variable. Note that the debugger does not support setting a watchpoint on a stack variable or a register variable.

4. Select **Add Watchpoint (C/C++)** from the context menu.

   The **Add Watchpoint** dialog box appears as seen in Figure 4.30. The debugger sets the watchpoint according to the settings that you specify in the **Add Watchpoint** dialog box. The **Breakpoints** view shows information about the newly set watchpoint. The **Problems** view shows error messages when the debugger fails to set the watchpoint.

Figure 4.30 Add Watchpoint Dialog Box

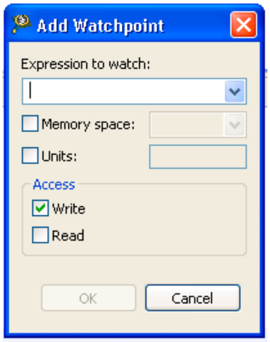


Table 4.24 describes the **Add Watchpoint** dialog box options.

Table 4.24 Add Watchpoint Dialog Box Options

Option	Description
Expression to watch	Enter an expression that evaluates to an address on the target device. The debugger displays an error message when the specified expression evaluates to an invalid address. You can enter these types of expressions: • An r-value, such as `&variable` • A register-based expression. Use the $ character to denote register names. For example, enter `$SP-12` to have the debugger set a watchpoint on the stack pointer address minus 12 bytes. The **Add Watchpoint** dialog box does not support entering expressions that evaluate to registers.
Memory space	Check this option to specify an address, including memory space, at which to set the watchpoint. Use the text box to specify the address or address range on which to set the watchpoint. If a debugging session is not active, the text/list box is empty, but you can still type an address or address range.
Units	Enter the number of addressable units that the watchpoint monitors.

Table 4.24 Add Watchpoint Dialog Box Options (*continued*)

Option	Description
Write	Check this option to enable the watchpoint to monitor write activity on the specified memory space and address range. Clear this option if you do not want the watchpoint to monitor write activity.
Read	Check this option to enable the watchpoint to monitor read activity on the specified memory space and address range. Clear this option if you do not want the watchpoint to monitor read activity.

Removing Watchpoints

To remove a watchpoint, perform these steps.

1. Open the **Breakpoints** view if it is not already open by choosing **Window > Show View > Breakpoints**.

   The **Breakpoint** view appears, displaying a list of watchpoints.

2. Right-click on the watchpoint you wish to remove and select **Remove** from the menu that appears.

   The selected watchpoint is removed, and it disappears from the list in the **Breakpoints** view.

Setting Breakpoints

The different breakpoint types that you can set are listed below:

- Software

  The debugger sets a software breakpoint into target memory. When program execution reaches the breakpoint, the processor stops and activates the debugger. The breakpoint remains in the target memory until you remove it.

  The breakpoint can only be set in writable memory like SRAM or DDR. You cannot use this type of breakpoints in ROM.

- Hardware

  Selecting the Hardware menu option causes the debugger to use the internal processor breakpoints. These breakpoints are usually very few and can be used with all types of memories (ROM/RAM) because they are implemented by using processor registers.

TIP You can also set breakpoint types by issuing the `bp` command in the CodeWarrior **Debugger Shell view.**

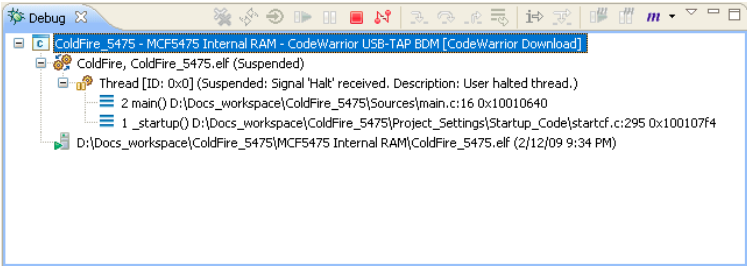
To set a breakpoint:

1. In the IDE's **Debug** perspective, click the **Debug** tab.

   Figure 4.31 shows the **Debug** view.

2. Right clicking on a code line will set a breakpoint.

Figure 4.31 Debug View

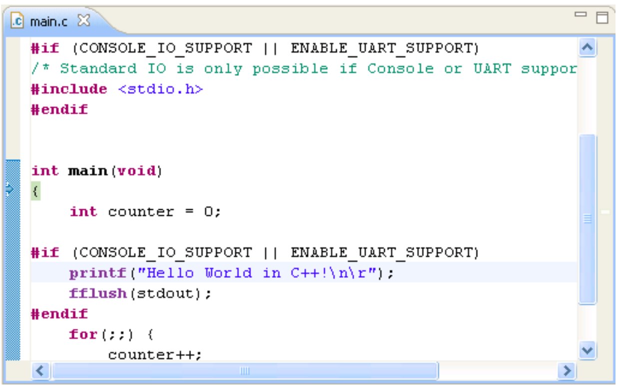


3. Expand the **Thread** group.

4. Under the **Thread** group, select the thread that has the `main()` function.

   The source code appears in an editor view as in Figure 4.32. The small blue arrow to the left of the source code indicates which code statement the processor's program counter is set to execute next.

Figure 4.32 Editor View



5. In the editor view, place the cursor on the line that has this statement:

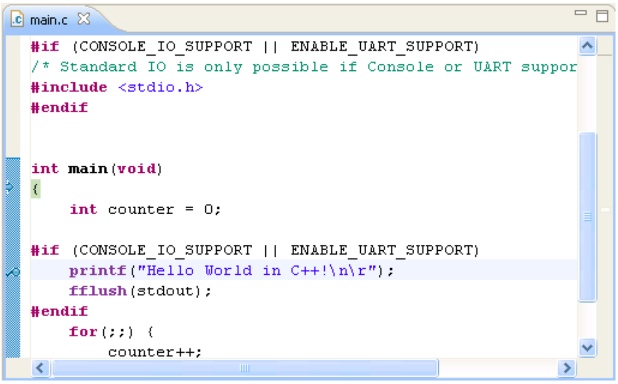
   ```
   printf("Hello World in C++!\n\r");
   ```

6. Select **Run** > **Toggle Line Breakpoint**.

7. A blue dot appears in the marker bar to the left of the line as seen in Figure 4.33. This dot indicates an enabled breakpoint. After the debugger installs the breakpoint, a blue checkmark appears beside the dot. The debugger installs a breakpoint by loading into the Java™ virtual machine the code in which you set that breakpoint.

TIP An alternate way to set a breakpoint is to double-click the marker bar to the left of any source-code line. If you set the breakpoint on a line that does not have an executable statement, the debugger moves the breakpoint to the closest subsequent line that has an executable statement. The marker bar shows the installed breakpoint location. If you want to set a hardware breakpoint instead of a software breakpoint, use the `bp` command in the **Debugger Shell** view. You can also right-click on the marker bar to the left of any source-code line, and select **Set Special Breakpoint** from the context menu.

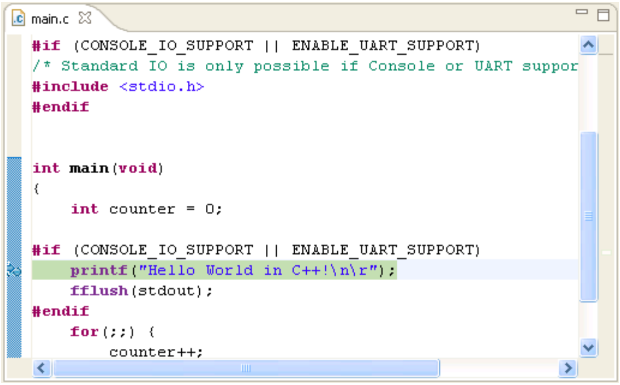
Figure 4.33 Editor View — After Setting Breakpoints



8. From the menu bar, select **Run** > **Resume**.

   The debugger executes all lines up to, but not including, the line at which you set the breakpoint. The editor view highlights the line at which the debugger suspended execution as shown in Figure 4.34. Note also that the program counter (blue arrow) is positioned here.

Figure 4.34 Editor View — After Reaching Breakpoint



Setting Hardware Breakpoints

There are two ways to set hardware breakpoints. These are:

- Using IDE to Set Hardware Breakpoint
- Using Debugger Shell to Set Hardware Breakpoint

Using IDE to Set Hardware Breakpoint

In either the **C/C++** perspective or the **Debug** perspective, select the source line in the **Editor** view where you want to place the breakpoint. Go to the marker bar on the left side of the **Editor** view. Right-click on it to display a menu. Select **Set Special Breakpoint > Hardware** to set a hardware breakpoint.

Using Debugger Shell to Set Hardware Breakpoint

Use the **Debugger Shell** view to set hardware breakpoints. Perform these steps to use the debugger shell to set a hardware breakpoint:

1. Open the **Debugger Shell** view.
2. Begin the command line with the text: `bp -hw`
3. Complete the command line by specifying the function, address, or file at which you want to set the hardware breakpoint.

   For example, to set a breakpoint at line 6 in the source file `main.c`, type:

   ```
   bp -hw main.c 6
   ```
4. Press the Enter key.

   The debugger shell executes the command and sets the hardware breakpoint.

TIP Enter `help bp` at the command-line prompt to see examples of the `bp` command syntax and usage.

Removing Breakpoints

To remove a breakpoint from your program, you have two options. These are:

- Remove Breakpoint Using Marker Bar
- Remove Breakpoint Using Breakpoints View

NOTE To remove hardware breakpoints, see the topic Removing Hardware Breakpoints, for more information.

Remove Breakpoint Using Marker Bar

To remove an existing breakpoint using the marker bar, perform these steps.

1. Right-click on the existing breakpoint in the marker bar.
2. Select **Toggle Breakpoint** from the menu that appears.

Remove Breakpoint Using Breakpoints View

To remove an existing breakpoint using the **Breakpoints** view, perform these steps.

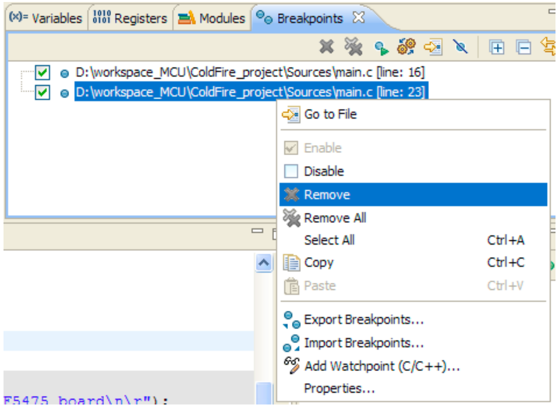
1. Open the **Breakpoints** view if it is not already open by choosing **Window > Show View > Breakpoints**.

   The **Breakpoint** view appears, displaying a list of breakpoints.
2. Right-click on the breakpoint you want to remove and select **Remove** from the context menu (Figure 4.35).

   The selected breakpoint is removed, and it disappears from the both the marker bar and the list in the view.

NOTE To remove all of the breakpoints from the program at once, select **Remove All** from the context menu.

Figure 4.35 Removing Breakpoint



Removing Hardware Breakpoints

There are two ways to remove existing hardware breakpoints. These are:

- Remove Hardware Breakpoint Using IDE
- Remove Hardware Breakpoint Using Debugger Shell

Remove Hardware Breakpoint Using IDE

To remove a hardware breakpoint, perform these steps.

1. Right-click on the existing breakpoint in the marker bar.
2. Select **Toggle Breakpoint** from the menu that appears.

Alternatively, you may remove the breakpoint from the Breakpoint view by performing these steps.

1. Open the **Breakpoints** view if it is not already open by choosing **Window > Show View > Breakpoints**.

   The **Breakpoint** view appears, displaying a list of breakpoints.

2. Right-click on the hardware breakpoint you wish to remove and select **Remove** from the menu that appears, as shown in Figure 4.35.

   The selected breakpoint is removed, and it disappears from the both the marker bar and the list in the view.

Remove Hardware Breakpoint Using Debugger Shell

To remove a hardware breakpoint using the **Debugger Shell** view, perform these steps.

1. Open the **Debugger Shell** view.
2. Begin the command line with the text: `bp#`
3. Complete the command line by specifying the function, address, or file at which you want to remove the hardware breakpoint.

   For example, to remove a breakpoint at line 6 in the source file `main.c`, type:

   `bp#<bp_index> off`

   Where, `<bp_index>` is the index if the hardware breakpoint is at line 6.
4. Press the Enter key.

   The debugger shell executes the command and removes the hardware breakpoint.

Setting Stack Crawl Depth

Select the **Maximum stack crawl depth** command lets you set the depth of the stack to read and display. Showing all levels of calls when you are examining function calls several levels deep can sometimes make stepping through code more time-consuming. Therefore, you can use this menu option to reduce the depth of calls that the debugger displays.

To set the stack crawl depth, perform these step:

1. Select **Window** > **Preferences**.

   The **Preferences** window appears.
2. Expand the **C/C++** tree control and select **Debug**.

   The general settings for C/C++ debugging are displayed on the right-hand side of the **Preferences** window.
3. Specify the appropriate stack crawl depth, in the **Maximum stack crawl depth** text box.

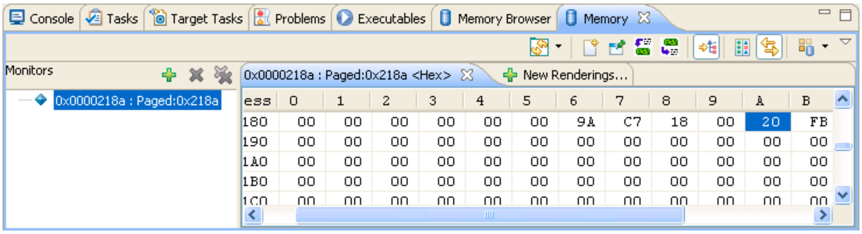
NOTE You can specify any integer from 1 to 100.

Viewing Memory

Use the **Memory** view to examine the active memory rendering of a specified expression or address. To display this view from the **Debug** perspective, Select **Window > Show View > Memory**, and the **Memory** view appears.

The **Memory** view supports the display of multiple memory spaces. Figure 4.36 shows the **Memory** view with the *Expression:baseaddr <name> tree* active memory rendering tab.

Figure 4.36 Memory View



Adding Memory Monitor

You can add multiple memory monitors to the **Memory** view. To add a new memory monitor, perform these steps.

1. Start a debugging session.
2. Open the **Memory** view.
3. Click the plus-sign  icon on the **Monitors** pane toolbar. Alternatively, right-click in the **Monitors** pane and select **Add Memory Monitor** from the context menu.
4. The **Monitor Memory** dialog box (Figure 4.37) appears.

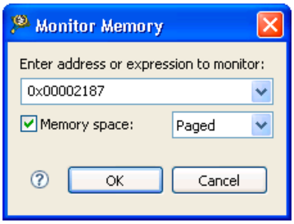
NOTE The **Enter memory space and address** option appears only when the debugger associated with the active debugging context supports memory spaces, and the currently debugged process has multiple memory spaces.

5. Specify options as explained in Table 4.25.

Table 4.25 Monitor Memory Dialog Box Options

Option	Description
Enter address or expression	Enter the expression to monitor in decimal or hexadecimal values. You can use the drop-down list to select a previously specified expression
Memory Space	Check to specify the memory space (*Paged or Flash*).

Figure 4.37 Monitor Memory Dialog Box



6. Click **OK**.

   The memory monitor appears in the **Memory** view (Figure 4.36).

Adding Memory Rendering

You can use the **Renderings** pane of the **Memory** view to examine the memory content, starting at any valid address. The information displayed in this page is readonly and cannot be used to modify the memory content.

To add a new memory rendering, perform these steps.

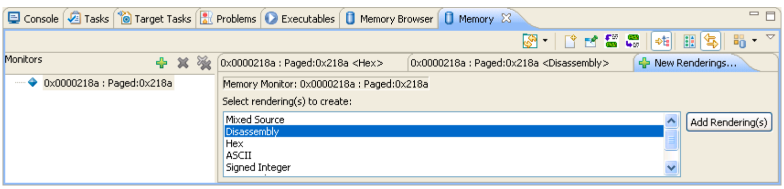
1. Start a debugging session.
2. Open the **Memory** view.
3. In the **Monitors** pane, select the memory monitor for which you want to add a memory rendering.

NOTE To create a memory monitor, right-click a blank area in the **Monitors** pane and select **Add Memory Monitor**. Alternatively, click the plus-sign icon in the **Monitors** pane toolbar.

4. Click the **New Renderings** tab.

   The **New Renderings view** appears.

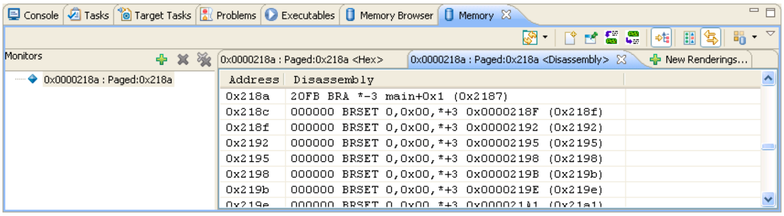
Figure 4.38 New Renderings View



5. Select a rendering type from the **Select rendering(s) to create** list and click the **Add Rendering(s)** button. Alternatively, right-click in the **Renderings** pane and select **Add Memory Rendering** from the context menu. For example, select *Disassembly*.
6. Click **OK**.

   The selected memory rendering type appears in the **Memory** view.

Figure 4.39 Added Rendering



Removing Memory Rendering

To remove a memory rendering from the **Memory** view, perform these steps.

1. Open the **Memory** view.
2. In the **Renderings** pane, select the tab that corresponds to the memory rendering that you want to remove.
3. Click the cross-sign  icon on the **Renderings** pane toolbar. Alternatively, right-click on the **Renderings** pane and select **Remove Rendering** from the context menu.

   The memory rendering is removed from the Memory view.

Resetting to Base Address

To reset the memory rendering and display the base address of the rendering, perform these steps.

1. Open the **Memory** view.
2. In the **Renderings** pane, select the tab that corresponds to the disassembly rendering that you want to reset to the base address.
3. Right-click in the **Renderings** pane and select **Reset to Base** from the context menu.
4. The disassembly rendering scrolls to the line that contains the base address of the displayed rendering.

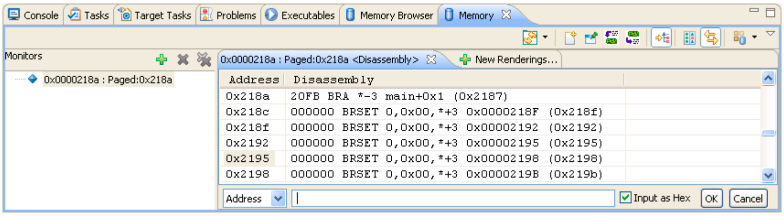
Go to Address

The memory view provides graphical controls to display memory at a specific address. To go to a specific address, perform these steps.

1. Open the **Memory** view.
2. In the **Renderings** pane, select the tab that corresponds to the disassembly rendering for which you want to display a specific address.
3. Right-click in the **Renderings** pane and select **Go to Address** from the context menu.

   A group of controls appears on the **Renderings** pane (Figure 4.40).
4. In the blank text box, enter the address that you want to display.

Figure 4.40 Disassembly Rendering - Go to Address



NOTE Check the **Input as Hex** checkbox only if you enter the address in hexadecimal notation.

---

5. Click **OK** to have the Disassembly rendering scroll to the specified address. Alternatively, click **Cancel** to abort the operation and hide the group of controls.

Hard Resetting

Use the `reset hard` command in the **Debugger Shell** view to send a hard reset signal to the target processor.

NOTE The **Hard Reset** command is enabled only if the debug hardware you are using supports it.

Debugging Externally Built Executable Files

You can use the Microcontrollers ELF executable wizard to debug an .elf file generated by a different IDE. To debug externally built executable files, perform these steps.

The main purpose of the **MCU Executable Import** wizard is to create a CodeWarrior for Microcontrollers Eclipse project that can be readily debugged starting from an executable file build with a Microcontrollers toolchain.

The **MCU Executable Import** wizard lets you import a `*.elf`, `*.abs`, or `*.flt` file and associate it to a project.

This topic describes the various pages that the wizard displays as it assists you in importing and associating an executable (`*.elf`, `*.abs`, or `*.flt`) file to a project.

- Import a MCU Executable File Page
- Select MCU executable file to be imported Page
- Device and Connection Page
- Connections Page
- Debug an Externally Built Executable File

Import a MCU Executable File Page

Use this page to name your new project, and specify the workspace directory.

Figure 4.41 Import MCU Executable — Import a MCU Executable File Page

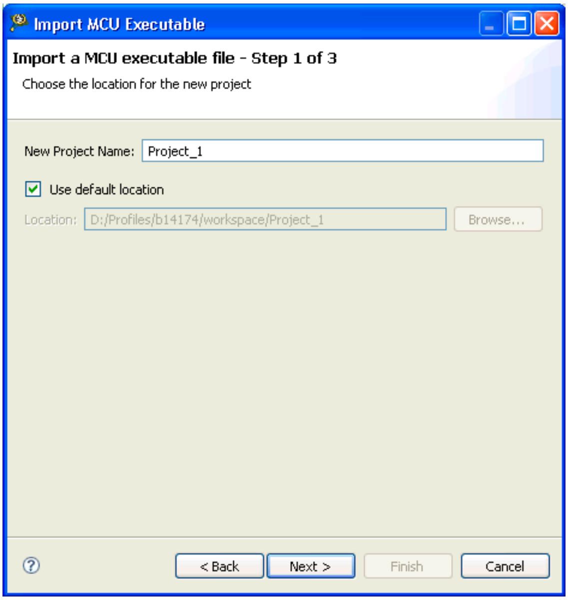


Table 4.26 describes the purpose of the various options.

Table 4.26 Import a MCU Executable File Page Settings

Option	Description
New Project Name	Enter the name for the new project in this text box.
Use default location	Stores the files required to build the program in the Workbench's current workspace directory. The project files are located in the directory you specify. Use the **Location** option to select the directory.
Location	Specifies the directory that contains the project files. Click **Browse** to navigate to the desired directory. This option is only available when **Use default location** is clear.

Select MCU executable file to be imported Page

Use this page to select an existing Microcontrollers `ELF, ABS, or FLT` file you want to import.

Figure 4.42 Import MCU Executable — Select MCU executable file to be imported Page

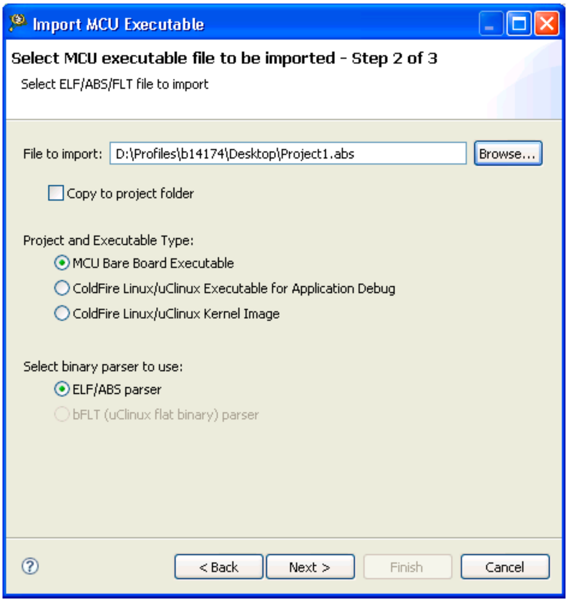


Table 4.27 explains the options available on the page.

Table 4.27 Select MCU executable file to be imported Page Settings

Option	Description
File to Import	Specifies the path of the ELF, ABS, or FLT files.
Browse	Click to locate the directory that contains the `*.elf`, `*.abs`, or `*.flt` files
Copy to project	Check to copy the selected import file in the new project.
MCU Bare Board Executable	Select to use the microcontrollers bareboard executable.
ColdFire Linux/uClinux Executable for Application Debug	Select to use the ColdFire Linux/uClinux executable for application debug.

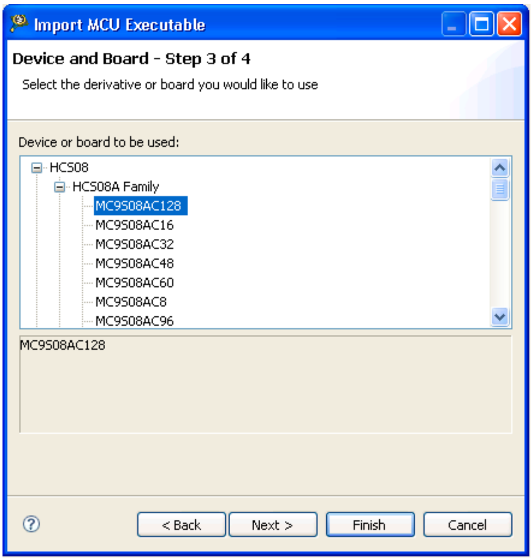
Table 4.27 Select MCU executable file to be imported Page Settings

Option	Description
ColdFire Linux/uClinux Kernel Image	Select to use the ColdFire Linux/uClinux Kernel Image.
Select binary parser	Select a binary parser for the executable to be imported into the CodeWarrior IDE. The drop-down list includes various parsers supported by the CodeWarrior IDE.The commonly used parsers are: • ELF/ABS parser • bFLT (uClinux flat binary) parser

Device and Connection Page

Use this page to select the derivative or board you would like to use.

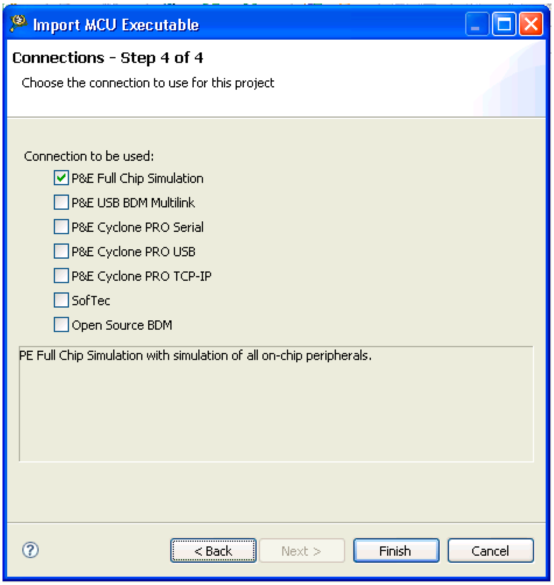
Figure 4.43 Import MCU Executable — Device and Connection Page



Connections Page

Use this page to select a connection to use for the project. Depending on the selected derivative or board, the connections will appear enabled or grayed out.

Figure 4.44 Import MCU Executable — Connections Page



Debug an Externally Built Executable File

You can use the Microcontrollers ELF Executable wizard to debug an .elf file generated by a different IDE. To debug externally built executable files, perform these steps.

1. Import a MCU Executable File Page
2. Specify Executable File to Import
3. Select Derivative or Board
4. Select Connection
5. Edit Launch Configuration
6. Specify Source Lookup Path
7. Debug Executable File

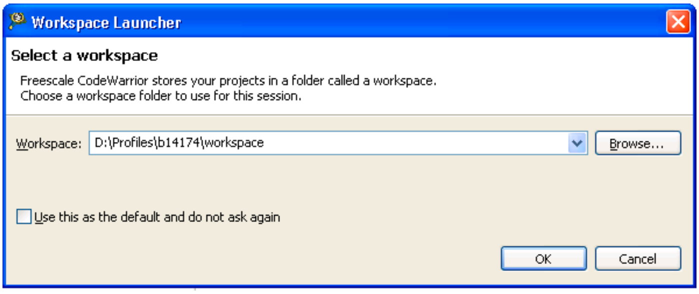
Import a MCU Executable File

You specify the externally built executable file that you want to debug in the CodeWarrior IDE. The IDE imports the executable file into a new project. To specify the executable file, perform these steps.

1. Select **Start > Programs > Freescale CodeWarrior > CW for Microcontrollers V *number* > CodeWarrior,** where *number* is the version number of your product.

   The IDE launches and the **WorkSpace Launcher** dialog box prompts you to select a workspace to use.

Figure 4.45 WorkSpace Launcher Dialog Box



2. Click **OK** to accept the default workspace. To use a workspace different from the default, click **Browse** and specify the desired workspace.

   The IDE starts and displays the **Welcome** page.

NOTE You can also select the **Use this as the default and do not ask again** checkbox to set default/selected path as a default location for storing all your projects.

3. Click the **Go to Workbench** link.

   The **Workbench** window opens.

4. Select **File > Import,** from the IDE menu bar.

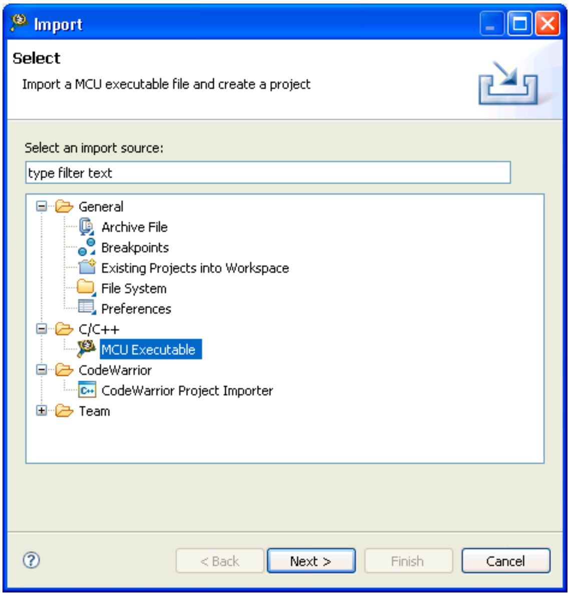
   The **Import** wizard appears.

5. Expand the **C/C++** group.

6. Select **MCU Executable** to debug a Microcontrollers `*.elf, *.abs,` or `*.flt` file as shown in Figure 4.46.

DRAFT

Figure 4.46 Import Wizard — Select MCU Executable



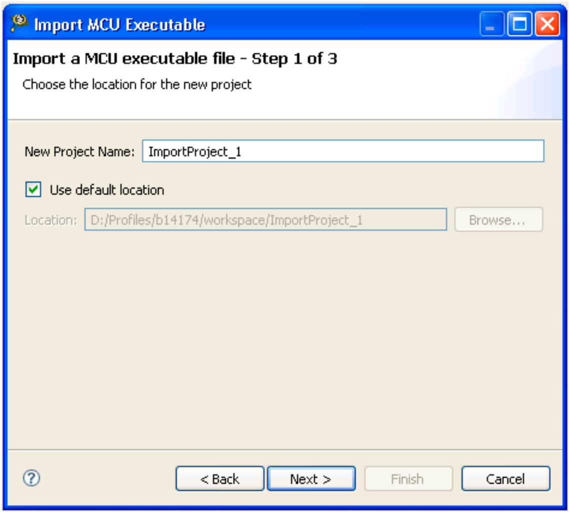
7. Click **Next**.

   The **Import a MCU executable file** page (Figure 4.47) appears.

8. Specify a name for the new project. For example, enter the project name as `ImportProject_1`.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify different location for the new project. By default, the **Use default location** checkbox is checked.

Figure 4.47 Import MCU Executable — Import a MCU executable file Page



9. Click **Next**.

   The **Select MCU executable file to be imported** page appears.

Specify Executable File to Import

1. Click **Browse**.

   The **Select file** dialog box appears.

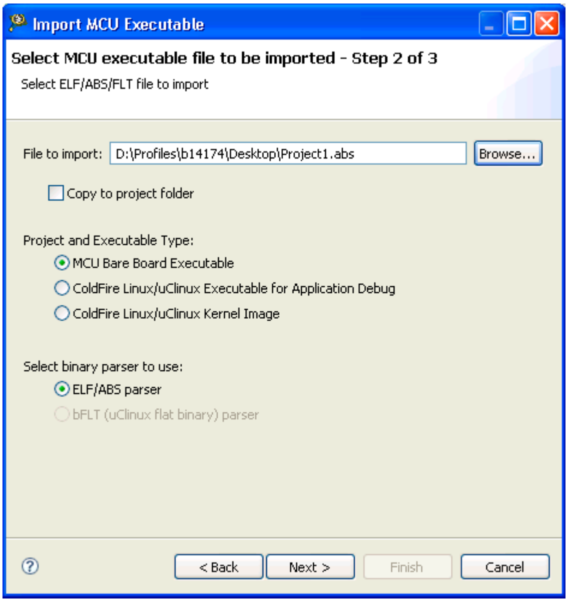
2. Navigate to the executable file that you want to import and click **Open**.

   The path of the selected file appears in the **File to import** text box.

3. Check the **Copy to project** checkbox if you want to copy the specified file in the new project. By default, the **Copy to project** checkbox is cleared.

4. From the **Select binary parser to use** drop-down list, select the parser you want to use. (Figure 4.48).

Figure 4.48 MCU Executable — Specify MCU Executable File to Import



5. Click **Next**.

   The **Device and Connection** page appears.

Select Derivative or Board

1. Expand the tree control and select the derivative or board you would like to use. For example, select `HCS08 > HCS08A Family > MC9S08AC128`.
2. Click **Next**.

   The **Connections** page appears.

Select Connection

1. Select the desired connection from the **Connection to be used** group. For example, check the **P&E Full Chip Simulation** checkbox.

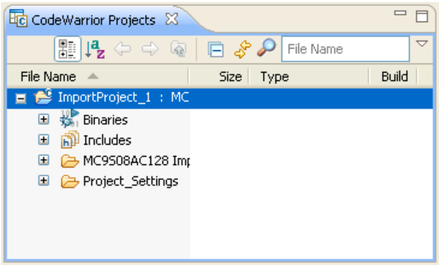
NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

2. Click **Finish**.

   The **Import MCU Executable** window closes and the wizard creates a project according to your specifications. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

3. Right-click on the project and from the context menu select **Build Project**.

Figure 4.49 CodeWarrior Projects View



The new project is ready for use. You can now customize it by adding your own source code files, changing debugger settings, or adding libraries.

Edit Launch Configuration

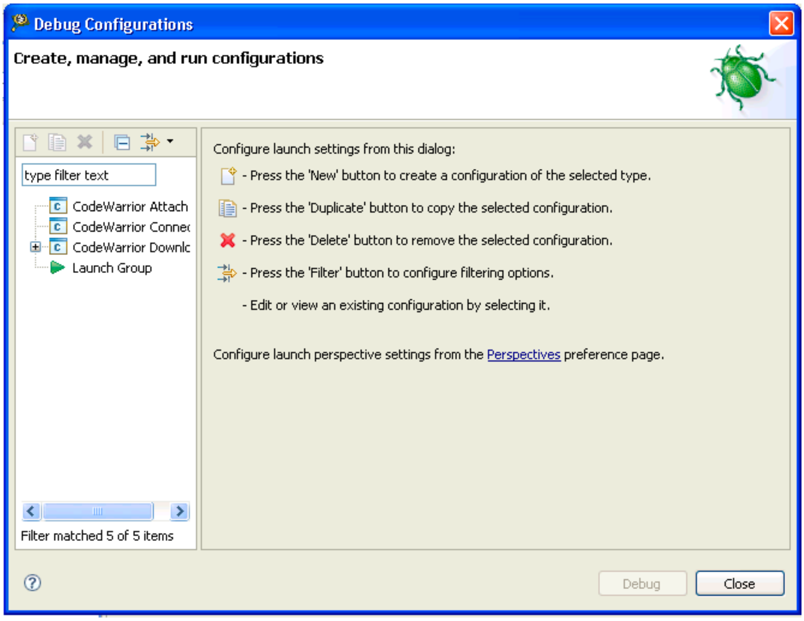
Before you edit the launch configuration, ensure that you create a project for the executable file.

To edit the launch configuration for your executable file, perform these steps.

1. From the main menu bar of the IDE, select **Run > Debug Configurations**. The IDE uses the settings in the launch configuration to generate debugging information and initiate communications with the target board.

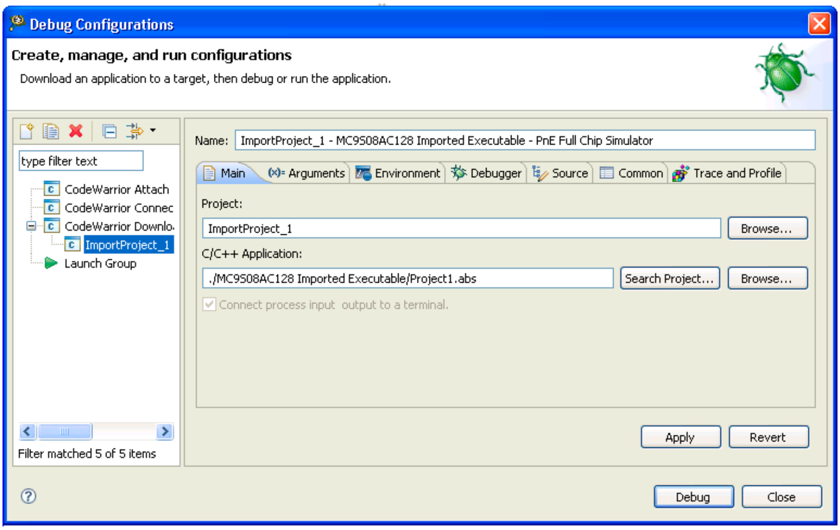
   The **Debug Configurations** dialog box appears. The left side of this dialog box has a list of debug configurations that apply to the current application.

Figure 4.50 Debug Configurations Dialog Box



2. Expand the **CodeWarrior Download** configuration.
3. From the expanded list, select the newly created debug configuration. For example, select *ImportProject_1 - MC9S08AC128*.

Figure 4.51 Selected Launch Configuration



4. Click the **Debugger** tab of the **Debug Configurations** dialog box.

   The corresponding page appears.

5. Use the Debugger list box to specify the debugger that corresponds to your type of executable file.

6. Configure the debugger options as appropriate for your executable file.

   For example, specify the appropriate target processor, any initialization files, and connection protocol.

Specify Source Lookup Path

You need to specify the source lookup path in terms of the compilation path and the local file-system path for the newly imported executable file. The CodeWarrior debugger uses both of these paths to debug the executable file.

The compilation path is the path to the original project that built the executable file. If the original project is from an IDE on a different computer, you specify the compilation path in terms of the file system on that computer.

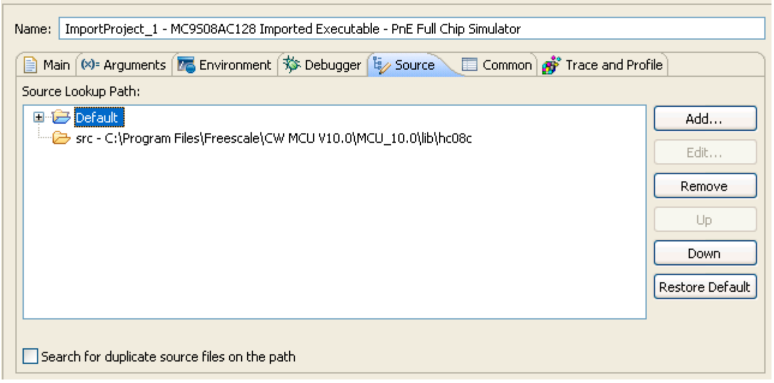
The local file-system path is the path to the project that the CodeWarrior IDE creates in order to debug the executable file.

To specify a source lookup path for your executable file:

1. Click the **Source** tab of the **Debug Configurations** dialog box.

   The corresponding page (Figure 4.52) appears.

Figure 4.52 Debug Configurations Dialog Box—Source Page

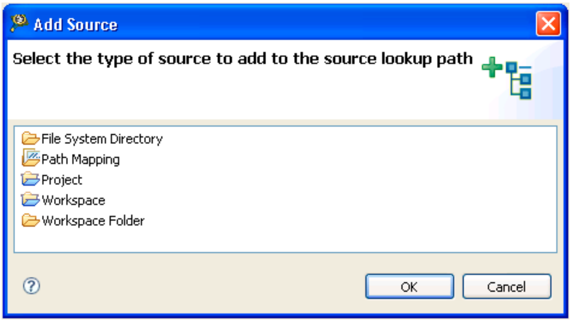


2. Click **Add**.

   The **Add Source** dialog box appears.

3. Select **Path Mapping** (Figure 4.53).

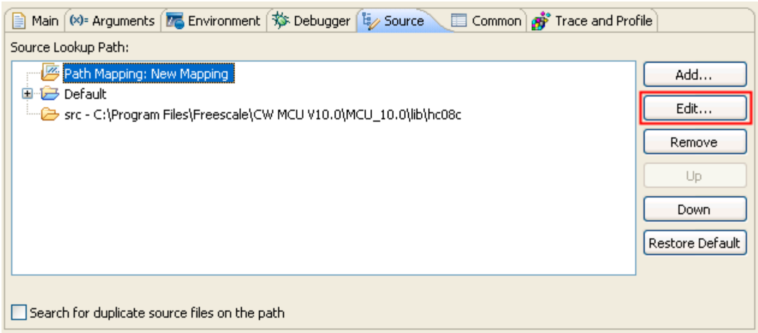
Figure 4.53 Add Source Dialog Box



4. Click **OK**.

   The **Add Source** dialog box closes. The IDE selects the new mapping in the **Source Lookup Path** list of the **Source** page.

Figure 4.54 Source Lookup Path



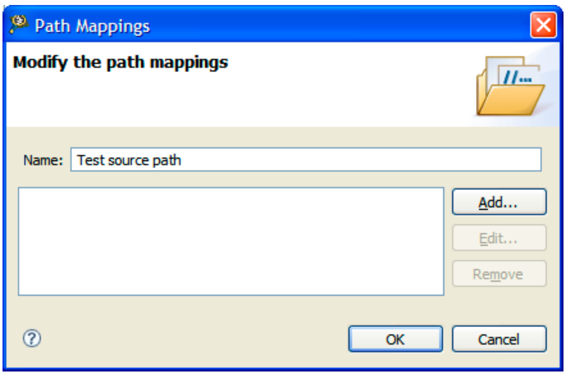
5. Click the **Edit** button of the **Source** page.

   The **Path Mappings** dialog box (Figure 4.55) appears.

6. In the Name text box, enter the name of the new path mapping.

   The name you enter also appears in the **Source Lookup Path** list of the **Source** page.

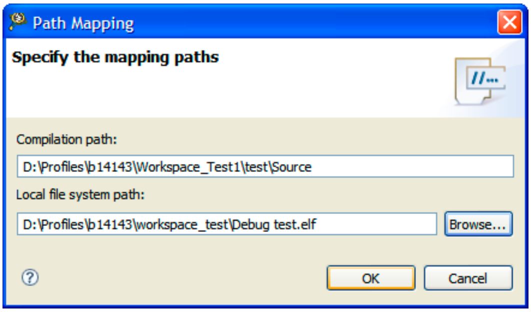
Figure 4.55 Path Mappings Dialog Box



7. Click **Add**.

   The **Path Mapping** dialog box (Figure 4.56) appears.

Figure 4.56 Path Mapping Dialog Box



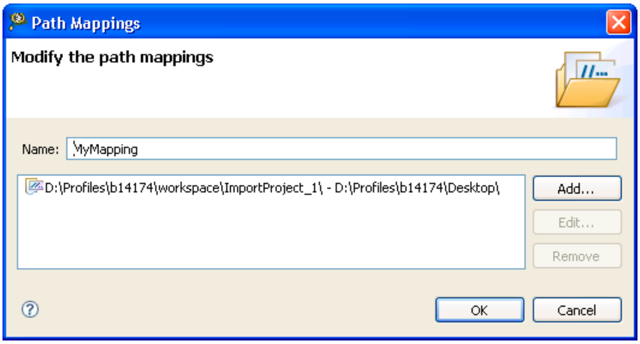
8. In the **Compilation path** text box, enter the path to the parent project of the executable file, relative to the computer that generated the file.

TIP You can use the IDE to discover the path to the parent project of the executable file, relative to the computer that generated the file. In the **C/C++ Projects** view of the **C/C++** perspective, expand the project that contains the executable file that you want to debug. Next, expand the group that has the name of the executable file itself. A list of paths appears, relative to the computer that generated the file. Search this list for the names of source files used to build the executable file. The path to the parent project of one of these source files is the path you should enter in the **Compilation path** text box.

9. In the **Local file system path** text box, enter the path to the parent project of the executable file, relative to your computer. Alternatively, click the **Browse** button to specify the parent project.
10. Click **OK**.

    The **Path Mapping** dialog box closes. The mapping information now appears in the **Path Mappings** dialog box.

Figure 4.57 Path Mappings Dialog Box



11. Click **OK**.

    The **Path Mappings** dialog box closes. The mapping information now appears under the path mapping shown in the **Source Lookup Path** list of the **Source** page.

12. If required, change the order in which the IDE searches the paths.

    The IDE searches the paths in the order shown in the **Source Lookup Path** list, stopping at the first match. To change this order, select a path, then click the **Up** or **Down** button to change its position in the list.

13. Click **Apply**.

    The IDE saves your changes.

Debug Executable File

Use the CodeWarrior debugger to debug the externally built executable file.

To debug the executable file, click the **Debug** button of the **Debug Configurations** dialog box.

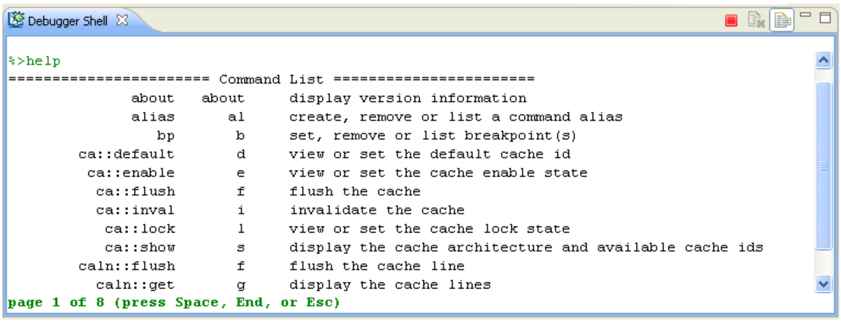
5

Scripting

CodeWarrior supports a command-line interface to some of its features including the debugger. You can use the command-line interface together with various scripting engines, such as the Microsoft® Visual Basic® script engine, the Java™ script engine, TCL, Python, and Perl. You can even issue a command that saves the command-line activity to a log file.

You use the **Debugger Shell** view (Figure 5.1) to issue command lines to the IDE. For example, you enter the command `debug` in this window to start a debugging session. The window lists the standard output and standard error streams of command-line activity.

Figure 5.1 Debugger Shell View



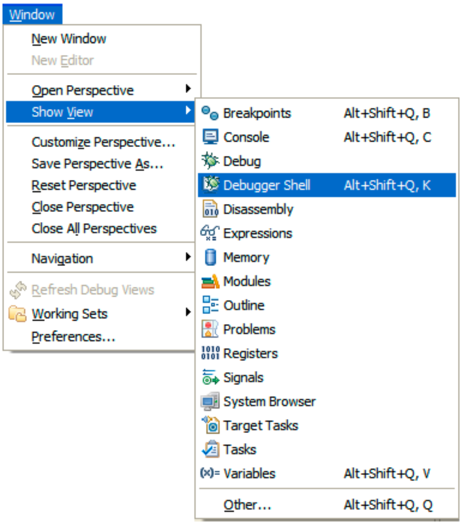
To open the **Debugger Shell** view, perform these steps.

1. Switch the IDE to the **Debug** perspective and start a debugging session.
2. Select **Window > Show View > Debugger Shell**.

   The **Debugger Shell** view appears (Figure 5.1).

NOTE Alternatively, select **Window > Show View > Other.** Expand the **Debug** tree control in the **Show View** dialog box, select **Debugger Shell**, and click **OK**.

Figure 5.2 Show View - Debugger Shell



To issue a command-line command, type the desired command at the command prompt (`%>`) in the **Debugger Shell** view, then press Enter or Return. The command-line debugger executes the specified command.

If you work with hardware as part of your project, you can use the command-line debugger to issue commands to the debugger while the hardware is running.

NOTE To list the commands the command-line debugger supports, type `help` at the command prompt and press Enter. The `help` command lists each supported command along with a brief description of each command.

TIP To view page-wise listing of the debugger shell commands, right-click in the **Debugger Shell** view and select **Paging** from the context menu. Alternatively, click the **Enable Paging**  icon.

When you debug from the command line, you can use:

- Tcl Support
- Command-Line Debugging Tasks
- Debugger Shell Command List
- Microcontrollers-Specific HIWARE Commands

Tcl Support

This topic describes command-line debugger’s Tcl support.

Resolution of Conflicting Command Names

The names of several command-line debugger commands conflict with the Tcl commands. Table 5.1 explains how the command-line debugger resolves such conflicts (if the mode is set to auto).

Table 5.1 Resolving Conflicting Commands

Command	Resolution
load	If you pass the command-line debugger a load command that includes a filename containing the suffix `.eld` or `.mcp`, the debugger loads the project. Otherwise, the debugger invokes the Tcl load command.
bp	If you pass the command-line debugger a `bp` command from within a script and the command has no arguments, the debugger invokes the `Tcl break` command. Otherwise, the debugger interprets a `break` command as a command to control breakpoints.
close	If you pass the command-line debugger a close command that has no arguments, the debugger terminates the debug session. Otherwise, the debugger invokes the Tcl close command.

Execution of Script Files

Tcl usually executes a script file as one large block, returning only after execution of the entire file. For the `run` command, however, the command-line debugger executes script files line-by-line. If a particular line is not a complete `Tcl` command, the debugger appends the next line. The debugger continues appending lines until it gets a complete Tcl script block.

Listing 5.1 lists code that includes a script. For the `Tcl source` command, the debugger executes this script as one block. But for the run debug command, the debugger executes this script as two blocks: the set statement and the while loop.

Listing 5.1 Example Tcl Script

```
set x 0;
while {$x < 5}
{

puts "x is $x";

set x [expr $x + 1]

}
```

NOTE The `run` debug command synchronizes debug events between blocks in a script file. For example, after a `go`, `next`, or `step` command, `run` polls the debug thread state and does not execute the next line or block until the debug thread terminates.
However, the Tcl `source` command does not consider the debug thread state. Consequently, use the `run` debug command to execute script files that contain these debug commands: `debug`, `go`, `next`, `stop`, and `kill`.

Tcl Startup Script

The command-line debugger can automatically run a Tcl script each time you open the command-line debugger window. This script is called a startup script.

You can use both Tcl and command-line debugger commands in the startup script. For example, you might include commands that set an alias or a define color configuration in a startup script.

To create a command-line debugger startup script, follow these steps.

1. Put the desired Tcl and command-line debugger commands in a text file.
2. Name this file `tcld.tcl`.
3. Place tcld.tcl in one of the directories listed below.
   - On a Windows® PC, put `tcld.tcl` in the system directory.

     For example, on Windows XP, put `tcld.tcl` in the WINDOWS directory.
   - On a Solaris Workstation, put `tcld.tcl` in your home directory.

NOTE There is no synchronization of debug events in the startup script. Consequently, put the c debug command to the startup script and place these debug commands in another script so they will execute properly: `debug`, `go`, `stop`, `kill`, `next`, and `step`.

Command-Line Debugging Tasks

Table 5.2 provides instructions for common command-line debugging tasks.

Table 5.2 Common Command-Line Debugging Tasks

Task	Instruction	Comments
Open the Debugger Shell	Select **Windows** > **Show View** > **Others** > **Debugger Shell**	The **Debugger Shell** view appears.
Use the help command	1. On the Debugger shell command prompt (**%>**), type `help`. 2. Press Enter.	The Command List for CodeWarrior is appears.
Enter a command	1. On the Debugger shell, type a command followed by a space. 2. Type any valid command-line options, separating each with a space. 3. Press Enter.	You can use shortcuts instead of complete command names, such as k for kill.
View debug command hints	Type alias followed by a space	The syntax for the rest of the command appears.
Review previous commands	Press Up Arrow and Down Arrow keys	
Clear command from the command line	Press the Esc key	
Stop an executing script	Press the Esc key	
Toggle between insert/overwrite mode	Press the Insert key	
Scroll up/ down a page	Press Page Up or Page Down key	

Table 5.2 Common Command-Line Debugging Tasks (*continued*)

Task	Instruction	Comments
Scroll left/right one column	Press Ctrl-Left Arrow or Ctrl-Right Arrow keys	
Scroll to beginning or end of buffer	Press Ctrl-Home or Ctrl-End keys	

Debugger Shell Command List

This topic lists and defines each command-line debugger command.

about

Lists the version information.

Syntax

```
about
```

alias

Creates an alias for a debug command, removes such an alias, or lists all current aliases.

Syntax

```
alias [<alias> [<command>]]
```

Parameters

`alias`

Lists current aliases.

Examples

Table 5.3 lists and defines examples of the `alias` command.

Table 5.3 alias Command-Line Debugger Command — Examples

Command	Description
`alias`	Lists current aliases.
`alias ls dir`	Issue the `dir` command when ls is typed.
`alias ls`	Remove the alias ls.

bp

Sets a breakpoint, removes a breakpoint, or lists the current breakpoints.

Syntax

```
bp [-{hw|sw|auto}] {<func>|[<ms>:]<addr>|<file> <line>
[<column>]}
```

```
bp all|#<id>|<func>|<addr> off|enable|disable
```

Examples

Table 5.4 lists and defines examples of the `bp` command.

Table 5.4 bp Command-Line Debugger Command — Examples

Command	Description
`bp`	Lists all breakpoints.
`bp -hw fn`	Set hardware breakpoint at function fn().
`bp -auto file.cpp 101 1`	Set an auto breakpoint on file file.cpp at line 101, column 1.
`bp fn off`	Remove the breakpoint at function fn().
`bp 10343`	Set a breakpoint at memory address 10343.
`bp #4 off`	Remove the breakpoint number 4.
`bp #4 disable`	Disable the breakpoint number 4.

Table 5.4 bp Command-Line Debugger Command — Examples

Command	Description
`bp #4 cond x == 3`	Set the condition for breakpoint number 4 to fire only if x == 3.
`bp #4 cond Hit Count % 3 == 0`	Break every third time. Hit Count corresponds to the breakpoint property of the same name.

cd

Changes to a different directory or lists the current directory. Pressing the Tab key completes the directory name automatically.

Syntax

```
cd [<path>]
```

Parameter

`path`

Directory pathname; accepts asterisks and wildcards.

Examples

Table 5.5 lists and defines examples of the `cd` command.

Table 5.5 cd Command-Line Debugger Command—Examples

Command	Description
`cd`	Lists current directory.
`cd c:`	Changes to the C: drive root directory.
`cd d:/mw/0622/test`	Changes to the specified D: drive directory
`cd c:p*s`	Changes to any C: drive directory whose name starts with **p** and ends with **s**.

change

Changes the contents of register, memory location, block of registers, or memory locations.

Syntax

```
change <addr-spec> [<range>] [-s|-ns] [%<conv>] <value>
change <addr-spec>{..<addr>|#<n>} [<range>] [-s|-ns] [%<conv>] <value>
change <reg-spec> [<n>] [-s|-ns] [%<conv>] <value>
change <reg-spec>{..<reg>|#<n>} [-s|-ns] [%<conv>] <value>
change <var-spec> [-s|-ns] [%<conv>] <value>
change v <var> [-s|-ns] [%<conv>] <value>
```

Parameter

<addr-spec> [<ms>:]<addr>

On architectures supporting multiple memory spaces, specifies the memory space in which <addr> is to be found.

See the help for the option -ms of display or mem for more information on memory spaces. If unspecified, the setting **config MemIdentifier** is used.

<addr>

Target address in hex format.

<count>

Number of memory cells.

x<cell-size>

Memory is displayed in units called cells, where each cell consists of <cell-size> bytes. If unspecified, the setting **config MemWidth** is used.

h<access-size>

Memory is accessed with a hardware access size of <access-size> bytes.

If unspecified, the setting **config MemWidth** is used.

%<conv>

Specifies the type of the data. Possible values for <conv> are given below. The default conversion is set by the radix command for memory and registers and by the config var command for variables.

- `%x` Hexadecimal
- `%d` Signed decimal
- `%u` Unsigned decimal
- `%f` Floating point

Examples

The examples assume the following settings:

- `radix x`
- `config MemIdentifier 0`
- `config MemWidth 32`
- `config MemAccess 32`
- `config MemSwap off`

Table 5.6 lists and defines **Memory** examples of the `change` command.

Table 5.6 change Command-Line Debugger Command—Memory Examples

Command	Description
`change 10000 10`	Change memory range 0x10000-3 to 0x10 (because radix is hex).
`change 1:10000 20`	Change memory range 0x10000-3, memory space 1, to 0x20.
`change 10000 16 20`	Change each of 16 cells in the memory range 0x10000-3f to 0x20.
`change 10000 16x1h8 31`	Change each of 16, 1-byte cells to 0x31, using a hardware access size of 8-bytes per write.
`change 10000 -s %d 200`	Change memory range 0x10000-3 to c8000000.

Table 5.7 lists and defines **Register** examples of the `change` command.

Table 5.7 change Command-Line Debugger Command—Register Examples

Command	Description
`change R1 123`	Change register `R1` to `0x123`.
`change R1..R5 5432`	Change registers `R1` through `R5` to `0x5432`.
`change "General Purpose Registers/R1" 100`	Change register `R1` in the General Purpose Register group to `0x100`.

Table 5.8 lists and defines **Variable** examples of the `change` command.

Table 5.8 change Command-Line Debugger Command—Variable Examples

Command	Description
`change myVar 10`	Change the value of variable `myVar` to `16 (0x10)`

cls

Clears the command line debugger window.

Syntax

`cls`

config

Lists current configuration information, provides the name of the default project or build target, or configures:

- command-line debugger window colors.
- command-line debugger window scrolling size.
- command-line debugger window mode.
- Default build target

- Hexadecimal prefix
- Memory identifier
- Processor name
- Subprocessor name

Syntax

```
conf[ig] [ c[olor] [r | m | c | s | e | n]
text_color [background_color] |
m[ode] [ dsp | tcl | auto] |
s[croll] number_of_lines |
h[exprefix] hexadecimal_prefix |
mem[identifier] memory_identifier |
p[rocessor] processor_name [subprocessor_name] ]
```

Parameter

`color text indicators —`

r (registers), m (memory), c (commands), s (script), e (errors), or n (normal)

`text_color`

Text color values for red, green, and blue, each from 0 through 255.

`background_color`

Background color values for red, green, and blue, each from 0 through 255.

mode

Command-name conflict resolution mode:

- `dsp`: use command-line debug commands
- `tcl`: use tcl commands
- `auto:` resolve automatically

`number_of_lines`

Number of lines to scroll.

`hexadecimal_prefix`

Prefix for display of hexadecimal values.

`memory_identifier`

Memory identifier.

`processor_name`

Name or identifier of target processor.

`subprocessor_name`

Name or identifier of target subprocessor.

`target_name`

Name of build target.

Examples

Table 5.9 lists and defines examples of the `config` command.

Table 5.9 config Command-Line Debugger Command—Examples

Command	Description
`config`	Lists current configuration information.
`config c e $ff $0 $0`	Sets error text to red.
`config c r $0 $0 $0 $ff $ff $ff`	Sets register display to black, on a white background.
`config m dsp`	Sets clash resolution to dsp mode.
`config hexprefix 0x`	Specifies 0x prefix for hexadecimal values.
`config memidentifier m`	Sets memory identifier to `m`.
`config processor 8101`	Sets processor to 8101.
`config project`	Lists default-project name.
`config target`	Lists default build-target name.
`config target debug release x86`	Changes default build-target name to debug release `x86`.

copy

Copies contents of a memory address or address block to another memory location.

Syntax

```
copy [<ms>:]<addr>[..<addr>|#<bytes>] [<ms>:]<addr>
```

Parameter

`<addr>`

One of these memory-address specifications:

- A single address
- First address of the destination memory block.

Examples

Table 5.10 lists and defines examples of the `copy` command.

Table 5.10 copy Command-Line Debugger Command—Examples

Command	Description
`copy 00..1f 30`	Copy memory addresses 00 through 1f to address 30.
`copy 20#10 50`	Copy 10 memory locations beginning at memory location 20 to memory beginning at location 50.

debug

Launches a debug session.

Syntax

```
debug [<index> | <debug-config-name>]
```

Examples

Table 5.11 lists and defines examples of the `debug` command.

Table 5.11 debug Command-Line Debugger Command—Examples

Command	Description
`debug`	Start debugging using the default launch configuration, which is the last debugged configuration if one exists and index 0 otherwise.
`debug 3`	Start debugging using the launch configuration at **index 3**. Type `launch` for the current set of launch configurations.
`debug {My Launch Config}`	Start debugging using the launch configuration named **My Launch Config**. Type `launch` for the current set of launch configurations.

dir

Lists directory contents.

Syntax

`dir [path|files]`

Examples

Table 5.12 lists and defines examples of the `dir` command.

Table 5.12 dir Command-Line Debugger Command—Examples

Command	Description
`dir`	Lists all files of the current directory.
`di *.txt`	Lists all current-directory files that have the `.txt` file name extension.
`dir c:/tmp`	Lists all files in the **tmp** directory on the **C:** drive.
`dir /ad`	Lists only the subdirectories of the current directory.

disassemble

Disassembles the instructions of the specified memory block.

Syntax

```
disassemble
disassemble pc|[<ms>:]<addr> [<count>]
disassemble reset
disassemble [<ms>:]<a1>{..<a2>|#<n>}
```

Parameter

[none]

With no options, the next block of instructions is listed. After a target stop event, the next block starts at the PC.

[<ms>:]<addr>

Target address in hex. On targets with multiple memory spaces, a memory space id can be specified.

pc

The current program counter.

<count>

Number of instructions to be listed.

reset

Reset the next block to the PC and the instruction count to one screen.

<a1>{..<a2>|#<n>}

Specifies a range of memory either by two endpoints, **<a1>** and **<a2>**, or by a startpoint and a count, **<a1>** and **<n>**.

Examples

Table 5.13 lists and defines examples of the disassemble command.

Table 5.13 disassemble Command-Line Debugger Command—Examples

Command	Description
disassemble	Lists the next block of instructions.
disassemble reset	Reset the next block to the PC and the instruction count to one screenful.
disassemble pc	Lists instructions starting at the PC.
disassemble pc 4	Lists 4 instructions starting at the PC. Sets the instruction count to 4.

Table 5.13 disassemble Command-Line Debugger Command—Examples

Command	Description
`disassemble 1000`	Lists instructions starting at address **0x1000**.
`disassemble p:1000 4`	Lists 4 instructions from memory space p, address 1000. Sets the instruction count to 4.

display

Lists the contents of a register or memory location; lists all register sets of a target; adds register sets, registers, or memory locations; or removes register sets, registers, or memory locations.

Syntax

```
display <addr-spec> [<range>] [-s|-ns] [%<conv>] [-np]
```

```
display -ms
```

```
display <addr-spec>{..<addr>|#<n>} [<range>] [-s|-ns]
[%<conv>] [-np]
```

```
display <reg-spec> [<n>] [-{d|nr|nv|np} ...] [-s|-ns]
[%<conv>]
```

```
display <reg-spec>{..<reg>|#<n>} [-{d|nr|nv|np} ...] [-s|-ns]
[%<conv>]
```

```
display all|r:|nr: [-{d|nr|nv|np} ...] [-s|-ns] [%<conv>]
```

```
display [-]regset
```

```
display <var-spec> [-np] [-s|-ns] [%<conv>]
```

```
display v: [-np] [-s|-ns] [%<conv>]
```

Parameter

`<ms>`

On architectures supporting multiple memory spaces, specifies the memory space in which `<addr>` is to be found.

`<addr>`

Target address in hex.

`<range>`

[<count>][x<cell-size>][h<access-size>] | [<count>] [{8,16,32,64}bit].

`<count>`

Number of memory cells.

`x<cell-size>`

Memory is displayed in units called cells, where each cell consists of `<cell-size>` bytes. If unspecified, the setting `config MemWidth` is used.

`{8,16,32,64}bit`

Sets both `<cell-size>` and `<access-size>`.

Examples

The examples assume the following settings:

- `radix x`
- `config MemIdentifier 0`
- `config MemWidth 32`
- `config MemAccess 32`
- `config MemSwap off`

Table 5.14 lists and defines examples of the `display` command.

Table 5.14 display Command-Line Debugger Command—Examples

Command	Description
`display 10000`	Display memory range 0x10000-3 as one cell.
`display 1:10000`	Display memory range 0x10000-3, memory space 1, as one cell.
`display 10000 16`	Display memory range 0x10000-3f as 16 cells.
`display 10000 16x1h8`	Display 16, 1-byte cells, with a hardware access size of 8-bytes per read.
`display 10000 8bit`	Display one byte, with a hardware access size of one byte.
`display 10000 -np`	Return one cell, but don't print it to the **Command Window**.
`display 10000 -s`	Display one cell with the data endian-swapped.

Table 5.14 display Command-Line Debugger Command—Examples (*continued*)

Command	Description
`display 10000 %d`	Display one cell in decimal format.
`display -ms`	Display the available memory spaces, if any.
`display -regset`	List all the available register sets on the target chip.
`display R1`	Display the value of register R1.
`display "General Purpose Registers/R1"`	Display the value of register R1 in the General Purpose Register group.
`display R1 -d`	Display detailed "data book" contents of R1, including bitfields and definitions.
`display "nr:General Purpose Registers/R1" 25`	Beginning with register **R1**, display the next 25 registers. Register groups are not recursively searched.

evaluate

Lists variable or expression.

Syntax

```
evaluate [#<format>] [-l] [<var|expr>]
```

Parameter

`<format>`

Output format and possible values:

`#-, #Default`

`#d, #Signed`

`#u, #Unsigned`

`#h, #x, #Hex`

```
#c, #Char
#s, #CString
#p, #PascalString
#f, #Float
#e, #Enum
#i, #Fixed
#o, #w, #Unicode
#b, #Binary
<none>, #Fract
<none>, #Boolean
<none>, #SignedFixed
```

Examples

Table 5.15 lists and defines examples of the `evaluate` command.

Table 5.15 evaluate Command-Line Debugger Command—Examples

Command	Description
`evaluate`	List the types for all the variables in current and global stack.
`evaluate i`	Return the value of variable 'i'
`evaluate #b i`	Return the value of variable 'i' formatted in binary
`evaluate -l 10`	Return the address for line 10 in the current file
`evaluate -l myfile.c,10`	Return the address for line 10 in file **myfile.c**
`evaluate -l +10`	Return the address to an offset of 10 lines starting from the current line

finish

Execute until the current function returns.

Syntax

```
finish
```

fl::blankcheck

Test that the flash device is in the blank state.

Syntax

```
fl::blankcheck
```

fl::checksum

Calculate a checksum.

Syntax

```
fl::checksum
```

fl::device

Define the flash device.

Syntax

```
fl::device
```

fl::disconnect

Close the connection to the target.

Syntax

```
fl::disconnect
```

fl::dumps

Dumps the content of entire flash.

Syntax

```
fl::dump [all | -range start_addr end_addr] -o <file>
```

Parameter

`-all`

Dumps content of entire flash.

`-range <start_addr> <end_addr>`

Sets the range of flash region to be dumped.

`-t <type>`

Sets the type of flash region to be dumped .

`-o <file>`

Dumps the flash to the specified file.

fl::erase

Erase the flash device.

Syntax

```
fl::erase
```

fl::image

Define the flash image settings.

Syntax

```
fl::image
```

fl::protect

Protects the sectors.

Syntax

```
fl::protect [on | off]
```

Parameter

`[on | off]`

Enable or disable protection of sectors.

l::target

Define the target configuration settings.

Syntax

```
fl::target
```

fl::verify

Verify the flash device.

Syntax

```
fl::verify
```

fl::write

Write the flash device.

Syntax

```
fl::write
```

funcs

Displays information about functions.

Syntax

```
funcs [-all] <file> <line>
```

Parameter

`[-all]`

Displays information about the functions using all debug contexts.

`<file>`

Specifies the file name.

`<line>`

Specifies the line number.

gdi

Forwards third party custom commands.

Syntax

```
gdi
```

getpid

List the ID of the process being debugged.

Syntax

```
getpid
```

go

Starts to debug your program from the current instruction.

Syntax

```
go [nowait | <timeout_s>]
```

Parameter

`<none>`

Run the default thread. The command may wait for a thread break event before returning, depending on the settings **config runControlSync** and **config autoThreadSwitch.**

`nowait`

Return immediately without waiting for a thread break event.

`<timeout_s>`

Maximum number of seconds to wait for a thread break event. Can be set to **nowait**.

Examples

Table 5.16 lists and defines examples of the `go` command.

Table 5.16 go Command-Line Debugger Command—Examples

Command	Description
`go`	Run the default thread.
`go nowait`	Run the default thread without waiting for a thread break event.
`go 5`	Run the default thread. If config runControlSync is enabled, then the command will wait for a thread break event for a maximum of 5 seconds.

help

Lists debug command help in the command-line debugger window.

Syntax

`help [-sort | -tree | <cmd>]`

Parameter

`command`

Name or short-cut name of a command.

Examples

Table 5.17 lists and defines examples of the `help` command.

Table 5.17 help Command-Line Debugger Command—Examples

Command	Description
`help`	Lists all debug commands.
`help b`	Lists help information for the break command.

history

Lists the history of the commands entered during the current debug session.

Syntax

```
history
```

kill

Stops one or all current debug sessions.

Syntax

```
kill [<index> ...]
```

Parameter

`all`

Specifier for all debug sessions.

Examples

Table 5.18 lists and defines examples of the `help` command.

Table 5.18 help Command-Line Debugger Command—Examples

Command	Description
`kill`	Kills the debug session for the current process.
`kill 0 1`	Kills debug sessions 0 and 1.

jtagclock

Read or update the current JTAG clock speed.

Syntax

```
jtagclock
```

kill

Close the specified debug session.

Syntax

```
kill
```

launch

Lists the launch configurations.

Syntax

```
launch
```

linux::displaylinuxlist

Lists the expression for each element of a Linux list.

Syntax

```
linux::displaylinuxlist
```

linux::loadsymbolics

Load the symbolics for the selected module.

Syntax

```
linux::loadsymbolics
```

linux::refreshmodules

Lists loaded modules.

Syntax

```
linux::refreshmodules
```

linux::selectmodule

Sets the current module.

Syntax

```
linux::selectmodules
```

linux::unloadsymbolics

Unloads the symbolics for the specified module.

Syntax

```
linux::unloadsymbolics
```

loadsym

Load a symbolic file.

Syntax

```
loadsym
```

log

Logs the commands or lists entries of a debug session. If issued with no parameters, the command lists all open log files.

Syntax

```
log c|s <filename>
log off [c|s] [all]
log
```

Parameter

`c`

Command specifier.

`s`

Lists entry specifier.

`<filename>`

Name of a log file.

Examples

Table 5.19 lists and defines examples of the `log` command.

Table 5.19 log Command-Line Debugger Command—Examples

Command	Description
`log`	Lists currently opened log files.
`log s session.log`	Log all display entries to file **session.log**.
`log off c`	Close current command log file.
`log off`	Close current command and log file.
`log off all`	Close all log files.

mem

Read and write memory.

Syntax

`mem`

next

Runs to next source line or assembly instruction in current frame.

Syntax

`next`

Remarks

If you execute the next command interactively, the command returns immediately, and target-program execution starts. Then you can wait for execution to stop (for example, due to a breakpoint) or type the `stop` command.

If you execute the `next` command in a script, the command-line debugger polls until the debugger stops (for example, due to a breakpoint). Then the command line debugger executes the next command in the script. If this polling continues indefinitely because debugging does not stop, press the ESC key to stop the script.

next

Run to next source line or assembly instruction in current frame.

Syntax

`next`

oneframe

Query or set the one-frame stack crawl mode for the current thread.

Syntax

```
oneframe
```

protocol

Executes a protocol plugin command (internal).

Syntax

```
protocol
```

pwd

Lists current working directory.

Syntax

```
pwd
```

quitIDE

Quits the IDE.

Syntax

```
quitIDE
```

radix

Lists or changes the default input radix (number base) for command entries, registers and memory locations. Entering this command without any parameter values lists the current default radix.

Syntax

```
radix [x|d|u|b|f|h]
```

Parameter

`x`

Hexadecimal

`d`

Decimal

`u`

Unsigned decimal

`b`

Binary

`f`

Fractional

`h`

Hexadecimal

Examples

Table 5.20 lists and defines examples of the `radix` command.

Table 5.20 radix Command-Line Debugger Command—Examples

Command	Description
`radix`	Lists the current setting.
`radix d`	Change the setting to decimal.
`radix x`	Change the setting to hexadecimal.

refresh

Discard all cached target data and refresh views.

Syntax

```
refresh
```

reg

Read and write registers.

Syntax

```
reg
```

reset

Reset the target hardware.

Syntax

```
reset
```

restart

Restarts the current debug session.

Syntax

```
restart
```

restore

Write file contents to memory.

Syntax

```
restore
```

run

Launch a process

Syntax

```
run
```

save

Saves the contents of memory locations to a binary file or a text file containing hexadecimal values.

```
Syntax
```

```
save -h|-b [<ms>:]<addr>... <filename> [-a|-o]
[8bit|16bit|32bit|64bit]
```

Parameter

`-h|-b`

Sets the output file format to hex or binary. For hex format, the address is also saved so that the contents can easily be restored with the `restore` command.

`[<ms>:]<addr>`

Address to read from. For architectures with multiple memory spaces, a memory space id may be specified.

`-a`

Append specifier. Instructs the command-line debugger to append the saved memory contents to the current contents of the specified file.

`-o`

Overwrite specifier: tells the debugger to overwrite any existing contents of the specified file.

Examples

Table 5.21 lists and defines examples of the `save` command.

Table 5.21 save Command-Line Debugger Command—Examples

Command	Description
`set addressBlock1 "p:10..`31"` `set addressBlock2 "p:10000#20"` `save -h $addressBlock1 $addressBlock2` `hexfile -a`	Dumps contents of two memory blocks to the text file **hexfile.lod** (in append mode).
`set addressBlock1 "p:10..`31"` `set addressBlock2 "p:10000#20"` `save -b $addressBlock1 $addressBlock2` `binfile -o`	Dumps contents of two memory blocks to the binary file **binfile.lod** (in overwrite mode).

setpc

Set the value of the program counter register.

Syntax

```
setpc
```

setpicloadaddr

Indicate where a PIC executable is loaded.

Syntax

`setpicloadaddr`

stack

Print the call stack.

Syntax

`stack`

status

Lists the debug status of all existing active targets.

Syntax

`status`

step

Steps through a program, automatically executing the `display` command.

Syntax

`step [asm|src] [into|over|out]`

`step [nve|nxt|fwd|end|aft]`

Parameter

`asm|src`

Controls whether the step is performed at the assembly instruction level or the source code level.

`into|over|out`

Controls the type of step operation. If unspecified, **into** is used.

`nve`

Step non optimized action.

`nxt`

Step next action.

`fwd`

Step forward action.

`end`

Step end of statement action.

`aft`

Step end all previous action.

Examples

Table 5.22 lists and defines examples of the `step` command.

Table 5.22 step Command-Line Debugger Command—Examples

Command	Description
`step`	Step into the current source or assembly line.
`step over`	Step over the current source or assembly line.
`step out`	Step out of a function.
`step asm`	Step over a single assembly instruction.

stepi

Execute to the next assembly instruction.

Syntax

```
stepi
```

stop

Stops a running program (started by a `go`, `step`, or `next` command).

Syntax

`stop`

Examples

Table 5.23 lists and defines examples of the `stop` command.

Table 5.23 stop Command-Line Debugger Command—Examples

Command	Description
`stop`	Using it after command go/step out/next, this will stop the target program.

switchtarget

Selects a thread for subsequent commands.

Syntax

`switchtarget [<index> | -cur | -ResetIndex]`

Parameter

`index`

Session Index number.

Examples

Table 5.24 lists and defines examples of the `switchtarget` command.

Table 5.24 switchtarget Command-Line Debugger Command—Examples

Command	Description
`switchtarget`	list currently available debug sessions.
`switchtarget 0`	select the thread with index 0
`switchtarget -cur`	list the index of the current thread.
`switchtarget -ResetIndex`	reset the index counter to 0, not valid while debugging.

system

execute system command.

Syntax

`system [command]`

Parameter

`command`

Any system command that does not use a full screen display.

Examples

Table 5.25 lists and defines examples of the `system` command.

Table 5.25 system Command-Line Debugger Command—Examples

Command	Description
`system del *.tmp`	Delete from the current directory all files that have the `.tmp` filename extension.

var

Read and write variables or C-expressions.

Syntax

`var`

wait

Tells the debugger to wait for a specified amount of time, or until you press the space bar.

Syntax

`wait <time-ms>`

Parameter

`time-ms`

Number of milliseconds to wait.

Examples

Table 5.26 lists and defines examples of the `wait` command.

Table 5.26 wait Command-Line Debugger Command—Examples

Command	Description
`wait`	Debugger waits until you press the space bar.
`wait 2000`	Wait for 2 seconds.

watchpoint

Sets, removes, disables, enables or list watchpoints. You can also set condition on watchpoint.

Syntax

```
watchpoint
watchpoint [-{r|w|rw}] {<var>|[<ms>:]<addr> <length>}
watchpoint all|#<id>|<var>|[<ms>:]<addr>  off|enable|disable
watchpoint #<id> cond <c-expr>
```

Examples

Table 5.27 lists and defines examples of the `watchpoint` command.

Table 5.27 watchpoint Command-Line Debugger Command—Examples

Command	Description
`watchpoint`	Display all watchpoints.
`watchpoint gData`	Set read-write (the default) watchpoint on variable **gData**.
`watchpoint -r gData`	Set read-only watchpoint on variable **gData**.

Table 5.27 watchpoint Command-Line Debugger Command—Examples (*continued*)

Command	Description
`watchpoint all off`	Remove all watchpoints.
`watchpoint #4 disable`	Disable watchpoint number 4.
`watchpoint 10343 4`	Set a watchpoint at memory address 10343 of length 4.

Microcontrollers-Specific HIWARE Commands

This topic lists and defines Microcontrollers-specific HIWARE commands.

Command List

Table 5.28 lists the HIWARE commands that are: supported followed by the CodeWarrior debugger shell syntax, partially supported, command that are not applicable in CodeWarrior, commands supported in script files with TCL control flow statements, and unsupported commands.

The following columns represent the status in the CodeWarrior Eclipse IDE:

- *S-CW* — Command is supported followed by the CodeWarrior debugger shell syntax
- *P* — Command is partially supported, meaning some options/parameters are not supported
- *NA* — Command is not applicable in CodeWarrior
- *S-TCL* — Commands is supported in script files with TCL control flow statements
- *U* — Command is not supported

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
HIWARE		
VER	*S-CW*	Lists the version of all loaded commands **Syntax** `about`

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
AUTOSIZE	*NA*	Selects window sizing mode
OPENIO	*NA*	Loads an IO simulation component
OPENPROJECT	*U*	Opens an existing project
OPEN	*NA*	Opens a component window
SET	*U*	Loads a target component
LOAD	*U*	Loads an application (Code & Symbols)
LOADCODE	*U*	Loads an application (Code only)
LOADSYMBOLS	*S-CW*	Loads an application (Symbols only) **Syntax** `loadsym <filename>`
FONT	*U*	Changes font in component windows
BCKCOLOR	*U*	Changes background color of component windows
SLAY	*NA*	Saves the layout and options of all components
ACTIVATE	*NA*	Activates a window component (in/out focus)
CLOSE	*NA*	Closes a component window
SYSTEM	*S-CW*	Executes an external application **Syntax** `system <command>`
EXIT	*S-CW*	Terminates this application **Syntax** `quitIDE`
RESET	*S-CW*	Resets the target MCU **Syntax** `Reset`

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
HELP	*S-CW*	Lists available commands; to get help on a specific command, use the command followed by '?' **Syntax** help help <command> <command> ?
HIWARE Engine		
LF	*S-CW*	Opens a log file **Syntax (for command)** log c <file> **Syntax (for session)** log s <file>
NOLF	*S-CW*	Closes a log file **Syntax (for command)** log off c **Syntax (for session)** log off s
CR	*U*	Records all commands to a file
NOCR	*U*	Stops recording commands to a file
LOG	*S-CW*	Specifies items to be logged **Syntax (for command)** log c <file> **Syntax (for session)** log s <file>

Table 5.28 Microcontrollers-Specific Debugger Command Lis

<table>
<tr><th>Command</th><th>Status</th><th>Description</th></tr>
<tr><td>BS</td><td>P</td><td>Sets breakpoint
Syntax
bp [-{hw|sw|auto}] {<func>|[<ms>:]<addr>|<file> <line> [<column>]}

bp all|#<id>|<func>|<addr> enable|disable|{ignore <count>}

bp #<id> cond <c-expr></td></tr>
<tr><td>SAVEBP</td><td>U</td><td>Saves breakpoints into a file</td></tr>
<tr><td>STEPINTO</td><td>S-CW</td><td>Step Into
Syntax
step [asm|src] into</td></tr>
<tr><td>STEPOUT</td><td>S-CW</td><td>Step out
Syntax
step [asm|src] out</td></tr>
<tr><td>STEPOVER</td><td>S-CW</td><td>Step over
Syntax
step [asm|src] over</td></tr>
<tr><td>RESTART</td><td>S-CW</td><td>Restart execution
Syntax
restart</td></tr>
<tr><td>DDEPROTOCOL</td><td>U</td><td>DDE Protocol options</td></tr>
<tr><td>DEFINEVALUEDLG</td><td>U</td><td>Opens a GUI to define a value for the symbol/ variable given as parameter</td></tr>
</table>

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
BC	*S-CW*	Clears breakpoint **Syntax** `bp all|#<id>|<func>|<addr> off`
BD	*S-CW*	Lists breakpoints **Syntax** `bp`
GO	*S-CW*	Starts execution (Go) **Syntax** `go`
STOP	*S-CW*	Stops execution (Halt) **Syntax** `stop`
P	*S-CW*	Executes an instruction (Flat step) **Syntax** `stepi`
T	*S-CW*	Executes CPU instructions **Syntax** `stepi`
Configuration Example • `radix x` • `config MemIdentifier 0` • `config MemWidth 32` • `config MemAccess 32` `config MemSwap off` **Note**: These options apply only to the memory commands below.		

Table 5.28 Microcontrollers-Specific Debugger Command Lis

<table>
<tr><th>Command</th><th>Status</th><th>Description</th></tr>
<tr><td>WB</td><td>S-CW</td><td>Writes byte(s) into target memory
Syntax
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] =<value></td></tr>
<tr><td>WW</td><td>S-CW</td><td>Writes word(s) into target memory (2 bytes)
Syntax
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] =<value></td></tr>
<tr><td>WL</td><td>S-CW</td><td>Writes long(s) into target memory (4 bytes)
Syntax
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] =<value</td></tr>
<tr><td>MS</td><td>S-CW</td><td>Writes byte(s) into target memory (same as WB)
Syntax
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] =<value></td></tr>
<tr><td>RD</td><td>S-CW</td><td>Lists registers
Syntax
reg all</td></tr>
<tr><td>RS</td><td>S-CW</td><td>Sets registers
Syntax
reg <reg-spec>{..<reg>|#<n>} [-s|-ns] [%<conv>] =<value></td></tr>
<tr><td>MEM</td><td>U</td><td>Lists memory map</td></tr>
<tr><td>DASM</td><td>S-CW</td><td>Disassembles target memory
Syntax
disassemble pc|[<ms>:]<addr> [<count>]</td></tr>
</table>

Table 5.28 Microcontrollers-Specific Debugger Command Lis

<table>
<tr><th>Command</th><th>Status</th><th>Description</th></tr>
<tr><td>DB</td><td>S-CW</td><td>Lists byte(s) from target memory
Syntax
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] [-np]</td></tr>
<tr><td>DW</td><td>S-CW</td><td>Lists words from target memory (2 bytes)
Syntax
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] [-np]</td></tr>
<tr><td>DL</td><td>S-CW</td><td>Lists long(s) from target memory (4 bytes)
Syntax
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] [-np]</td></tr>
<tr><td>CD</td><td>S-CW</td><td>Lists or changes directory
Syntax
cd</td></tr>
<tr><td>E</td><td>S-CW</td><td>Evaluates an expression and lists its result
Syntax
evaluate [#<format>] [-l] [<var|expr>]</td></tr>
<tr><td>A</td><td>S-CW</td><td>Evaluates an expression and assigns its result to an existing variable
Syntax
var <var-spec> [-s|-ns] [%<conv>]=[evaluate [#<format>] [-l] [<var|expr>]]
Example
var myVar = [evaluate 1+1] - assigns value "2" to "myVar"</td></tr>
<tr><td>PRINTF</td><td>U</td><td>Display a string on the window using printf like format</td></tr>
<tr><td>FPRINTF</td><td>U</td><td>Write a string to a file using fprintf like format</td></tr>
</table>

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
NB	*S-CW*	Changes or displays the default number base for the value of expressions **Syntax** `evaluate [#<format>] [-l] [<var|expr>]`
LS	*U*	Lists also global variables and procedures of the loaded application

SREC	*P*	Loads of Motorola S-records from a specified file
		Syntax
		`restore -h *.lod [[<ms>:]<addr>|+<offset>] [8bit|16bit|32bit|64bit]`
		`restore -b *.lod [<ms>:]<addr> [8bit|16bit|32bit|64bit]`

SAVE	*S-CW*	Saves a specified block of memory to a specified file in Motorola S-record format **Syntax** `save -h|-b [<ms>:]<addr>... <filename> [-a|-o] [8bit|16bit|32bit|64bit]`
PAUSETEXT	*NA*	Displays a modal message box for testing purpose
TESTBOX	*NA*	Displays a modal message box with a given string
REGFILE	*U*	Loads the I/O register descriptions from a 'register file'
REGBASE	*U*	Sets the base address of the on-chip I/O registers
ANDB	*U*	Bitwise-AND with target memory byte
ANDW	*U*	Bitwise-AND with target memory word (2 bytes)

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
ANDL	*U*	Bitwise-AND with target memory long (4 bytes)
NANDB	*U*	Bitwise-NAND with target memory byte
NANDW	*U*	Bitwise-NAND with target memory word (2 bytes)
NANDL	*U*	Bitwise-NAND with target memory long (4 bytes)
ORB	*U*	Bitwise-OR with target memory byte
ORW	*U*	Bitwise-OR with target memory word (2 bytes)
ORL	*U*	Bitwise-OR with target memory long (4 bytes)
NORB	*U*	Bitwise-NOR with target memory byte
NORW	*U*	Bitwise-NOR with target memory word (2 bytes)
NORL	*U*	Bitwise-NOR with target memory long (4 bytes)
EXORB	*U*	Bitwise-EXOR with target memory byte
EXORW	*U*	Bitwise-EXOR with target memory word (2 bytes)
EXORL	*U*	Bitwise-EXOR with target memory long (4 bytes)
MEMCOPY	*S-CW*	Copies the target memory
MEMBITCOPY	*S-CW*	Copies one bit from one memory address to another bit to another memory address **Syntax** `copy [<ms>:]<addr>[..<addr>|#<bytes>] [<ms>:]<addr>`
DEFINE	*S-CW*	Defines a symbol and associates a value **Syntax** `set varName ?value? <TCL command>`

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
UNDEF	*S-CW*	Removes a symbol definition **Syntax** `unset varName <TCL command>`
RETURN	*U*	Terminates the current command processing level
GOTO	*U*	Goes to the line following the label
GOTOIF	*U*	Goes to the line following the label if condition is TRUE
WHILE	*S-TCL*	Executes commands as long as the condition is true
FOR	*S-TCL*	Executes commands up to a predefined number of times
REPEAT	S-TCL	Executes commands until a certain condition is true
IF	S-TCL	Executes different command sections depending on the conditions
FOCUS	*NA*	Assigns a component as the destination for all subsequent commands
WAIT	*S-CW*	Waits by time tenths of a second **Syntax** `wait`
AT	*U*	Executes the next command at time (in ms)
CF	*S-CW*	Executes commands in the specified command file
CALL	*S-CW*	Executes commands in the specified command file **Syntax** `source`
Source		

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
SPC	*NA*	Highlights the statement corresponding to the code address
SMEM	*NA*	Highlights the statements corresponding to the code address range
SMOD	*NA*	Loads the corresponding module's source text
SPROC	*NA*	Highlights the statement of the procedure that is in the procedure chain
FOLD	*NA*	Hides source text for clearness at program block level
UNFOLD	*NA*	Exhibits the contents of folded source text blocks
SLINE	*NA*	Displays the line
FINDPROC	*NA*	Find the Procedure
FIND	*NA*	Searches an arbitrary pattern in the currently loaded source file
ATTRIBUTES	*NA*	Sets up the display
Assembly		
SPC	*NA*	Lists the specified address
SMEM	*NA*	Lists the specified address
ATTRIBUTES	*NA*	Sets up the display
Procedure		
ATTRIBUTES	*NA*	Sets up the display
Register		
ATTRIBUTES	*NA*	Sets up the display
Memory		
SPC	*NA*	Lists the address given as an argument
SMEM	*NA*	Lists the memory range given as an argument

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
SMOD	*NA*	Lists the first global variable of the module
FILL	*S-CW*	Fills a memory range with the given value **Syntax** mem <addr-spec> [<range>] [-s|-ns] [%<conv>] =<value>
UPDATERATE	*NA*	Sets the update rate
ATTRIBUTES	*NA*	Sets up the display
COPYMEM	*S-CW*	Copies a memory range to a specified location **Syntax** copy [<ms>:]<addr>[..<addr>|#<bytes>] [<ms>:]<addr>
SEARCHPATTERN	*NA*	Search a pattern in memory
REFRESHMEMORY	*S-CW*	After releasing caches, refreshes the memory **Syntax** refresh
Data		
SPROC	*NA*	Displays local or global variables of the procedure given as parameter
ADDXPR	*NA*	Adds a new expression in the data component
PTRARRAY	*NA*	Switches on or off the pointer as array displaying
SMOD	*NA*	Displays global variables of the module given as parameter
ZOOM	*NA*	Exhibits the member fields of structures by 'diving' into the structure
UPDATERATE	*NA*	Sets the update rate of the data component

Table 5.28 Microcontrollers-Specific Debugger Command Lis

Command	Status	Description
DUMP	*P*	Dumps the content of the data component to the command line **Syntax** `display`
ATTRIBUTES	*NA*	Sets up the display
REFRESHDATA	*S-CW*	After releasing caches, refreshes the display **Syntax** `refresh`
Command		
CLR	*S-CW*	Clears the Command window **Syntax** `cls`
ATTRIBUTES	*NA*	Sets up the display

6 Connections — HCS08

This chapter describes the features and settings of the connections that interface the CodeWarrior debugger with the HCS08 simulator or the target board.

For the IDE to communicate with the target hardware, you must specify several key items: the debugger protocol, a connection type, and any connection parameters. You enter the first two items of information using options in the **Connection** tab. The **Connection** tab is located in the **Debugger** tab of the **Debug Configurations** dialog box. These options are:

- The **Connection Protocol** option determines what *debugger protocol* the debugger uses to communicate with the target.
- The **Physical Connection** option specifies the hardware probe or *connection type* that physically connects the workstation hosting CodeWarrior to the target board under debug. After you make the option of physical connection, the view changes to display configuration options specific for the hardware probe.

You use the options in the revised view to configure the third item, the *connection parameters*.

The topics in this chapter discuss the features and settings of the connections that interface the CodeWarrior debugger with the HCS08-based bare board target.

The topics of this chapter are:

- Changing Connection in IDE
- P&E Full Chip Simulation
- P&E HCS08 Multilink\Cyclone Pro
- Softec
- Open Source BDM

Changing Connection in IDE

Full Chip Simulation (FCS) connection runs a complete simulation of all processor peripherals and I/O on your personal computer. Thus, when debugging an FCS project for a selected derivative it is not necessary to connect your PC with a Microcontrollers development or target board.

To select Full Chip Simulation as the debugger connection:

1. Select **Project > Change Device/Connection** from the IDE menu bar.

   The **Device/Connection Change** wizard appears.

2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location** checkbox is checked.

3. Click **Next**.

   The **Device and Connection** page appears.

4. Expand the HCS08 tree control and select the derivative or board you would like to use. For example, select `HCS08 > HCS08D Family > 9S08DE32`.

5. Click **Next**.

   The **Connections** page appears.

6. Check the **P&E Full Chip Simulation** checkbox.

NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

7. Click **Finish**.

   The wizard creates a simulator project for the HCS08 architecture according to your specifications. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

8. Build the new project. For more information, refer to the topic Building Projects.

9. Debug the new project. For more information, refer to the topic Debugging Projects.

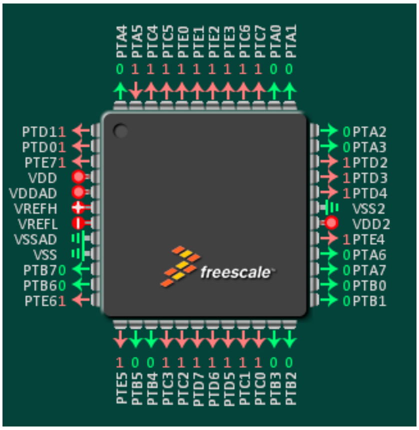
P&E Full Chip Simulation

This topic explains Chip View, which is a time-saving FCS feature. Additionally, it describes the settings of the connections that interface the CodeWarrior debugger with the HCS08 simulator.

Chip View

Chip View is an innovative feature designed to simplify Full Chip Simulation (FCS) and In-Circuit Debugging (ICD) sessions. The **Chip View** provides instantaneous access to internal modules of the chip and lets you instantly change any of the pin properties by clicking the pins. Each pin features the current pin direction, input/output value, and the name of the signal that reflects the current module that controls it. These data features are updated every 50ms throughout a running FCS or ICD session.

Figure 6.1 Chip View

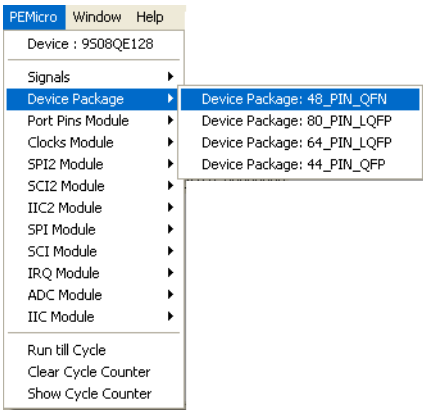


To open **Chip View**, perform these steps.

1. From the IDE menu bar, select **PEMicro > Device Package > Device Package:<** *Pin*>, where < *Pin*> is the pin package you would like to work with. (See Figure 6.2).

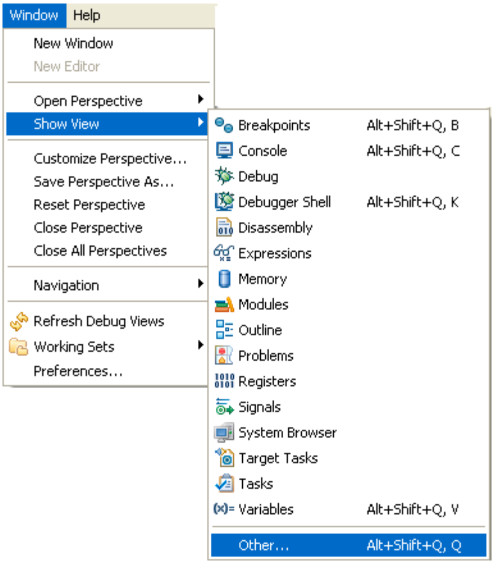
   The **Device Package** can be changed before or after the Chip View window is invoked within the CodeWarrior IDE.

Figure 6.2 Device Package Extended Menu



2. From the IDE menu bar, select **Window > Show View > Others** (Figure 6.3).

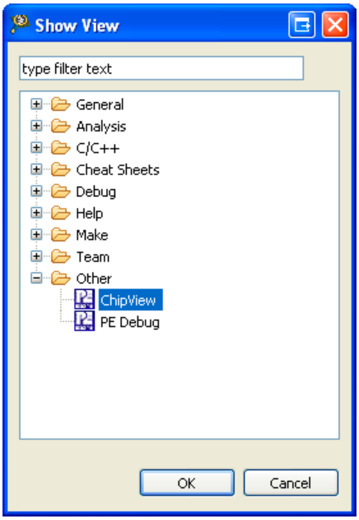
Figure 6.3 Show View Extended Menu



The **Show View** dialog box appears.

3. Expand **Other** and select **Chip View** (Figure 6.4).

Figure 6.4 Show View Menu



4. To change direction and values of the pin, double-click the corresponding arrow or the number value. Details are listed below.

NOTE If you close the **Chip View** Window during debug session, the Chip View will not be accessible. You must reopen the **Chip View** window and restart the current debugging session and to open the **Chip View** window again. Closing **Chip View** should slightly improve the performance during existing debug session.

Chip GUI - Ports Module Support

You can change the pin's direction and values by double-clicking the corresponding arrow or the number value. Figure 6.5 is an example of what the **Chip View** may look like before any changes are made. When the pin direction is input, the pin will display the current pin input value. When the pin direction is output, you have the option of double-clicking the number value to control the output value for the pin.

Figure 6.5 Chip View Display Before Change

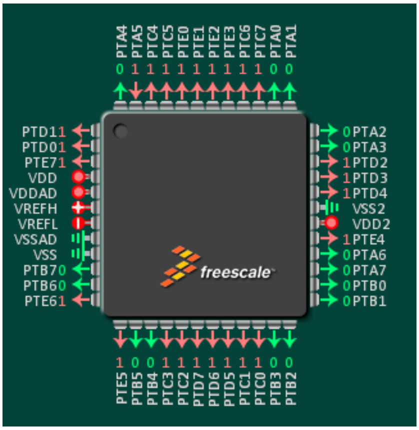
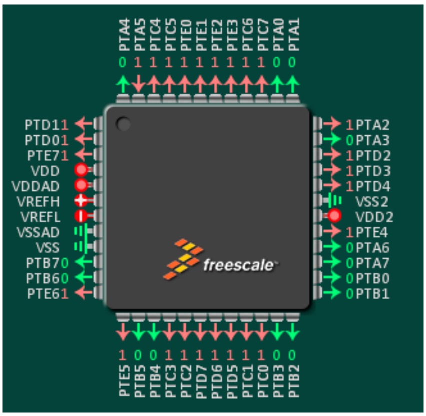


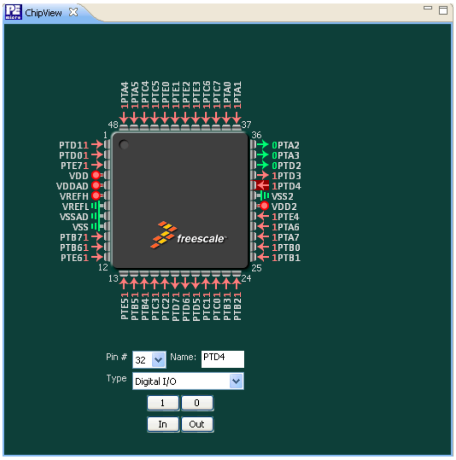
Figure 6.6 is an example of the PTA2 pin value being changed from 0 to 1 by double-clicking on the number value.

Figure 6.6 Chip View Display After Change



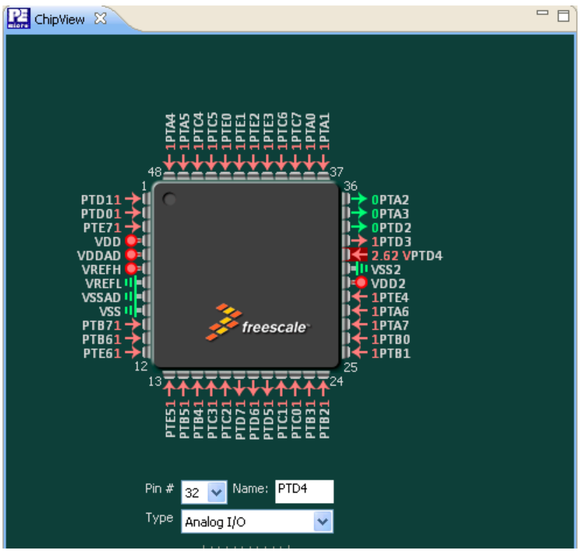
When you double-click the pin's value or the direction, a pin configuration dialog appears beneath the Chip View diagram (Figure 6.7). In the pin configuration options, you can change the I/O settings for a given pin. You can select a pin from the pin-number drop-down list, select between analog and digital signals, and switch the pin directions. For the digital I/O signal, you can switch between high or low signals (Figure 6.7).

Figure 6.7 Chip View with Digital Pin Configuration Options



For the analog input signal, you can use the slider to change the analog signal value (Figure 6.8).

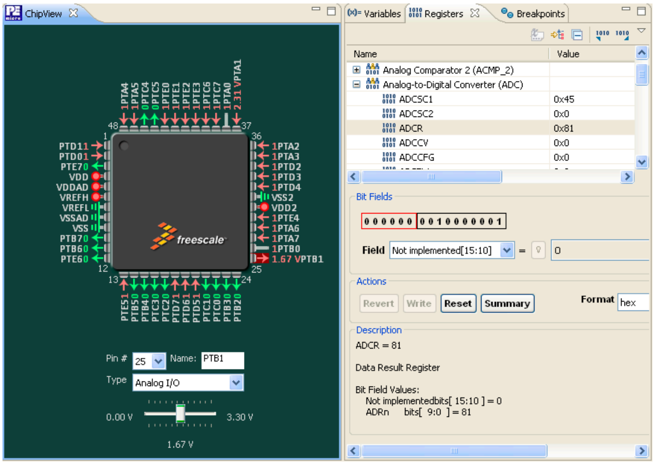
Figure 6.8 Chip View with Analog Pin Configuration Options



Chip GUI - Analog to Digital Module Support

The Analog to Digital (ATD) Module has a higher priority than the General Pin I/O module. Therefore, you have an ATD channel enabled and the ATD input buffer is empty, current input value on a pin will be converted and displayed in the ATD data conversion register (Figure 6.9).

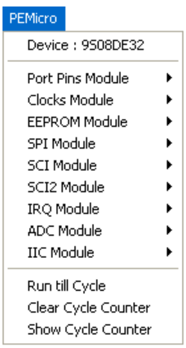
Figure 6.9 Chip View with ATD



Module Options

The PEMicro menu (Figure 6.10) includes the Full Chip Simulation options for the modules that have specialty commands associated with them for a chosen device.

Figure 6.10 PEMicro Menu



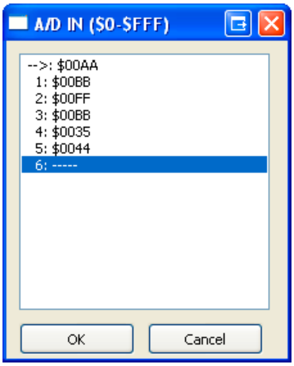
The options available are:

- Analog-to-Digital Converter Module
- 16-Bit Analog-to-Digital Converter Module
- Clock Generation Module
- Digital-to-Analog Converter Module
- EEPROM Module
- Fault Detection and Shutdown Module
- Flash Module
- Inter-Integrated Circuit Module
- Interrupt Priority Controller Module
- External Interrupt (IRQ) Module
- Keyboard Interrupt Module
- Modulo Timer Interrupt Module
- MSCAN Controller Module
- Programmable Delay Block Module
- Programmable Gain Amplifier Module
- Programmable Reference Analog Comparator Module
- Input/Output (I/O) Ports Module
- Serial Communications Interface Module
- Slave LIN Interface Controller (SLIC) Module
- Serial Peripheral Interface Module
- Timer Interface Module
- Time Of Day Module Option
- Universal Serial Bus (USB) Module
- Voltage Reference Module

Analog-to-Digital Converter Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Analog-to-Digital Conversion (ADC) module, including data input on all ADC channels, flag polling, interrupt operation, and the bus and CGMXCLK reference clock sources. FCS mode uses the buffered input structure to simulate the ADC inputs. You can queue up to 256 data values. To queue the ADC Input Data, use the `ADDI` command in the command prompt. If the data parameter is given, the value is placed into the next slot in the input buffer. Otherwise, if no parameter is provided, a window is displayed with the input buffer values. Input values can be entered while the window is open. An arrow points to the next value to be used as input to the ADC. The conversion takes place after a proper value is written to the ADC Status and Control register. Once the conversion occurs, the arrow moves to the next value in the ADC Buffer.

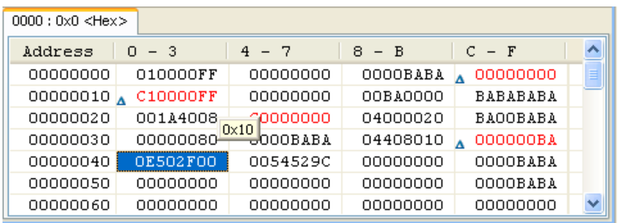
Figure 6.11 ADC IN Buffer Display



The ADCLR command can be used at any point to flush the input buffer for the ADC simulation.

After the conversion is complete, the first queued value is passed from the data buffer into the ADC data register. It can be observed in the Memory window by displaying the memory location corresponding to the ADC data register.

Figure 6.12 Memory Component Window



When the conversion is complete, FCS sets the appropriate flag. If interrupts are enabled, the Program Counter changes flow to the interrupt routine (as defined in the vector space of the MCU).

NOTE For more information on ADC configuration, refer to the Freescale user manual for your microprocessor.

ADC Module Commands

The following commands are available for the HC08/HCS08 ADC Module.

ADDI Command

The `ADDI` command lets you input the data into the ADC converter. If a data parameter is given, the value is placed into the next slot in the input buffer. Otherwise, if no parameter is given, a window is displayed with the input buffer values. Input values can be entered while the window is open. An arrow points to the next value to be used by the ADC. The maximum number of input values is 256 bytes.

Syntax

```
>gdi ADDI [<n>]
```

Where:

`<n>` The value to be entered into the next location in the input buffer.

Example

```
>gdi ADDI $55
```

Set the next input value to the ADDI to $55

```
>gdi ADDI
```

Pull up the data window with all the input values.

ADCLR Command

Use the `ADCLR` command to flush the input buffer for ADC simulation. This resets the input data buffer and clears out all values. Notice that if the ADC is currently using a value, this command does not prevent the ADC from using it.

NOTE See the `ADDI` command for information on how to access the input buffer of the ADC interface.

Syntax

```
>gdi ADCLR
```

Example

```
>gdi ADCLR
```

Clear the input buffer for ADC simulation.

16-Bit Analog-to-Digital Converter Module

In Full Chip Simulation (FCS) Mode, this module simulates all functionality of the 16-bit Analog-to-Digital Converter (ADC16) module, including data input on all ADC16 channels, flag polling, interrupt operation, single-ended output mode, differential output mode, as well as the bus and ICSERCLK reference clock sources. In single-ended output mode the FCS uses the buffered input structure to simulate the ADC16 inputs. You can queue up to 256 data values. To queue the ADC16 Input Data, use the `ADDI` command in the command prompt. If the data parameter is given, the value is placed into the next slot in the input buffer. If no data parameter is provided, a window is displayed with the input buffer values. Input values can be entered while the window is open. An arrow points to the next value that will be used as input to the ADC16. The conversion takes place after a proper value is written to the ADC16 Status and Control register. Once the conversion occurs, the arrow moves to the next value in the ADC16 Buffer. In differential output mode, you can use the `ADDID` command in the command prompt to open a window where you can specify the data inputs.

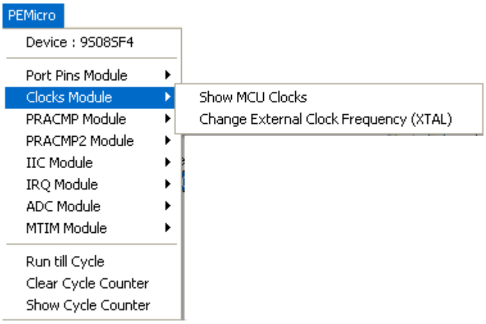
Clock Generation Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Clock Generation Module (ICG), including:

- Phase Locked Loop (PLL) generation
- Automatic lock detection
- Interrupt
- Acquisition
- Tracking
- Flag polling

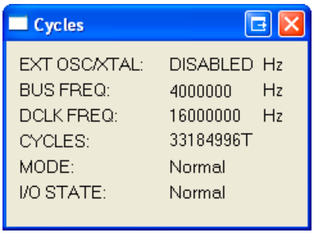
FCS mode uses a simulated External Oscillator Frequency change command (`XTAL`) tlets you input the desired XTAL value. To check the current value of the External Oscillator, Bus Frequency and CGMXCLK Frequency, open the HCS08FCS menu and select Clocks Module > Show MCU Clocks.

Figure 6.13 Clocks Module Extended Menu



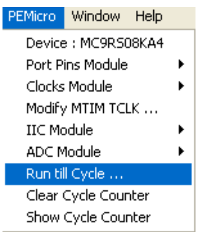
Once you select the MCU Clocks menu, the Cycles window displays all of the aforementioned Clock Frequencies, or you can select the Show Cycle Counter option within the FCS menu to get the same window.

Figure 6.14 Frequency Display



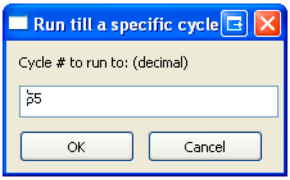
Within the FCS menu, you can select the Run till Cycle option, which lets you begin code execution and stop execution when the specified cycle count is reached. Note that the parameter given is not the number of cycles that executed, but rather the total cycle-count of the simulator (displayed in the Register Window).

Figure 6.15 Run till Cycle Command



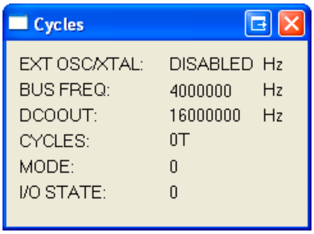
This command is extremely useful for verifying specific timings of a given event, running until a given event is complete, or just before it completes to enable stepping through the event or any application where cycle-timed execution is desired.

Figure 6.16 Run till a specific cycle Dialog Box



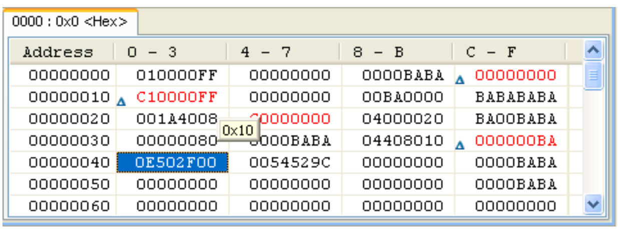
You can also select the Clear Cycle Counter option within the FCS menu, which clears the cycle counter. If you select the Show Cycle Counter option within the FCS menu, you can check to make sure that the cycle counter is zero.

Figure 6.17 Cycles Dialog Box with Cleared Counter



Once the ICG is properly configured, you can monitor the status of the PLL by polling the corresponding flag. If PLL interrupt is enabled, FCS jumps to an appropriate subroutine, as long as the interrupt vector is properly defined. To observe the flag going up as a result of the corresponding CPU event, situate your Memory window on the memory location of the ICG Status and Control register.

Figure 6.18 Memory Window



For more information on how to properly configure Clock Generation, refer to the Freescale reference manual for your microprocessor.

Clock Generation Module Commands

The following commands are available for the HC08/HCS08 Clock Generation Module.

XTAL Command

Use the `XTAL` command to change the value of the simulated external oscillator. This in turn affects the input to the PLL/DCO, and therefore the bus frequency. The P&E simulator is a cycle-based simulator, so changing the XTAL value does not affect the speed of simulation. It does, however, affect the ratio in which peripherals receive cycles. Certain peripherals that run directly from the XTAL will run at different speeds than those that run from the bus clock.

Syntax

```
>gdi XTAL <n>
```

where, `<n>`, by default, is a hexadecimal number, representing the simulated frequency of an external oscillator. Adding the suffix `'t'` to the `'n'` parameter forces the input value to be interpreted as base 10.

Example

```
>gdi XTAL
```

Brings up an input window. The default base for this input value is 10. However, this value can be forced to a hexadecimal format through use of the suffix `'h'`.

Digital-to-Analog Converter Module

In Full Chip Simulation (FCS) Mode, this module lets you simulate all the functionality of the 5-bit Digital-to-Analog Converter (DAC) module. This module provides 32 distinct selectable voltage levels through the use of a 32-tap resistor ladder network and a 32-to-1 multiplexer. Each DAC module output can be routed to an HSCMP input.

EEPROM Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of EEPROM module including sector erase abort, burst programming capability, security feature, flexible block protection and vector redirection, and command interface for fast program and erase operation.

EEPROM User Commands

The following `EEPROM` commands are available for the HCS08.

EEPROM<x> Command

The `EEPROM<x>` command simulates changing of the EEPROM page for devices that have paged EEPROM.

Syntax

```
>gdi EEPROM<x>
```

Where:

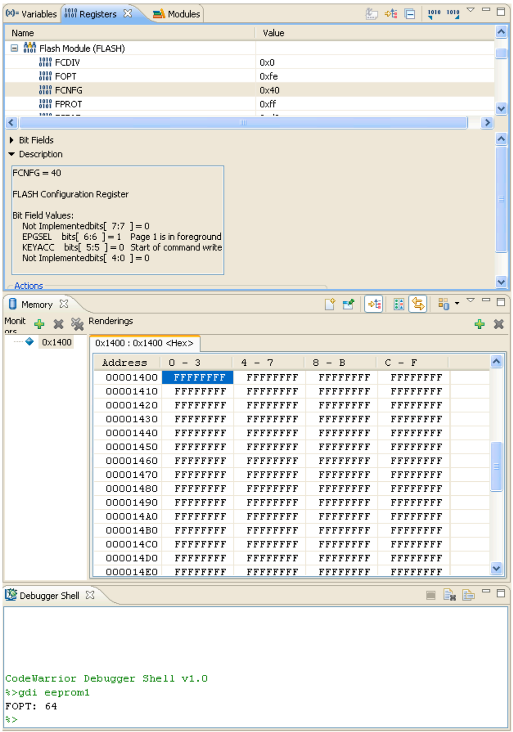
<x> is the letter representing corresponding EEPROM page number

Example

```
> gdi EEPROM1
```

Simulate change to EEPROM page 1.

Figure 6.19 Example of using EEPROM<x>Command



Fault Detection and Shutdown Module

In Full Chip Simulation (FCS) Mode, this module lets you simulate all the functionality of the Fault Detection and Shutdown (FDS) module. When a fault condition occurs, the module provides a mechanism to immediately place port pins into a pre-defined state; the output pin of FDS can be configured as output 0, output 1, high impedance, or bypass during shutdown. The module can configure up to 8 fault input sources and control up to 8 port pins.

Flash Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of Flash module including sector erase abort, burst programming capability, security feature, flexible block protection and vector redirection, and command interface for fast program and erase operation.

Flash User Commands

The following Flash commands are available for the HCS08.

PPAGE <x> Command

The `PPAGE <x>` command simulates changing of Flash PPAGE for devices that have paged FLASH.

Syntax

```
>gdi PPAGE <x>
```

Where:

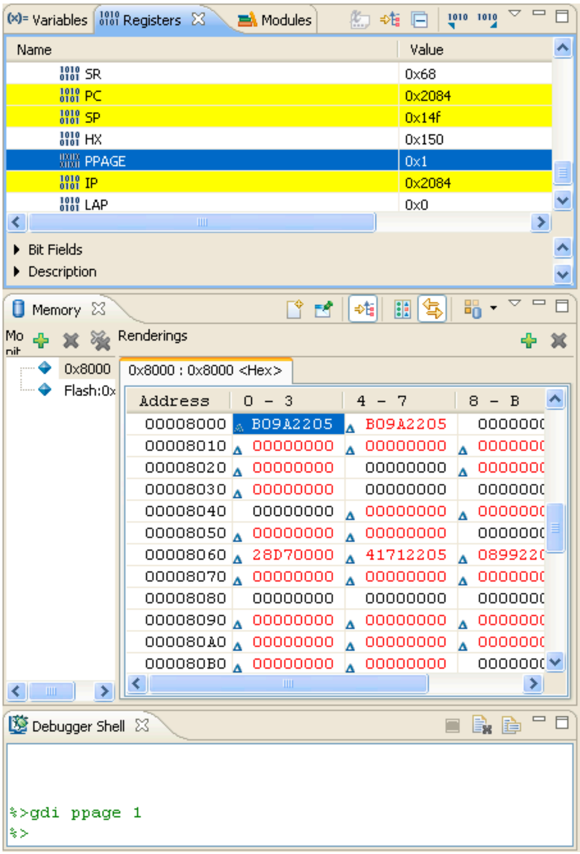
<x> is the letter representing corresponding PPAGE number

Example

```
>gdi PPAGE 1
```

Simulate change to PPAGE 1.

Figure 6.20 Example of using PPAGE <x> command



Inter-Integrated Circuit Module

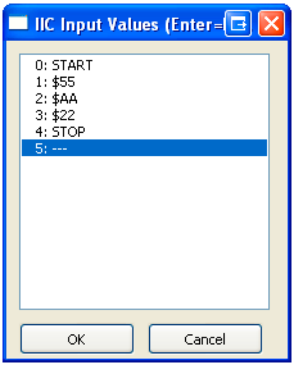
In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Inter-Integrated Circuit (IIC) module including:

- Flag polling
- Interrupt enabled mode
- Transmission and reception of external data
- Master and slave modes of operation
- START and STOP signal generation detection
- Acknowledge bit generation detection

FCS mode uses the buffered input/output structure to simulate IIC inputs. You can queue up to 256 data bytes into the input buffer. The output buffer of the USB module can also hold 256 output bytes. To queue the IIC Input Packets, use the `IICDI <...>` command in the command prompt. For a more detailed description of the command, refer to the IIC Commands section. If the IIC packet parameters are properly defined, the packet is placed into the next slot in the input buffer. Otherwise, if no parameters are provided, an IIC Input Buffer window is displayed.

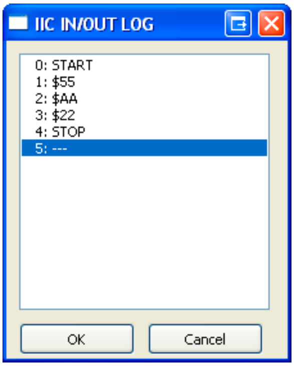
You can enter different IIC packet parameters while the window is open, including START, STOP, ACK, NACK and data bytes. An arrow points to the next byte to be used as input to the IIC. The data from the IIC input buffer is written to the IIC module registers once the IIC module is turned on and properly configured for receiving data from an external IIC device. Once simulation of the data transmission is over, the arrow moves to the next value in the IIC Input Buffer.

Figure 6.21 IIC Input Buffer Display



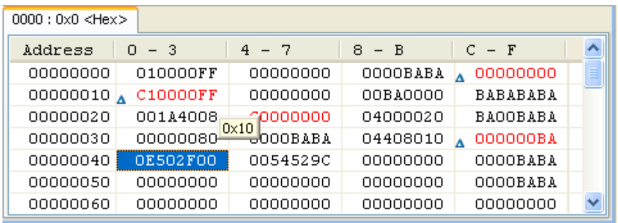
The IIC data input/output log buffer simulation lets you gain access to the past 256 IIC data bytes that have been shifted in and out of the module. To bring up the IIC IN/OUT LOG buffer dialog box, use the `IICDO` command.

Figure 6.22 IIC IN/OUT LOG Buffer Display



At any point, use the `IICCLR` command to flush the input as well as input/output log IIC buffers. After the IIC simulated input is received, the first queued-in data byte is passed from the data buffer into the corresponding IIC module registers. It can be observed in the Memory Window by displaying the appropriate register location there.

Figure 6.23 Memory Component Window



You can also observe different IIC flags in the Memory window. If you run the module in Flag Polling mode, poll the flag corresponding to the expected IIC event. If the IIC interrupts are enabled, FCS jumps to an appropriate subroutine as long as the IIC interrupt vectors are properly defined.

NOTE For more information on how to configure IIC module for desired operation, refer to the Freescale user manual for your microprocessor.

Inter-Integrated Circuit Module Commands

The following commands are available for the HCS08 Inter-Integrated Circuit (IIC) module and the HC08 Multi-Master Inter-Integrated Circuit (MMIIC) module. Command function is identical even though the module names differ.

IICDI Command

The `IICDI` command lets you input data into a buffer of data to shift into the IIC module when it receives data from an external device. If a data parameter is given, the value is placed into the next slot in the input buffer. Otherwise, if no parameter is given, a window is displayed with the input buffer values. Input values can be entered while the window is open. The maximum number of input values is 256. This command is useful for either inputting response data from a slave target or for inputting data packets from an external master. Note that when the microprocessor attempts to read an acknowledge from an external device, and the next value in the buffer is neither ACK nor NACK, the microprocessor automatically receives an ACK signal (i.e. assumes ACK unless NACK is specified).

Syntax

```
>gdi IICDI [<n>][START][STOP][ACK][NACK]
```

Where:

- `<n>` indicates the value to be entered into the next location in the input buffer
- `START` indicates the incoming START signal
- `STOP` indicates the incoming STOP signal
- `ACK` corresponds to ACK signal
- `NACK` corresponds to NACK signal

NOTE For a detailed description of the IIC protocol and a proper way to configure the IIC module, refer to the Freescale user manual for your microprocessor.

Example

```
>gdi IICDI
```

Pulls up the data window with all the input values

```
>gdi IICDI 22 33
```

This is an example of data being returned from a slave device. Once the MCU transmits a start signal and the target address, it receives an ACK from the slave device. An ACK is implied unless a NACK is specified via the `IICDI` command. The next two data bytes read are 22 and 23. If the microprocessor attempts to read another byte, it gets an $FF value followed by a NACK signal (NACK because nothing remains in the input buffer). The receiving device then generates a STOP signal. A more exact input from a device designed to return two bytes is:

```
>gdi IICDI ACK 22 ACK 23 NACK
```

IIC in master mode transmits to a slave:

• If the slave device acknowledges all output bytes of the transmitting device, there is no need to specify an input packet. If the master device is going to transmit an address and two bytes, the following packet is equivalent to no packet:

```
>gdi IICDI ACK ACK ACK
```

• If, however, the slave receiver is designed to generate a NACK signal after the second received data byte, the proper response packet is:

```
>gdi IICDI ACK ACK NACK
```

• The address result being the first ACK, the first data result being the second ACK, and the second data byte being the NACK.

IIC in MASTER mode is not acknowledged by any Slave:

```
>gdi IICDI NACK
```

• If the NACK signal is entered before the master device transmits a START signal, then the master device gets a NACK when it tries to read an acknowledge after the address is output. The master device then generates a STOP signal and releases the BUS.

IIC in SLAVE mode receives a Write from an external Master:

This example is for an external master that is writing to the microprocessor configured to simulate the slave mode operation. The packet contains both START and STOP signals which puts the simulated device into the slave mode.

```
>gdi IICDI START 55 AA 22 STOP
```

This input adds five values to the input queue, which is a packet from an external master, including the following procedure values:

• A start signal comes in

• The address $55 comes in specifying a write (slave receive). The Address Register in the current simulated device has been previously set to $55

• The data byte $AA comes in

• The data byte $22 comes in

• A STOP signal comes in

IICDO Command

The IICDO command displays a window, which shows data both shifted in and shifted out of the IIC peripheral. An arrow points to the last output value transmitted/received. The maximum number of output values that the buffer can hold is 256.

Syntax

```
>gdi IICDO
```

Example

`>gdi IICDO`

View data from the input/output log buffer for IIC simulation.

IICCLR Command

Use the `IICCLR` command to flush the input and output buffers for IIC simulation. This resets the buffers and clears all values. Notice that if the IIC is currently shifting a value, this command does not prevent the IIC from finishing the transfer.

Syntax

`>gdi IICCLR`

Example

`>gdi IICCLR`

Clear input and output buffers for IIC simulation.

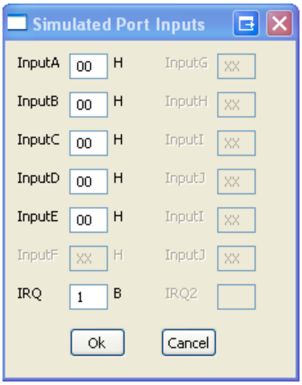
Interrupt Priority Controller Module

In Full Chip Simulation (FCS) Mode, this module simulates all the functionality of the Interrupt Priority Controller (IPC) module. This module provides a hardware-based, nested-interrupt mechanism in HCS08 MCUs and allows all prioritized non-software interrupts to interrupt. IPC features a four-level programmable interrupt priority for each source, supports prioritized preemptive interrupt service routines, and the interrupt priority mask can be modified during main flow or interrupt service execution. When the interrupt vector is being fetched, the module can automatically update the interrupt priority mask with its serviced interrupt source priority level and automatically store previous interrupt mask levels.

External Interrupt (IRQ) Module

In Full Chip Simulation (FCS) mode, this module simulates the input, flag polling and interrupt functionality of the External Interrupt (IRQ) module. FCS mode uses the `INPUTS` command and let you monitor and change the simulated value of the IRQ input pin state. Once you enter the `INPUTS` command into the command line prompt, the Simulated Port Inputs window appears. See the `INPUT<x>` Command for more information about the various forms of this command. In addition, the state of the IRQ pin can be modified directly using the `IRQ<n>` command (documented below).

Figure 6.24 Simulated Port Inputs Dialog Box

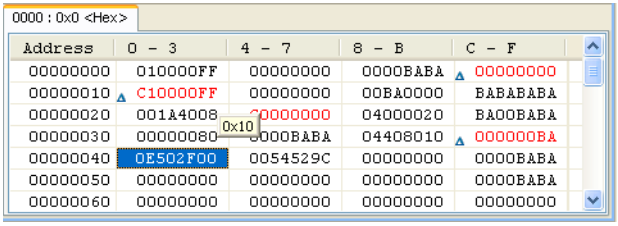


An IRQ event occurrence sets the appropriate flag in the corresponding IRQ register. You can poll the IRQ flag if the Polling Mode is simulated. In the Interrupt Mode, the simulator branches to an appropriate interrupt subroutine as long as the IRQ interrupt vector is properly configured.

NOTE For more information on IRQ configuration, refer to the Freescale user manual for your microprocessor.

Following the IRQ event, you can observe the IRQ Flag being set in the IRQ Status and Control register.

Figure 6.25 Memory Component Window



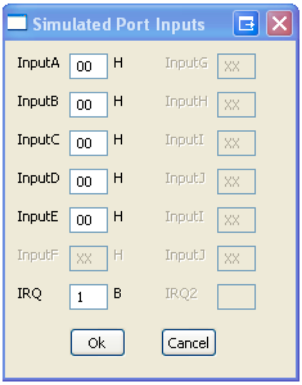
IRQ Commands

The following interrupt request command is available for the HC08/HCS08 processors.

INPUTS Command

In FCS and CPU-Only Simulation mode, the `INPUTS` command opens the Simulated Port Inputs dialog box shown in Figure 6.26. You may then use this box to specify the input states of port pins and IRQ.

Figure 6.26 Simulated Port Inputs Dialog Box



When using In-Circuit Simulation mode, the INPUTS command shows the simulated input values for any applicable port.

Syntax

```
>gdi INPUTS
```

Example

```
>gdi INPUTS
```

Show I/O port input values.

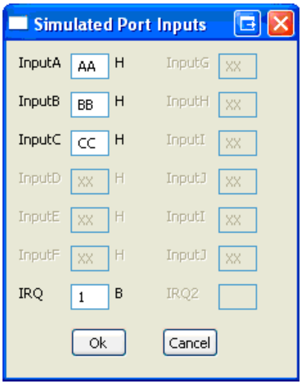
NOTE The IRQ pin state can be directly manipulated with the IRQ command. For example, IRQ 1 simulates a high state on the IRQ pin; likewise, IRQ 0 simulates a logic-low state on the IRQ pin.

Keyboard Interrupt Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Keyboard Interrupt (KBI) module, including the edge-only, edge and level interrupt, and flag polling modes of operation. FCS mode uses simulated port inputs to trigger the KBI event from the proper I/O port pin.

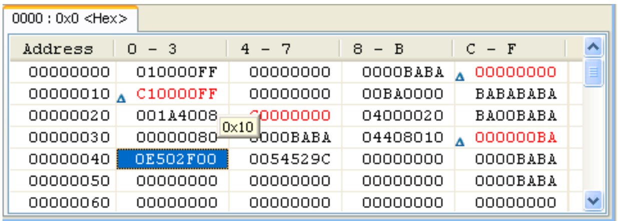
To define an input state of the specific port, write the INPUT<x> <n> command in the Command window. The <x> represents the corresponding I/O port, while <n> stands for the input value to write to this port. At the same time, you can use the INPUTS command to bring up the Simulated Port Inputs for all general I/O ports. It displays the current simulated values to all applicable input ports. See the documentation for Timer Module Commands for more information about the various forms of this command.

Figure 6.27 Simulated Port Inputs Dialog Box



Use the Simulated Port Inputs dialog box to reconfigure the input value to any I/O port. To trigger the event, manipulate the inputs to the port in the appropriate manner, depending on whether the KBI is configured for edge-only or edge and level. Once the KBI event takes place, you can observe the KEYF Flag bit, which is a part of the Keyboard Status and Control register, in the Memory window.

Figure 6.28 Memory Component Window



You can poll the KBI Interrupt Pending flag if the Polling Mode is simulated. In Interrupt Mode, the simulator branches to an appropriate interrupt subroutine as long as the KBI interrupt vector is properly configured.

NOTE For more information on KBI configuration, refer to the Freescale user manual for your microprocessor.

Keyboard Interrupt Commands

Use the following commands for Keyboard Interrupt manipulation.

INPUT<x> Command

The INPUT<x> command sets the simulated inputs to port <x>. The CPU reads this input value when port <x> is set as an input port.

Syntax

```
>gdi INPUT<x> <n>
```

Where:

<x> is the letter representing corresponding port

<n> is an eight-bit simulated value for port <x>

Example

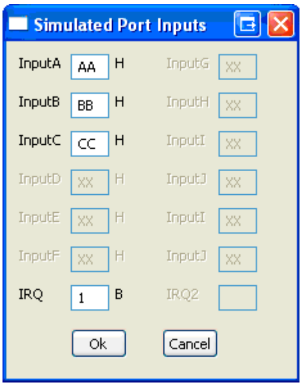
```
>gdi INPUTA AA
```

Simulate the input AA on port A.

INPUTS Command

In FCS and CPU-Only Simulation mode, the INPUTS command opens the Simulated Port Inputs dialog box shown in Figure 6.29. You may then use this box to specify the input states of port pins and IRQ.

Figure 6.29 Simulated Port Inputs Dialog Box



When using In-Circuit Simulation mode, the INPUTS command shows the simulated input values to any applicable port.

Syntax

```
>gdi INPUTS
```

Example

```
>gdi INPUTS
```

Show I/O port input values.

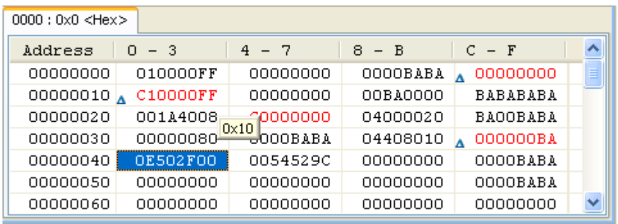
Modulo Timer Interrupt Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Modulo Timer Interrupt (MTIM) Module, including:

- Programmable MTIM clock input
- Free running or modulo up count operation
- Flag polling
- Interrupt enabled mode of operation

Once the MTIM Status and Control register properly configures the operation of the module, the MTIM Counter starts incrementing. If modulo up count operation is enabled, you can observe the MTIM overflow flag in the MTIM Status and Control register in the Memory window.

Figure 6.30 Memory Component Window



If the MTIM interrupt is enabled, the FCS jumps to an appropriate subroutine as long as the MTIM interrupt vector is properly defined.

MSCAN Controller Module

The MSCAN Controller Module fully simulates the operation of the MSCAN08 Protocol Version 2.0 based device, including:

- Flag polling
- Interrupt enabled mode
- 0-8 bytes data length
- Transmission and reception of external data

The MSCAN08 peripheral is a scalable Control Area Network (CAN) 2.0 compliant device that allows microcontrollers to exchange data between themselves at high speeds. This is done through a high-speed serial link that is deterministic and reliable. CAN devices are often utilized in automobiles, where multiple microcontrollers need to be connected into a network. The CAN specification indicates that any unit on the bus can be a master at any time, which sends a message to another unit at any time, provided the bus is free to do so. All of these messages can be set up through the CAN I/O commands built into the simulator. This section goes through an example which shows how the simulator can be used to test out code that drives the CAN peripheral

Programmable Delay Block Module

In Full Chip Simulation (FCS) Mode, this module lets you simulate all the functionality of the Programmable Delay Block (PDB) module. This module's primary function is to provide a controllable delay from FTM SYNC output to the sample trigger input of PGA or ADC, or a controllable window synchronized with PWM pulses for ACMP to compare the analog signals in a defined window. PDB can alternately generate PWM pulses that are synchronized to FTM, CMPR output, and RTC.

Programmable Gain Amplifier Module

In Full Chip Simulation (FCS) Mode, this option lets you simulate all the functionality of the Programmable Gain Amplifier (PGA) module, including data input on all PGA channels, flag polling, and output connection to the ADC input channel. You can utilize either the PGA Inputs display form or command-line commands to provide inputs to the PGA module. The PGAINPUTS command shows the simulated PGA input/output values. There are also three specific commands in the simulation for providing PGA inputs to simulation via a command line.

Programmable Reference Analog Comparator Module

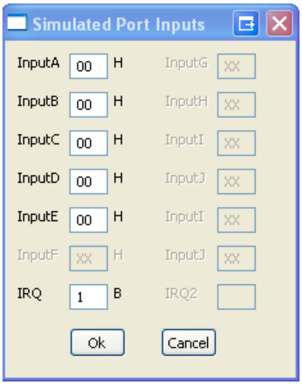
In Full Chip Simulation (FCS) Mode, this option lets you simulate all the functionality of the Programmable Reference Analog Comparator (PRACMP) module, including data input on all PRACMP channels, flag polling, and interrupt operation. You can use either the PRACMP Inputs display form or command-line commands to provide inputs to PRACMP module.

Input/Output (I/O) Ports Module

In Full Chip Simulation (FCS) mode, this module simulates all input and output functionality of the Input/Output (I/O) Ports module. FCS mode uses a set of designated commands to simulate the input and output activity on corresponding I/O port pins. To define an input state of a specific port, write the INPUT <x> <n> command in the Command window. The <x> represents the corresponding I/O port, while the <n> stands for the input value to write to this port. At the same time, you can use the INPUTS command to bring up the Simulated Port Inputs for all general I/O ports. It displays the current simulated values to all applicable input ports.

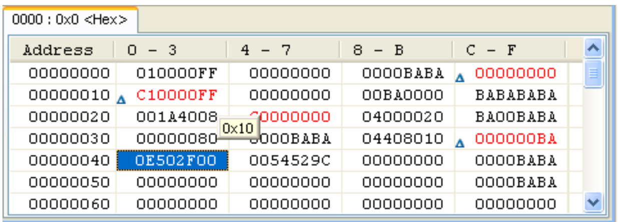
NOTE See the Input/Output Ports User Commands and IRQ Commands for more information about the various forms of this command.

Figure 6.31 Simulated Port Inputs Dialog Box



Use the Simulated Port Inputs dialog box to reconfigure the input value to any I/O port. Use the INPUTS command to reconfigure the output values on any relevant I/O port. You can observe the manipulation of I/O port pins in the Memory window.

Figure 6.32 Memory Component Window



Note that if the regular I/O pins are multiplexed to be used by a different MCU Module, they might not be available for general I/O functionality.

NOTE For more information on how to properly configure I/O pins, refer to the Freescale user manual for your microprocessor.

Input/Output Ports User Commands

Use the following commands for general I/O ports manipulation.

INPUT<x> Command

The INPUT<x> command sets the simulated inputs to port <x>. The CPU reads this input value when port <x> is set as an input port.

Syntax

```
>gdi INPUT<x> <n>
```

Where:

<x> is the letter representing corresponding port

<n> Eight-bit simulated value for port <x>

Example

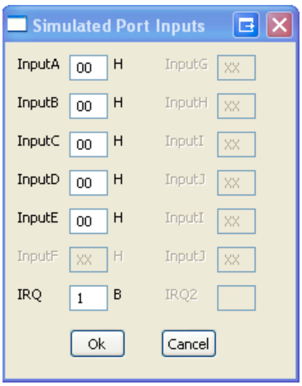
```
>gdi INPUTA AA
```

Simulate the input AA on port A.

INPUTS Command

In FCS and CPU-Only Simulation mode, the INPUTS command opens the Simulated Port Inputs dialog box shown in Figure 6.33. You may then use this box to specify the input states of port pins and IRQ.

Figure 6.33 Simulated Port Inputs Dialog Box



When using In-Circuit Simulation mode, the INPUTS command shows the simulated input values to any applicable port.

Syntax

```
>gdi INPUTS
```

Example

```
>gdi INPUTS
```

Show I/O port input values.

Serial Communications Interface Module

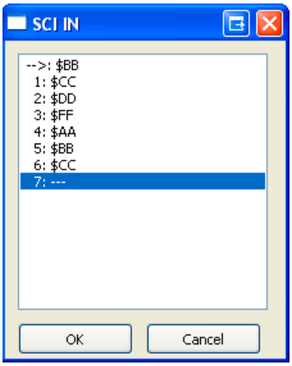
In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Serial Peripheral Interface (SPI) module including:

- Flag polling
- Interrupt enabled mode
- 8- or 9-bit length data codes
- Odd and even parity modes
- Transmission and reception of external data

FCS mode uses the buffered input/output structure to simulate SCI inputs. You can queue up to 256 data values into the input buffer. The output buffer of the SCI module can also hold 256 output values. To queue the SCI Input Data, use the SCDI <n> command in the command prompt. If <n> (the data parameter) is given, the value is placed into the next slot in the input buffer.

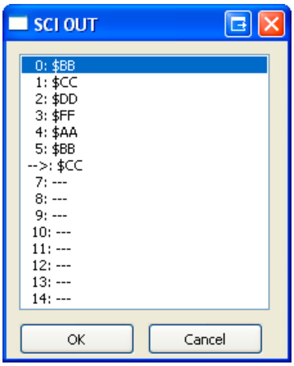
Otherwise, if no parameter is provided, a window is displayed with the input buffer values. You can enter input values while the window is open. An arrow points to the next value to be used as input to the SCI. The data from the SCI input buffer is written to the SCI data register once the SCI module has been turned on and is properly configured for receiving data from an external serial device. Once the simulation of the data transmission is over, the arrow moves to the next value in the SCI IN Buffer.

Figure 6.34 SCI IN Buffer Display



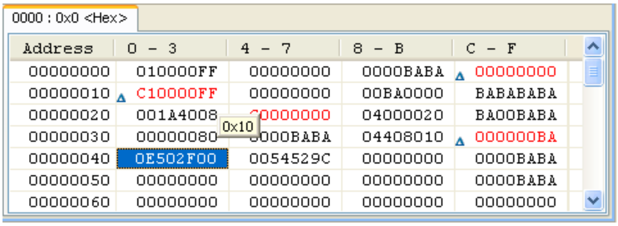
SCI Data Output Buffer simulation lets you gain access to the past 256 SCI data values transmitted out of the module. To bring up the SCI OUT buffer dialog box, use the SCDO command.

Figure 6.35 SCI OUT Buffer Display



The SCCLR command may be used at any point to flush the input and output SCI buffers. After the SCI simulated input is received, the first queued value is passed from the data buffer into the SCI data register. It can be observed in the memory window by displaying the memory location corresponding to the SCI data register.

Figure 6.36 Memory Component Window



You can also observe different SCI flags in the Memory window. If the module is run in Flag Polling mode, poll the flag corresponding to the expected SCI event. If the SCI interrupts are enabled, the FCS jumps to an appropriate subroutine as long as the SCI interrupt vectors are properly defined.

NOTE For more information on how to configure the SCI module for desired operation, refer to the Freescale user manual for your microprocessor.

SCI Commands

The following serial communication interface commands are available for the HC08/ HCS08.

SCCLR Command

Use the SCCLR command to flush the input and output buffers for SCI simulation. This resets the buffers and clears out all values. Note that if the SCI is in the process of shifting a value, this command allows the SCI to finish the transfer. See the SCDI and SCDO commands for accessing the input and output buffers of the SCI interface.

Syntax

```
>gdi SCCLR
```

Example

```
>gdi SCCLR
```

Clear input and output buffer for SCI simulation

SCDI Command

The SCDI command lets you input data into the SCI. If a data parameter is given, the value is placed into the next slot in the SCI input buffer. If no parameter is given, a window displays the input buffer values. Input values can be entered while the window is open. An arrow points to the next value to be used as input to the SCI. The maximum number of input values is 256 bytes.

Syntax

```
>gdi SCDI [<n>]
```

Where:

`<n>` The value to be entered into the next location in the input buffer

Example

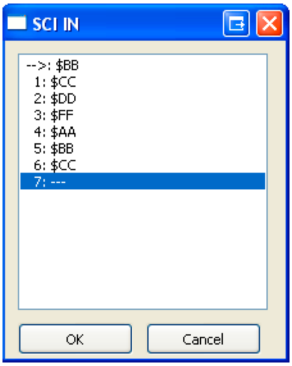
```
>gdi SCDI $55
```

Set the next input value to the SCI to $55

```
>gdi SCDI
```

Pull up the data window with all the input values.

Figure 6.37 SCI IN Buffer Display



SCDO Command

The `SCDO` command displays the output buffer from the SCI. A window is opened that shows all the data that the SCI has shifted out. An arrow points to the last output value transmitted. The maximum number of output values that the buffer holds is 256 bytes.

Syntax

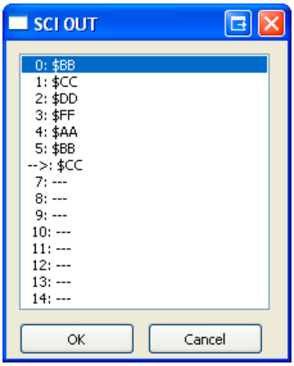
```
>gdi SCDO
```

Example

```
>gdi SCDO
```

View data from the output buffer for the SCI simulation.

Figure 6.38 SCI OUT Buffer Display



Slave LIN Interface Controller (SLIC) Module

In Full Chip Simulation (FCS) mode, this option will simulate all functionality of the Slave LIN Interface Controller (SLIC) Module, including:

- Flag polling
- Interrupt enabled mode
- Transmission and reception of external data
- Check sum generation and verification
- Different message lengths data modes

Full Chip Simulation (FCS) mode uses a buffered structure to simulate SLIC inputs and outputs. You can queue up to 256 data bytes into the input buffer. The output buffer of the SLIC module can also hold 256 output bytes. To queue the SLIC Input bytes use the SLCIN instruction in the command prompt. For a more detailed description of the command, please refer to the SLIC Commands section. The SLIC instruction brings up a window, which displays a list of queued input data. Different SLIC packets can be entered while the window is open. An arrow points to the byte that will be used next as input to the SLIC. Once the SLIC module is turned on and properly configured for receiving data from an external SLIC device, the data from the SLIC input buffer is written to the SLIC module identifier or data registers. After the simulation of the data transmission is complete, the arrow moves to the next value in the SLIC IN Buffer.

Serial Peripheral Interface Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Serial Peripheral Interface (SPI) module including:

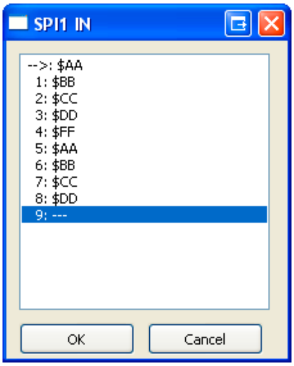
- Flag polling

- Interrupt enabled mode
- Master and slave modes
- Slave input clock
- Transmission and reception of external data

FCS mode uses the buffered input/output structure to simulate SPI inputs. You can queue up to 256 data values into the input buffer. The output buffer of the SPI module can also hold 256 output values. To queue the SPI Input Data, use the SPDI <n> command at the command prompt. If <n> (the data parameter) is given, the value is placed into the next slot in the input buffer.

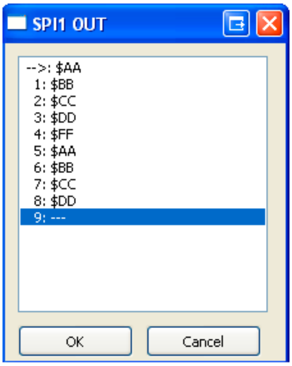
Otherwise a window is displayed with the input buffer values. You can enter input values while the window is open. An arrow points to the next input value to the SPI. The data from the SPI input buffer is written to the SPI data register once the SPI module is turned on and is properly configured for receiving data from an external serial device. Once the simulation of the data transmission is over, the arrow moves to the next value in the SPI IN Buffer.

Figure 6.39 SPI IN Buffer Display



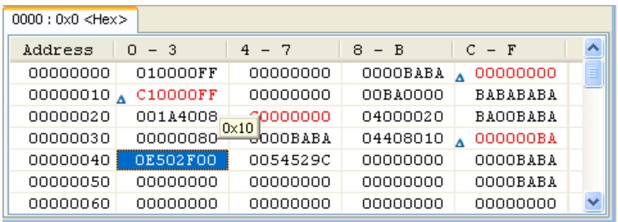
SPI data output buffer simulation lets you gain access to the past 256 SPI data values transmitted out of the module. To bring up the SPI OUT buffer dialog box, use the SPDO command.

Figure 6.40 SPI OUT Buffer Display



The SPCLR command may be used at any point to flush the input and output SPI buffers. After the SPI simulated input is received, the first queued value is passed from the data buffer into the SPI data register. It can be observed in the Memory Window by displaying the memory location corresponding to the SPI data register.

Figure 6.41 Memory Component Window



You can also observe different SPI flags in the Memory window. If the module is run in Flag Polling mode, poll the flag corresponding to the expected SPI event. If the SPI interrupts are enabled, the FCS jumps to an appropriate subroutine as long as the SPI channel interrupt vectors are properly defined.

To simulate the frequency of the SPI slave input clock, use the SPFREQ <n> command. If the SPI is configured for slave mode, this command let you enter the number of cycles <n> in the period of the input clock. If the SPFREQ command is not used, then clocking is set by the SPI control register.

NOTE For more information on how to configure the SPI module for desired operation, refer to the Freescale user manual for your microprocessor.

SPI Commands

The following serial peripheral interface commands are available for the HCS08.

SPCLR Command

Use the SPCLR command to flush the input and output buffers for SPI simulation. This resets the buffers and clears out all values. Notice that if the SPI is currently shifting a value, this command allows the SPI to finish the transfer. See the SPDI and SPDO commands for accessing the input and output buffers of the SPI interface.

Syntax

```
>gdi SPCLR
```

Example

```
>gdi SPCLR
```

Clear input and output buffer for SPI simulation

SPDI Command

The SPDI command lets you input data into the SPI. If a data parameter is given, the value is placed into the next slot in the SPI input buffer. If no parameter is given, a window displays the input buffer values. You can enter input values while the window is open. An arrow points to the next input value to the SPI. The maximum number of input values is 256 bytes.

Syntax

```
>gdi SPDI [<n>]
```

Where:

`<n>` The value to be entered into the next location in the input buffer

Example

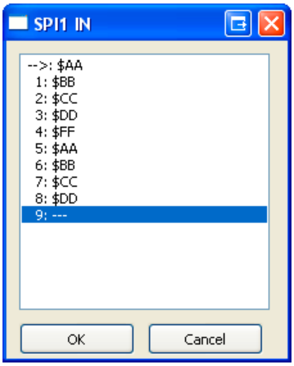
```
>gdi SPDI $55
```

Set the next input value to the SPI to $55

```
>gdi SPDI
```

Pull up the data window with all the input values.

Figure 6.42 SPI IN Buffer Display



SPDO Command

The SPDO command displays the output buffer from the SPI. A window opens that shows all the data that the SPI has shifted out. An arrow points to the last output value transmitted. The maximum number of output values that the buffer holds is 256 bytes.

Syntax

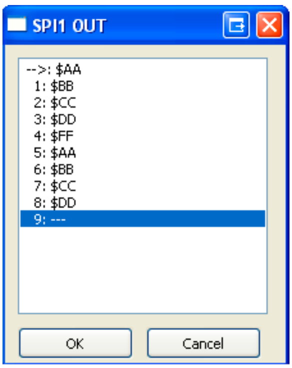
```
>gdi SPDO
```

Example

```
>gdi SPDO
```

View data from the output buffer for the SPI simulation.

Figure 6.43 SPI OUT Buffer Display



SPFREQ Command

The SPFREQ command lets you set the frequency of the SPI slave input clock. If the SPI is configured for the slave mode, this command lets you enter the number of cycles <n> per one input clock period. If no value is given, a window appears and you are prompted for a value. If this command is not used, then the clocking is assumed to be set by the SPI control register.

Syntax

```
>gdi SPFREQ [<n>]
```

Where:

`<n>` The number of cycles for the period of the input clock.

Example

```
>gdi SPFREQ 8
```

Set the period of the input slave clock to 8 cycles (total shift = 8*8 cycles per bit = 64 cycles)

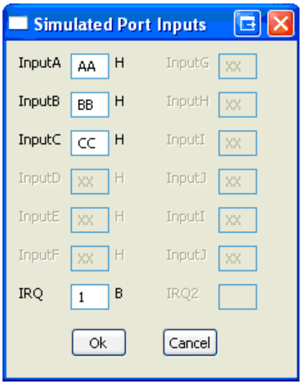
Timer Interface Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Timer Interface module, including:

- Input capture/output compare
- Pulse width modulation
- Internal or external clock input
- Free running or modulo up count operation
- Flag polling
- Interrupt enabled mode of operation.

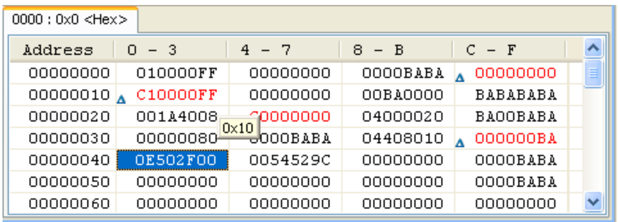
FCS mode uses the simulated port inputs to trigger the input capture on a given timer channel. To define an input state of the specific port, use the INPUT<x> <n> command in the Command window. The <x> represents the corresponding I/O port, while <n> stands for the input value to write to this port. At the same time, the INPUTS command can be used to display the Simulated Port Inputs for all general I/O ports. It displays the current simulated values to all applicable input ports. See the documentation for Timer Module Commands for more information about the various forms of this command.

Figure 6.44 Simulated Port Inputs Dialog Box



Use the Simulated Port Inputs dialog box to reconfigure the input value to any I/O port. To trigger the event, first set the port inputs high or low and then invert them to an opposite value, depending on whether the input capture is set for rising/falling edge. Once the Input Capture event takes place you can observe the CHxF in the Channel Status and Control register in the Memory window.

Figure 6.45 Memory Component Window

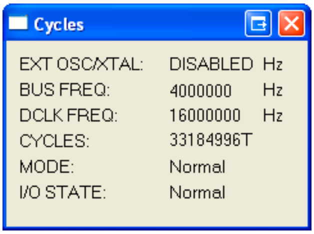


If the Timer module is configured for an Output Compare event, then once the event takes place you can observe the same CHxF Flag via the Memory window. If the timer channel interrupt is enabled, the FCS jumps to an appropriate subroutine as long as the Timer channel interrupt vector is properly defined. To observe the Timer Overflow Flag (TOF) flag being set as a result of the corresponding CPU event, situate your Memory window on the memory location of the Timer Status and Control register.

To observe the Pulse Width Modulation (PWM) operation, properly configure the Timer to operate in the Modulo up count mode, select the toggle-on-overflow or clear/set output on compare events to create the desired duty cycle wave. Once a PWM event takes place, you can observe pin toggle/clear/set behavior corresponding to the Timer configuration in the Memory window displaying the I/O port associated with a given timer channel.

To observe the accuracy of the Timer module operation, you can observe the number of CPU cycles that it takes for the event to occur. The cycle counter is only incremented as the you step through the code. To determine the exact amount of cycles over which the event occurs, one can either observe the cycle display in the Register window or use the built in simulation commands. To display the current number of cycles in the Command window, use the CYCLES command. To change the number of cycles in the cycle counter, use CYCLES <n>, where <n> is the new cycle value. If the event has a pre-calculated number of cycles, use CYCLE 00 to reset the number of cycles and GOTOCYCLE <n> to run through the code until you reach the expected event.

Figure 6.46 Register Window With Cycles Display



Timer Module Commands

The following timer module commands are available for use with the HC08/HCS08 processors.

CYCLES Command

The CYCLES command changes the value of the cycles counter. The cycles counter counts the number of the processor cycles that have passed during execution. The Cycles window shows the cycle counter. The cycle count can be useful for timing procedures.

Syntax

```
>gdi CYCLES <n>
```

Where:

`<n>` Integer value for the cycles counter

Examples

```
>gdi CYCLES 0
```

Reset cycles counter

```
>gdi CYCLES 1000
```

Set cycle counter to 1000.

GOTOCYCLE Command

The GOTOCYCLE command executes the program in the simulator beginning at the address in the program counter (PC). Execution continues until the cycle counter is equal to or greater than the specified value, until a key or the Stop button on the toolbar is pressed, until it reaches a break point, or until an error occurs.

Syntax

```
>gdi GOTOCYCLE <n>
```

Where:

`<n>` Cycle-counter value at which the execution stops

Example

```
>gdi GOTOCYCLE 100
```

Execute the program until the cycle counter equals 100.

INPUT<x> Command

The INPUT<x> command sets the simulated inputs to port <x>. The CPU reads this input value when port <x> is set as an input port.

Syntax

```
>gdi INPUT<x> <n>
```

Where:

`<x>` is the letter representing corresponding port

`<n>` Eight-bit simulated value for port <x>

Example

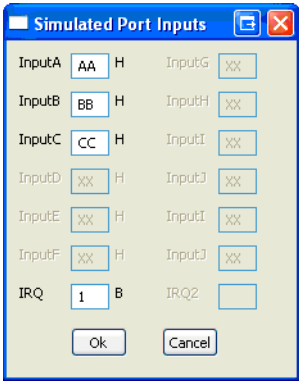
```
>gdi INPUTA AA
```

Simulate the input AA on port A.

INPUTS Command

In FCS and CPU-Only Simulation mode, the INPUTS command opens the Simulated Port Inputs dialog box shown in Figure 6.47. You may then use this box to specify the input states of port pins and IRQ.

Figure 6.47 Simulated Port Inputs Dialog Box



When using In-Circuit Simulation mode, the INPUTS command shows the simulated input values to any applicable port.

Syntax

```
>gdi INPUTS
```

Example

```
>gdi INPUTS
```

Show I/O port input values.

Time Of Day Module Option

In Full Chip Simulation (FCS) mode, this module lets you simulate all the functionality of the Time Of Day (TOD) module. The module includes an 8-bit counter, a 6-bit match register, several binary-based and decimal-based prescaler dividers, three clock source options, and one interrupt that can be used for quarter second, one second and match conditions. A 4 Hz signal is used as the reference clock for the TOD counter, where each tick of the TOD counter is 0.25 seconds. This module can be used for time-of-day, calendar, or any task scheduling functions. It can also serve as a cyclic wake up from low-power modes without the need for external components.

Universal Serial Bus (USB) Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Universal Serial Bus (USB) module including USB flags and interrupts, seven USB endpoints, USB RAM and USB reset options. While all control transactions occur through bi-directional endpoint 0, the other endpoints can be set up for data transfer in the input or output direction.

Some of the microcontrollers in the HCS08 family contain USB compliant peripheral devices. These can be low-speed or high-speed USB slave devices. This means that all USB transfers are initiated by a host (i.e. a personal computer) and that the microcontroller needs to be set up to respond with the appropriate acknowledgement messages. According to the USB specification, there are a series of messages that go back and forth between the host and the device in order to set up and describe the channel for data transfer. All of these messages can be set up through the USB I/O commands built into the simulator. This section goes through an example of this, showing how the simulator can be used to test out code for driving the USB peripheral.

Voltage Reference Module

In Full Chip Simulation (FCS) mode, this module lets you simulate all the functionality of the Voltage Reference (VREF) module. The module is a bandgap buffer system intended to supply an accurate voltage output that is trimmable by an 8-bit register in 0.5 mV steps. It can be used internally for the analog peripherals of an ADC channel or for an ACMP input. VREF has three operating modes that provide different levels of load regulation and power consumption.

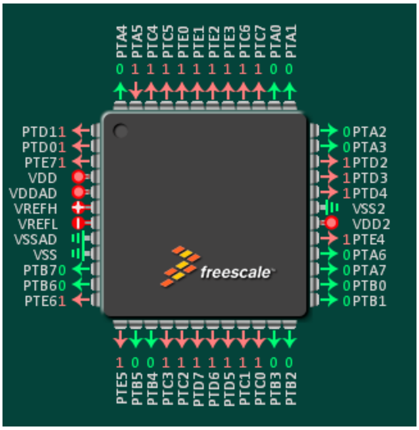
P&E HCS08 Multilink\Cyclone Pro

This section describes the HCS08 P&E Multilink/Cyclone Pro Connection options, and also Chip View, which is a time-saving ICD feature that makes the debugging process much easier. The HCS08 P&E Multilink/Cyclone Pro Connection setting permits a connection to HCS08 Freescale devices via P&E Multilink/Cyclone Pro hardware interfaces. This connection mode lets you debug code, as the firmware is fully resident in the Flash or RAM of the microprocessor.

Chip View

Chip View is an innovative feature designed to simplify Full Chip Simulation (FCS) and In-Circuit Debugging (ICD) sessions. The **Chip View** grants you instantaneous access to internal modules of the chip, and also lets you instantly change any of the features by clicking them. Each pin features the current pin direction, input/output value, and the name of signal that reflects the current module that controls it. These data features are updated every 50ms throughout a running FCS or ICD session.

Figure 6.48 Chip View Window

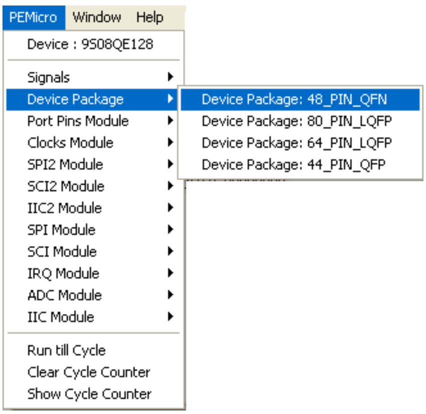


To open **Chip View**, perform these steps.

1. From the IDE menu bar, select **PEMicro > Device Package > Device Package:<** *Pin*>, where < *Pin*> is the pin package you would like to work with. (See Figure 6.49).

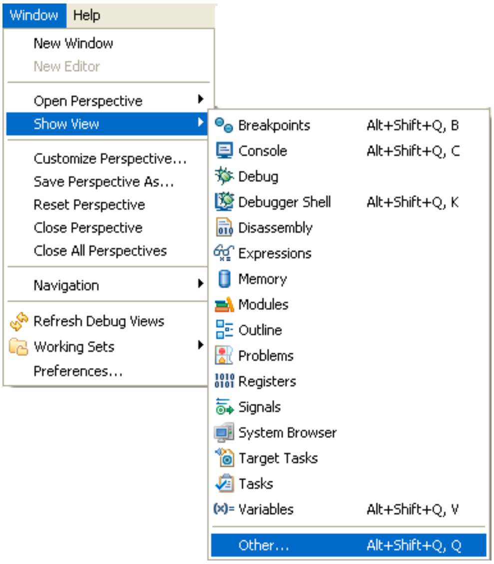
   The Device Package can be changed before or after the **Chip View** window is invoked within the CodeWarrior IDE.

Figure 6.49 Device Package Extended Menu



2. From the IDE menu bar, select **Window > Show View > Others** (Figure 6.50).

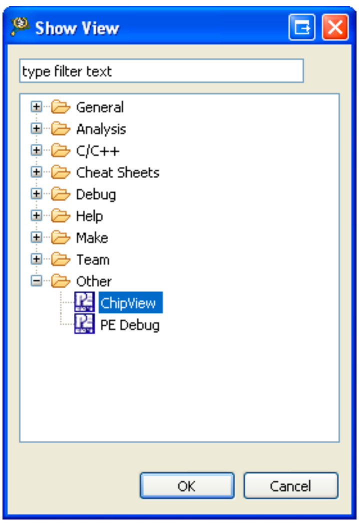
Figure 6.50 Show View Extended Menu



The **Show View** dialog box appears.

3. Expand **Other** and select **Chip View** (Figure 6.51).

Figure 6.51 Show View Menu



4. To change direction and values of the pin, double-click the corresponding arrow or the number value. Details are listed below.

NOTE If you close the **Chip View** window during debug session, you will not be able to access to the Chip View.You must reopen the **Chip View** window and restart the current debugging session to open the **Chip View** window again. Closing **Chip View** should slightly improve performance during existing debug session.

Chip GUI - Ports Module Support

You have the option of changing the pin’s direction and values by double-clicking on the corresponding arrow or number value. Figure 6.52 is an example of what the Chip View may look like before any changes are made. When the pin direction is input, the pin will display the current pin input value. When the pin direction is output, you have the option of double-clicking the number value to control the output value for the pin. Figure 6.53 is an example of the PTA2 pin value being changed from 0 to 1 by double-clicking on the number value.

Figure 6.52 Chip View Display Before Change

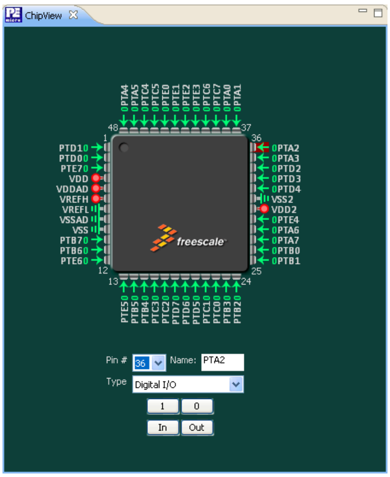
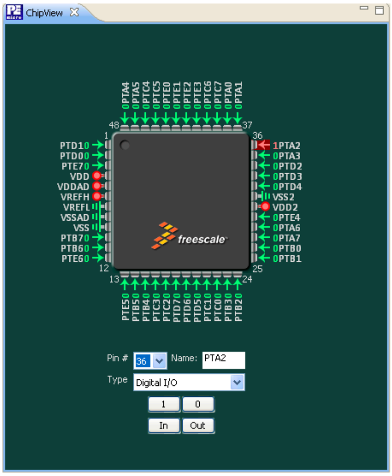
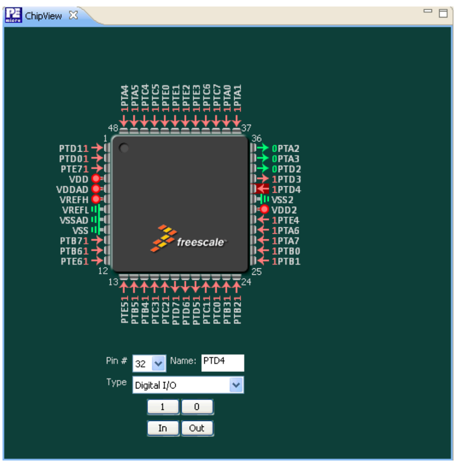


Figure 6.53 Chip View Display After Change



When you double-click the pin's value or direction, a pin configuration dialog appears underneath the Chip View diagram (Figure 6.54). In the pin configuration options, you have the option of changing analog and digital I/O settings for a given pin.You can select a pin from the pin-number drop-down list, select between analog and digital signals, and switch pin directions. For the digital I/O signal, you can switch between high or low signals (Figure 6.54).

Figure 6.54 Chip View with Digital Pin Configuration Options



Connection Options

This topic describes all P&E Multilink\Cyclone connection options, which are common to all P&E USB BDM Multilink, P&E Cyclone Pro Serial, P&E Cyclone PRO USB, and P&E Cyclone PRO TCP-IP connections.

The connection options include:

- Changing P&E Connections Settings
- Connection Assistant
- Launch Configuration Settings
- Active Mode Menu Options
- Advanced Programming/Debug Options
- View Register Files Option
- Socket Programming Options Button
- P&E HCS08 Multilink\Cyclone Pro Connection-Specific Options

Changing P&E Connections Settings

All connection settings for P&E hardware interfaces are configured in the Launch Configurations dialog box.

Figure 6.55 P&E Multilink/Cyclone Pro

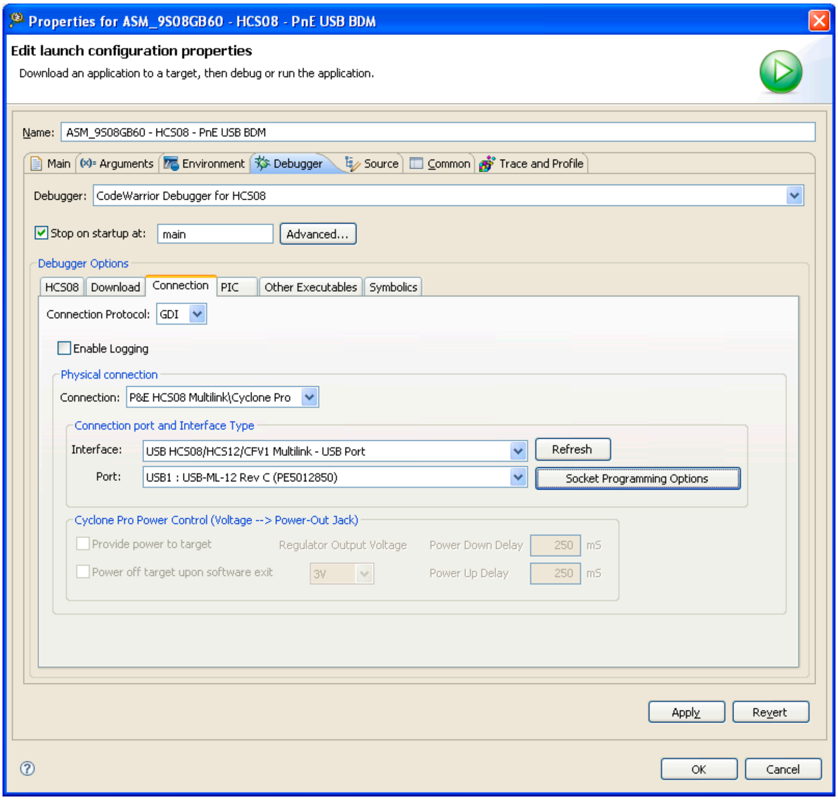


Table 6.1 describes the options for the **Debugger** tab page.

Table 6.1 Connection Parameter Options for P&E Multilink/Cyclone Pro

Option	Description
Interface	Use this option to select the interface type. Select a supported interface from the list box. The options are: • BDM Multilink Parallel Port • USBHCS08\HCS12\CFV1 Multilink - USB Port • Cyclone PRO - Serial Port • Cyclone PRO - USB Port • Cyclone PRO - Ethernet Port
Port	This option selects the port over which debug communications is conducted. Select an available port from the list box.
Refresh	Click this button to have the workstation scan for a valid interface and port. Valid interfaces and ports appear in the `Interface` and `Port` list boxes.
Socket Programming Options	The Socket Programming Options button brings up a dialog that provides you with a graphical representation of the signals that must be connected from the BDM header to the pins of the microprocessor, in order to use Freescale socket adapters.
(Cyclone Pro only) Provide power to target	This option determines whether the Cyclone Pro (circuitry) provides power to the target hardware via the probe. Check this option to have the Cyclone Pro (circuitry) supply power to the hardware target Uncheck this option to not provide power.

Table 6.1 Connection Parameter Options for P&E Multilink/Cyclone Pro (*continued*)

Option	Description
(Cyclone Pro only) Power off target upon software exit	This option determines whether the Cyclone PRO hardware interface provides power to the target hardware via the VDD of the BDM cable. Check this option to turn off the power when the program terminates. Uncheck this option to leave the hardware target powered continuously.
(Cyclone Pro only) Regulator Output Voltage	This option adjusts the output voltage that powers the hardware target. Select a voltage value from this option's list box.
(Cyclone Pro only) Power down delay	This option specifies amount of time for which the target will be turned off during a RESET power cycling sequence. Enter the delay interval (in milliseconds) in this option's text box.
(Cyclone Pro only) Power up delay	This option specifies amount of time for which the target will remain powered prior to a RESET power cycling sequence. Enter the delay interval (in milliseconds) in this option's text box.

WARNING! An improper voltage setting can damage the board.

To change P&E Connections settings, perform these steps:

1. In the **CodeWarrior Projects** view, select the project for which you want to change the P&E Connections settings.

NOTE It is assumed that you have created a project and built it.

2. Select **Run > Debug Configurations** from the main menu bar of the IDE.

   The **Debug Configurations** dialog box appears.

3. Expand the **CodeWarrior Download** tree control in the left pane and select the launch configuration you want to debug.

4. Click the **Debugger** tab.

   The **Debugger** page appears in the area beneath the tabs.

5. Click the **Connection** tab in the **Debugger Options** group to show the connection settings.
6. Ensure to select `GDI` from the **Connection Protocol** drop-down list.
7. In the **Physical connection** group, select `P&E HCS08 Multilink\Cyclone Pro` from the **Connection** drop-down list.
8. Click **Refresh** to scan valid interface and port.

   Valid interfaces and ports appear in the **Interface** and **Port** drop-down lists in the **Connection** port and **Interface Type** group.

9. Select a supported interface from the **Interface** drop-down list.
10. Select a supported port from the **Port** drop-down list.

NOTE The port displayed may vary depending on the interface. For example, if you select interface as `Cyclone PRO - Serial Port`, the available port option is `COM1 : Serial Port 1`.

11. Specify settings in the **Cyclone Pro Power Control (Voltage --> Power -Out Jack)** group.

NOTE This group will be enabled for `Cyclone PRO` interface only.

12. Check the **Provide power to target** checkbox to have the Cyclone PRO (circuitry) provide power to the target else clear the checkbox if you do not want to provide power to the target.
13. Check the **Power off target upon software exit** checkbox to turn off the power when the program terminate else clear the checkbox to leave the hardware target powered continuously.
14. Select a voltage value from the **Regulator Output Voltage** drop-down list.

    This adjusts the output voltage that powers the hardware target.

WARNING! An improper voltage setting can damage the board.

15. Enter the delay interval (in milliseconds) in the **Power Down Delay** text box.

    This option specifies the time interval to wait before shutting off the power to the hardware target.

16. Enter the delay interval (in milliseconds) in the **Power Up Delay** text box.

    This option specifies the time interval to wait before turning on the power to the hardware target.

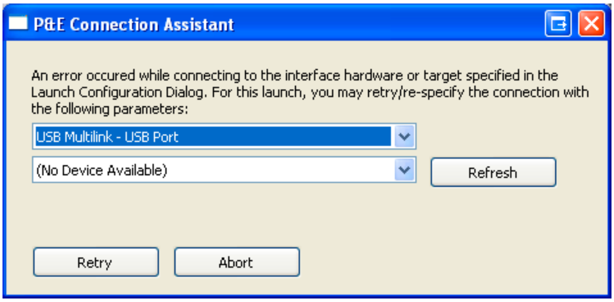
17. Click **Apply** to save changes to the P&E Connections settings.
18. Click **Close** to close the **Debug Configurations** dialog box.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Multilink/Cyclone Pro as your debugger connection:

1. Select the P&E device that you are using from the first drop-down list and click Refresh. See Figure 6.56.
2. Using the second drop-down list, select the port on which the interface is connected.
3. Click the Retry button

Figure 6.56 HCS08 Connection Assistant Interface Selected



Launch Configuration Settings

To set the launch configurations for the debugger:

1. Find the debugger icon and click the drop-down arrow to bring up the debugger menu. See Figure 6.57.
2. Select Debug Configurations
3. In the left column, select the project download type you would like to set the launch configurations. See Figure 6.58
4. In the right column, click the Debugger tab.
5. Set your configurations and click the Debug button to start the debugger.

Figure 6.57 Debugger drop-down list

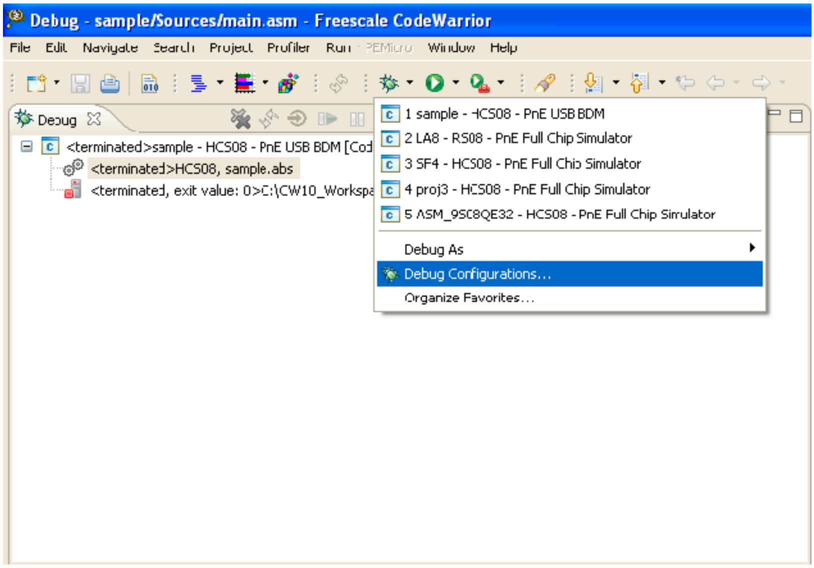
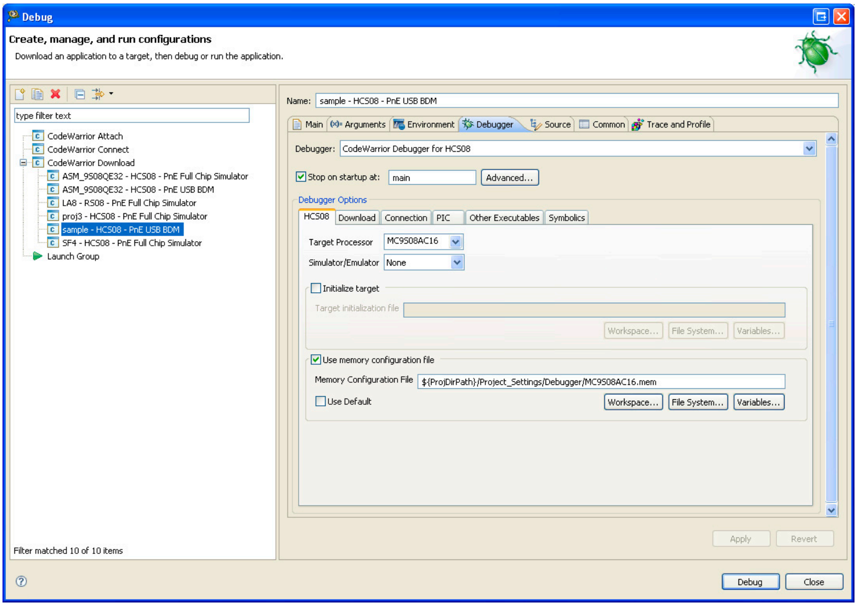


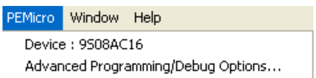
Figure 6.58 Debug Configuration Dialog Box



Active Mode Menu Options

When the microprocessor is connected, the active mode menu shows the name of the microprocessor and gives you the access to the Advanced Programming/Debug Options. When the microprocessor is not connected, the menu is not available.

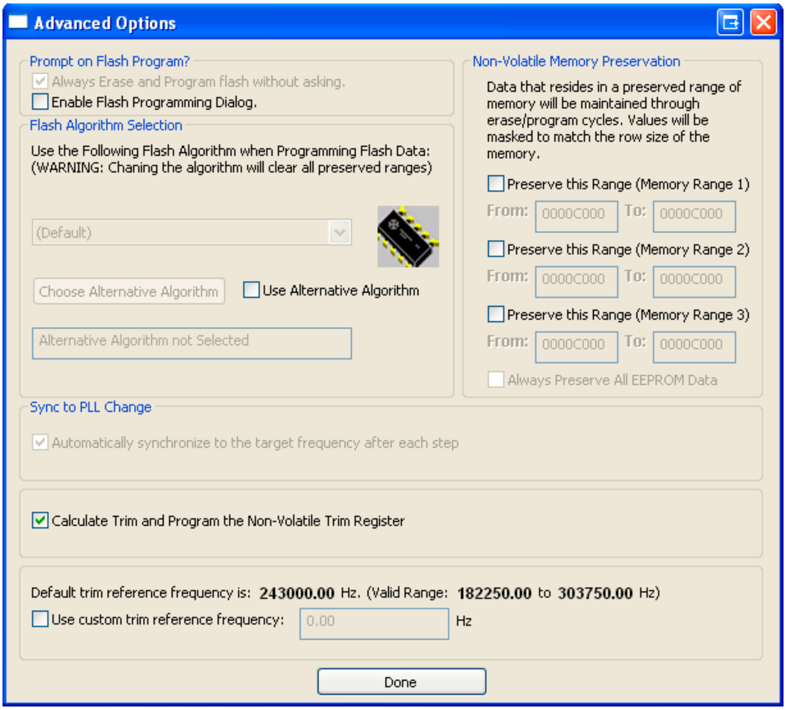
Figure 6.59 Additional Connection Menu Options



Advanced Programming/Debug Options

The Advanced Programming/Debug Options menu option takes you to the Advanced Options dialog box, where you can configure the software settings for the flash programming procedure.

Figure 6.60 Advanced Options Dialog Box



Prompt on Flash Program Checkbox

Setting the "Always Erase and Program flash without asking" checkbox in this dialog box allows the software to transparently program the microprocessor every time the debugger is started. Setting the "Enable Flash Programming Dialog" lets you view the steps taken by the Flash Programmer.

Trim Options

The Calculate Trim and Program the Non-Volatile Trim Register checkbox enables automatic calculation and programming of the trim value to a designated Non-Volatile memory location.

Non-Volatile Memory Preservation

You have the option of preserving up to three independent ranges of non-volatile memory (on devices with EEPROM, the entire EEPROM array may optionally be preserved as well). Ranges that are designated as “preserved” are read before an erase, and re-programmed immediately afterwards, thereby preserving the data in these ranges. Any attempt to program data into a preserved range is ignored. When entering an address into the preserved range field (hexadecimal input is expected), the values are masked according to the row size of the device. This ensures that the reprogramming of preserved data does not cause any conditions that disturb programming.

Sync to PLL Change Checkbox

The debugger requires that Sync to PLL Change be selected to synchronize the software/hardware connection with the microprocessor during the Flash erasing/programming procedure. This option is always enabled for M68HCS08 devices.

Trim Control

The Use custom trim reference frequency option lets you select a custom trim value for the target device (valid only for devices with an Internal Clock). The allowable trim value is limited only by the device itself; you can input any value within the valid internal clock frequency range. Note that the valid internal clock frequency range and the default trim value for the currently selected device/algorithm are displayed as well. For more information about the specific functionality of the internal clock source, see the Freescale Data Sheet for your specific device.

Alternative Algorithm Functionality

Once you create a project for a specific HCS08/RS08 microprocessor, the debugger specifies a default algorithm to use during all Flash programming operations. The debugger uses this algorithm for nearly all programming requirements. The default algorithm can be found in the `<CW_Install>/prog/P&E directory`.

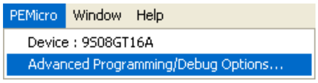
However, you can override the default algorithm via the Alternative Algorithm function, located in the Advanced Programming/Debug Options menu. This feature can be used to select a custom programming algorithm, or select another one of P&E's many programming algorithms for use with a specific project.

TIP Selecting a wrong programming algorithm may damage you device, lead to under/over programming situations, or simply not program portions of the project file. Therefore it is recommended to use the default algorithm unless there is a compelling reason to do otherwise.

Use these steps to override the default algorithm:

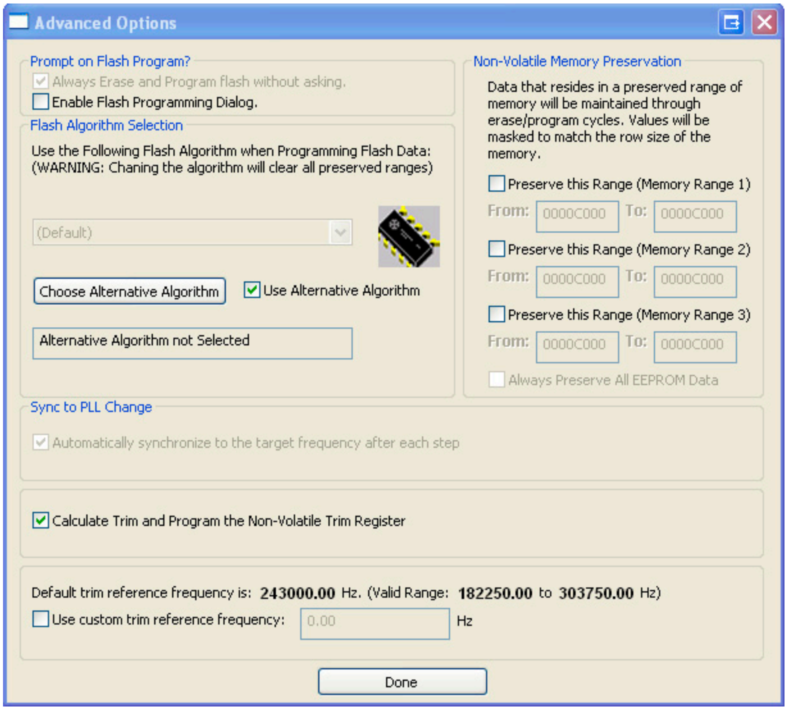
1. Select the Advanced Programming/Debug Options selection from the PEMicro menu.

Figure 6.61 Advanced Programming/Debug Options Menu Selection



2. Check the **Use Alternative Algorithm** checkbox.

Figure 6.62 Advanced Options - Alternative Algorithm Checkbox



3. Click the **Choose Alternative Algorithm** button, which lets you browse for an alternative algorithm.

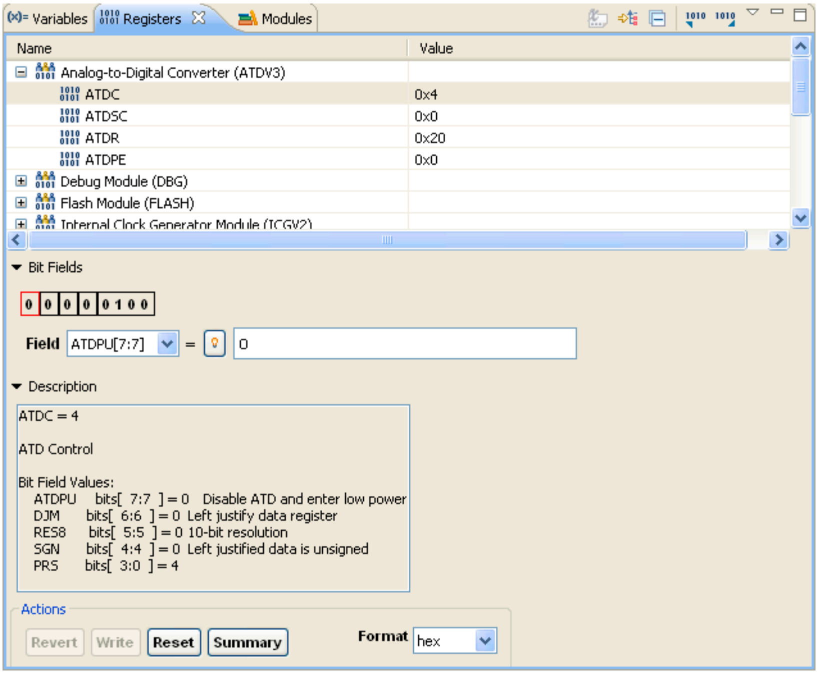
4. Once you select the alternative algorithm, the name of the algorithm along with its full path appears in the text field below the Choose Alternative Algorithm button.

At this point, the current project performs all future Flash programming operations using the alternative algorithm. You may revert to the default algorithm at any time by clearing the Use Alternative Algorithm checkbox.

View Register Files Option

The **Register Files** tab in the debugger gives you the option of viewing and editing the register files. If register files are available for the device that you have chosen, the Registers tab in the debugger (see Figure 6.63) is populated.

Figure 6.63 Debug Register File Tab



To view the Register Files of the device that you have chosen:

1. Find the debugger icon and click it to enter debug mode and open the debugging window
2. Select the “Registers” tab on the right side of the debugging window, or select the Window menu -> Show View -> Registers to open the Register window.
3. Expand a module by clicking on the plus/minus button to view the registers within the module
4. Select a desired register to view its bit fields and bit descriptions in the window below.

In the Registers tab, all of the available modules are listed, and under each module all of its registers are displayed with their current values. Selecting a register brings up the Bit field, Actions box, and Description box. In the Bit field, you can view the bits in binary format. The Actions box is used when a bit needs to be modified. You can revert changes, write a new value, reset all of the bits, and view a summary of the register. You can also change the format of the value written in the bit field. The Description box displays the values and significance of each bit in the register. When a bit is modified, the description will change.

You can modify each bit by selecting it in the drop-down list under the Bit field, or by clicking the bit on the Bit field. Note that bits that are read-only will not allow you to modify the bit values. A new value can be written into the edit box, or you can click the light bulb button next to the edit box to view all of the options, and then double-click the changes.

Socket Programming Options Button

The Programming Adapter Connections dialog assistant is designed to facilitate the use of an extensive set of Freescale programming socket adapters. This dialog can be used to get a graphical representation of the signals that must be connected from the BDM header to the pins of the microprocessor. Making these connections lets you establish communication with a given device via a hardware debug interface.

The Socket Programming Options button in the BDM Launch Configuration dialog box (see Figure 6.64) takes you to the Programming Adapter Connections dialog box (see Figure 6.65), where you can look up pin connection settings for the selected package type of the target processor. Only available package types for each target processor are listed in the Package drop-down list. Once you have selected a package type, the Adapter Information section provides the part number of the adapter board, the socket number where the processor should be placed, and a pair of header numbers that indicate which connections should be made between them. Immediately below the Adapter Information section you will find a pin layout that displays the required connections between the aforementioned pair of headers.

Figure 6.64 HCS08 BDM Launch Configuration Dialog Box

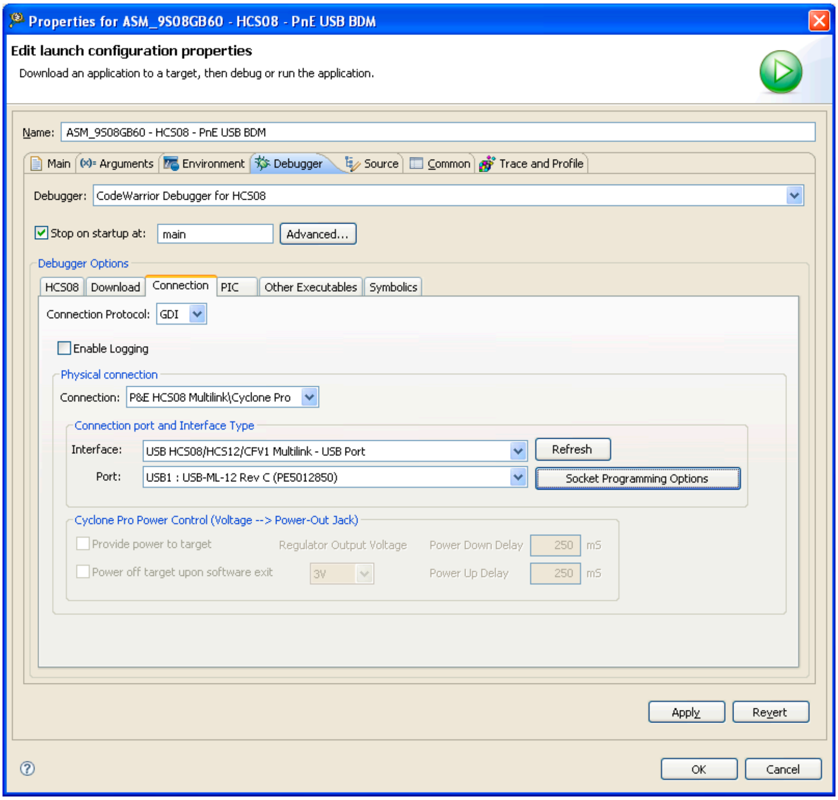
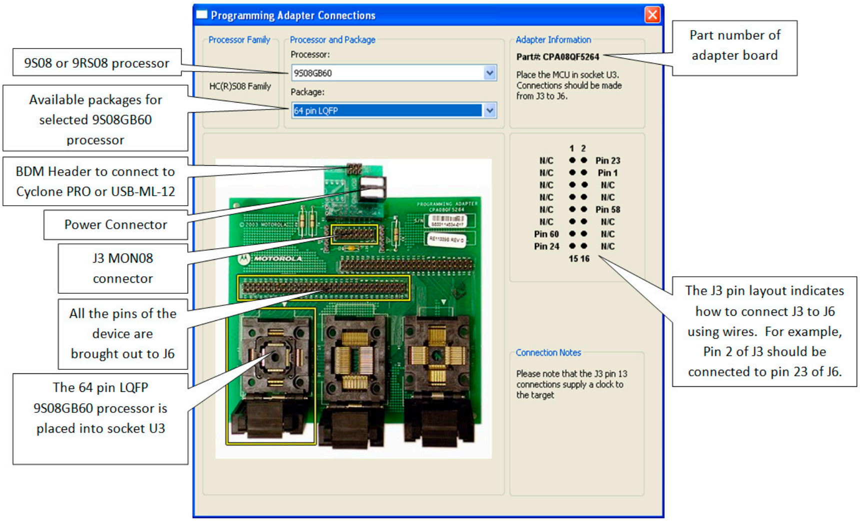


Figure 6.65 Programming Adapter Connections Dialog Box



P&E HCS08 Multilink\Cyclone Pro Connection-Specific Options

This topic describes the connection-specific options. The connections include:

- P&E USB BDM Multilink
- P&E Cyclone Pro Serial
- P&E Cyclone PRO USB
- P&E Cyclone PRO TCP-IP

P&E USB BDM Multilink

The P&E USB BDM Multilink Connection setting permits a connection to USB BDM Multilink devices. P&E USB BDM Multilink mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

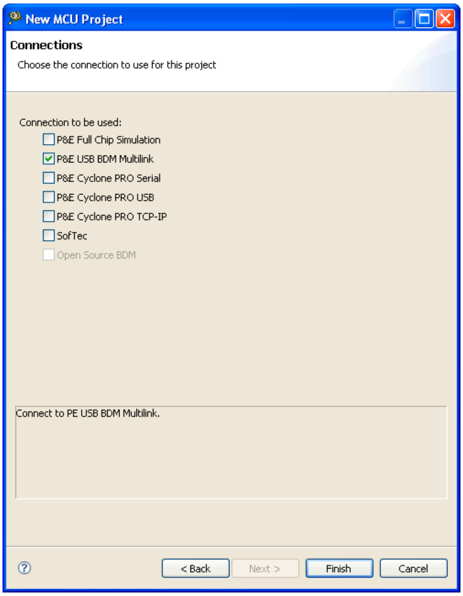
To select P&E USB BDM Multilink as the debugger connection:

1. Select **Project > Change Device/Connection** from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the New Project Name text box. By default, it is the existing project name.

NOTE Clear the Use default location checkbox and click Browse to specify a different location for the new project. By default, the Use default location checkbox is checked.

3. Click Next. The **Device and Connectio**n page appears.
4. Expand the **HCS08** tree control and select the derivative or board you would like to use. For example, select **HCS08 > HCS08D Family > 9S08DE32**.
5. Click **Next**. The **Connections** page appears.
6. Check the **P&E USB BDM Multilink** checkbox. See Figure 6.66.

Figure 6.66 HCS08 P&E USB BDM Multilink Selected



7. Click Finish.

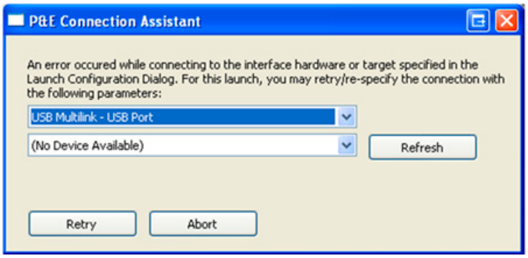
The wizard creates a project for the HCS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E USB BDM Multilink as your debugger connection:

1. Select **USB Multilink – USB Port** from the first drop-down list and click Refresh. See Figure 6.67.
2. Using the second drop-down list, select the port on which the interface is connected.
3. Click the Retry button

Figure 6.67 HCS08 Connection Assistant Interface Selected



P&E Cyclone Pro Serial

The P&E Cyclone Pro Serial Connection setting permits a connection to Cyclone Pro Serial devices. P&E Cyclone Pro Serial mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

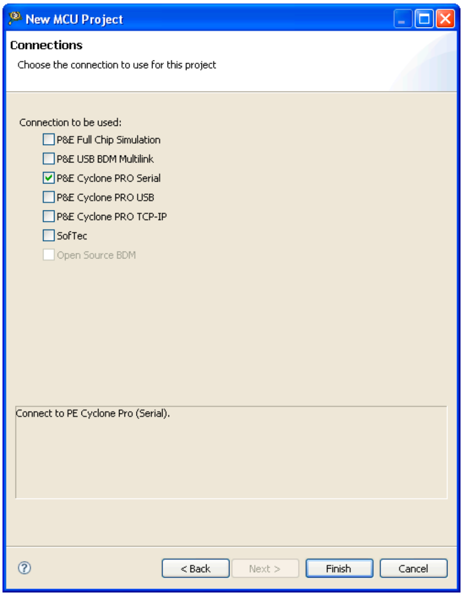
To select P&E Cyclone Pro Serial as the debugger connection:

1. Select **Project > Change Device/Connection** from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location** checkbox is checked.

3. Click **Next**. The **Device and Connection** page appears.
4. Expand the **HCS08** tree control and select the derivative or board you would like to use. For example, select **HCS08 > HCS08D Family > 9S08DE32**.
5. Click **Next**. The **Connections** page appears.
6. Check the **P&E Cyclone Pro Serial** checkbox. See Figure 6.68.

Figure 6.68 HCS08 P&E Cyclone Pro Serial Selected



7. Click **Finish.**

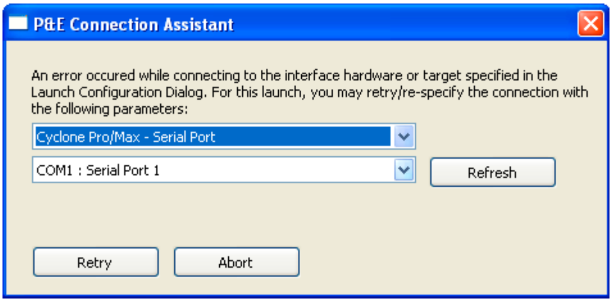
The wizard creates a project for the HCS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro Serial as your debugger connection:

1. Select **USB Multilink – USB Port** from the first drop-down list and click Refresh. See Figure 6.69.
2. Using the second drop-down list, select the port on which the interface is connected.
3. Click the **Retry** button

Figure 6.69 HCS08 Connection Assistant Interface Selected



P&E Cyclone PRO USB

The P&E Cyclone Pro USB Connection setting permits a connection to Cyclone Pro USB devices. P&E Cyclone Pro USB mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

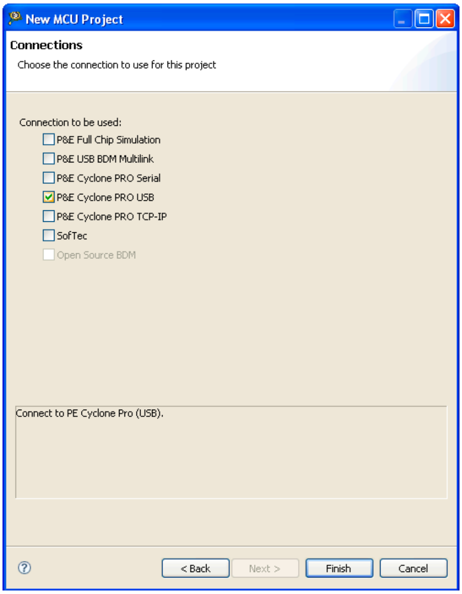
To select P&E Cyclone Pro USB as the debugger connection:

1. Select **Project > Change Device/Connection** from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the New Project Name text box. By default, it is the existing project name.

NOTE Clear the Use default location checkbox and click Browse to specify a different location for the new project. By default, the Use default location checkbox is checked.

3. Click **Next**. The **Device and Connection** page appears.
4. Expand the **HCS08** tree control and select the derivative or board you would like to use. For example, select **HCS08 > HCS08D Family > 9S08DE32**.
5. Click **Next**. The **Connections** page appears.
6. Check the **P&E Cyclone Pro USB** checkbox. See Figure 6.70.

Figure 6.70 HCS08 P&E Cyclone Pro USB Selected



7. Click **Finish**.

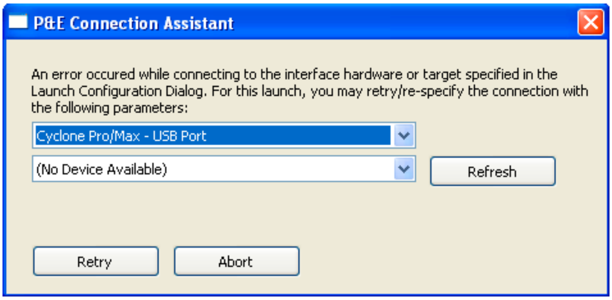
The wizard creates a project for the HCS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro USB as your debugger connection:

1. Select **USB Multilink – USB Port** from the first drop-down list and click Refresh. See Figure 6.71.
2. Using the second drop-down list, select the port on which the interface is connected.
3. Click the **Retry** button

Figure 6.71 HCS08 Connection Assistant Interface Selected



P&E Cyclone PRO TCP-IP

The P&E Cyclone Pro TCP-IP Connection setting permits a connection to Cyclone Pro TCP-IP devices. P&E Cyclone Pro TCP-IP mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

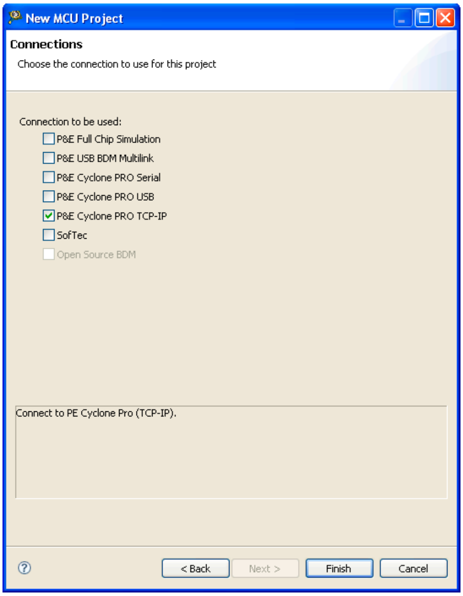
To select P&E Cyclone Pro TCP-IP as the debugger connection:

1. Select **Project > Change Device/Connection** from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location checkbox** is checked.

3. Click **Next**. The **Device and Connection** page appears.
4. Expand the **HCS08 t**ree control and select the derivative or board you would like to use. For example, select **HCS08 > HCS08D Family > 9S08DE32**.
5. Click **Next**. The **Connections** page appears.
6. Check the **P&E Cyclone Pro TCP-IP** checkbox. See Figure 6.72.

Figure 6.72 HCS08 P&E Cyclone Pro TCP-IP Selected



7. Click **Finish.**

The wizard creates a project for the HCS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

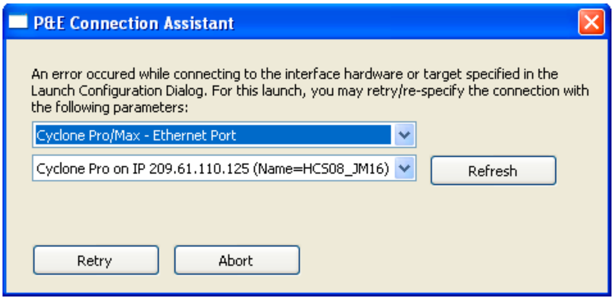
The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro TCP-IP as your debugger connection:

1. Select **USB Multilink – USB Port** from the first drop-down list and click **Refresh**. See Figure 6.73.

2. Using the second drop-down list, select the port on which the interface is connected.

3. Click the **Retry** button

Figure 6.73 HCS08 Connection Assistant Interface Selected



Softec

This topic will contain information specific to Softec connection.

Open Source BDM

This topic will contain information specific to OSBDM connection.

7 Connections — RS08

For the IDE to communicate with the target hardware, you must specify several key items: the debugger protocol, a connection type, and any connection parameters. You enter the first two items of information using options in the **Connection** tab. The **Connection** tab is located in the **Debugger** tab of the **Debug** window. These options are:

- The **Connection Protocol** option determines what *debugger protocol* the debugger uses to communicate with the target.
- The **Physical Connection** option specifies the hardware probe or *connection type* that physically connects the workstation hosting CodeWarrior to the target board under debug. After you make the option of physical connection, the view changes to display configuration options specific for the hardware probe.

You use the options in the revised view to configure the third item, the *connection parameters*.

The topics in this chapter discuss the features and settings of the connections that interface the CodeWarrior debugger with the RS08-based bare board target.

The topics of this chapter are:

- Changing Connection in IDE
- P&E Full Chip Simulation
- P&E RS08 Multilink\Cyclone Pro
- Softec
- Open Source BDM

Changing Connection in IDE

Full Chip Simulation (FCS) connection runs a complete simulation of all processor peripherals and I/O on your personal computer. Thus, when debugging an FCS project for a selected derivative it is not necessary to connect your PC with a Microcontrollers development or target board.

To select Full Chip Simulation as the debugger connection:

1. Select **Project > Change Device/Connection** from the IDE menu bar.

   The **Device/Connection Change** wizard appears.

2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location** checkbox is checked.

3. Click **Next**.

   The **Device and Connection** page appears.

4. Expand the RS08 tree control and select the derivative or board you would like to use. For example, select `RS08 > RS08KA Family > MC9RS08KA1`.

5. Click **Next**.

   The **Connections** page appears.

6. Check the **P&E Full Chip Simulation** checkbox.

NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

7. Click **Finish**.

   The wizard creates a simulator project for the HCS08 architecture according to your specifications. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

8. Build the new project. For more information, refer to the topic Building Projects.

9. Debug the new project. For more information, refer to the topic Debugging Projects.

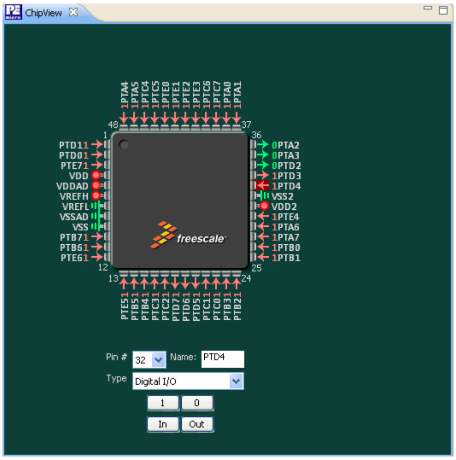
P&E Full Chip Simulation

This topic explains Chip View, which is a time-saving FCS feature, and also describes the settings of the connections that interface the CodeWarrior debugger with the RS08 simulator.

Chip View

Chip View is an innovative feature designed to simplify Full Chip Simulation (FCS) and In-Circuit Debugging (ICD) sessions. The **Chip View** provides instantaneous access to internal modules of the chip and lets you instantly change any of the features by clicking them. Each pin features the current pin direction, input/output value, and the name of the signal that reflects the current module that controls it. These data features are updated every 50ms throughout a running FCS or ICD session.

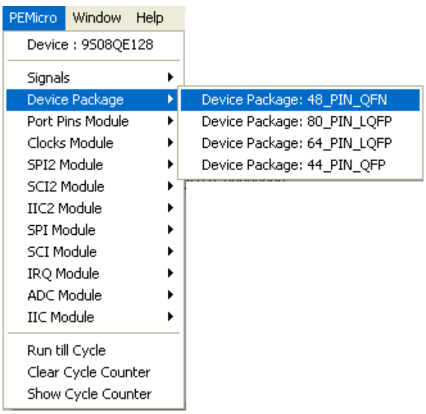
Figure 7.1 Chip View



To open **Chip View**, perform these steps.

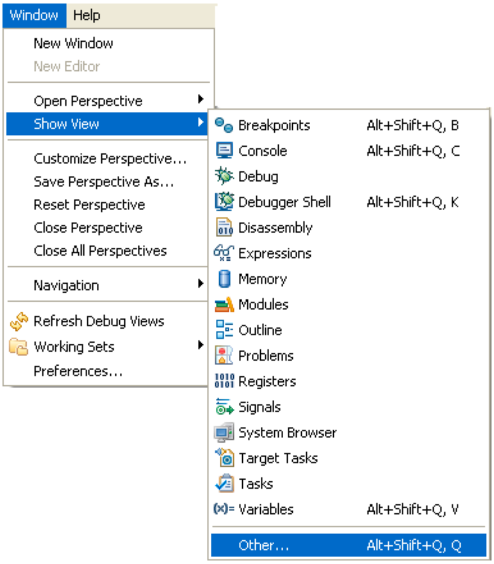
1. From the IDE menu bar, select **PEMicro > Device Package > Device Package:<** *Pin*>, where < *Pin*> is the pin package you would like to work with. (See Figure 7.2). The Device Package can be changed before or after the Chip View window is invoked within the CodeWarrior IDE.

Figure 7.2 Device Package Extended Menu



2. From the IDE menu bar, select **Window > Show View > Others** (Figure 7.3).

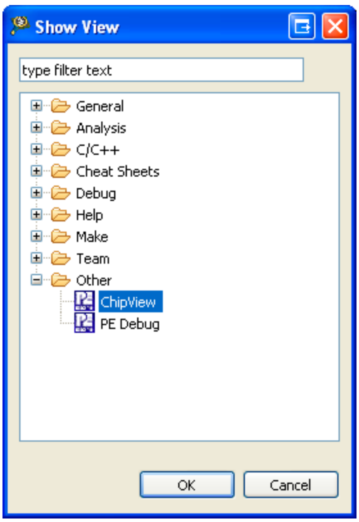
Figure 7.3 Show View Extended Menu



The **Show View** dialog box appears.

3. Expand **Other** and select **Chip View** (Figure 7.4).

Figure 7.4 Show View Menu



4. To change direction and values of the pin, double-click on the corresponding arrow or the number value. Details are listed below.

NOTE If you close the **Chip View** window during debug session, you will not be able to access to the Chip View.You must reopen the **Chip View** window and restart the current debugging session to open the **Chip View** window again. Closing **Chip View** should slightly improve performance during existing debug session.

Chip GUI - Ports Module Support

You have the option of changing the pin's direction and values by double-clicking on the corresponding arrow or number value. Figure 7.5 is an example of what the Chip View may look like before any changes are made. When the pin direction is input, the pin will display the current pin input value. When the pin direction is output, you have the option of double-clicking the number value to control the output value for the pin. Figure 7.6 is an example of the PTA2 pin value being changed from 0 to 1 by double-clicking on the number value.

Figure 7.5 Chip View Display Before Change

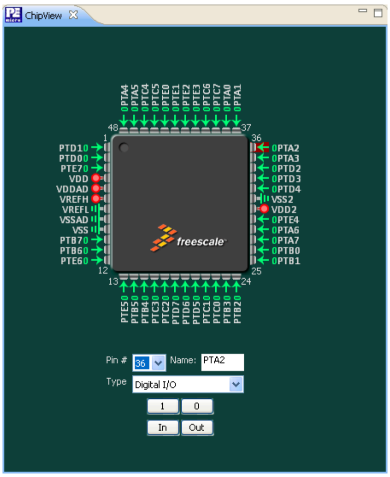
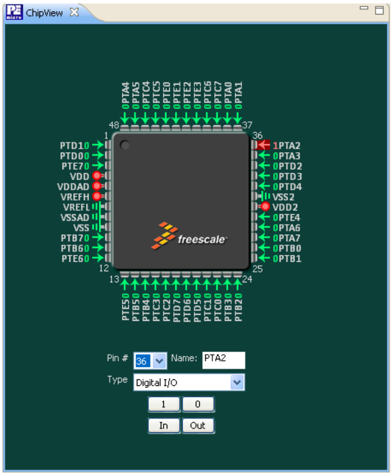
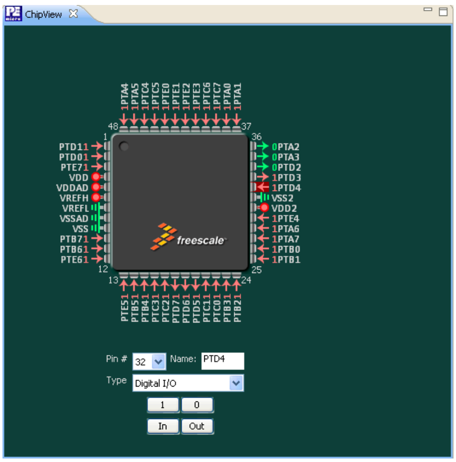


Figure 7.6 Chip View Display After Change



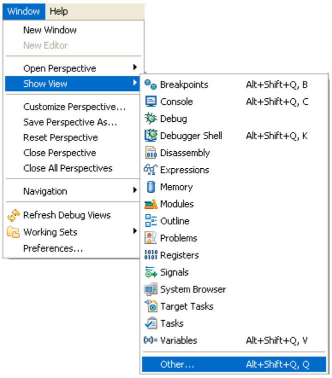
When you double-click a pin's value or direction, a pin configuration dialog appears beneath the Chip View diagram (Figure 7.7). In the pin configuration options, you have the option of changing analog and digital I/O settings for a given pin. You can select a pin from the pin-number drop-down box, select between analog and digital signals, and switch pin directions. For the digital I/O signal, you can switch between high or low signals (Figure 7.7).

Figure 7.7 Chip View with Digital Pin Configuration Options



For the Analog input signal, you can use the slider to change the analog signal value (Figure 7.8).

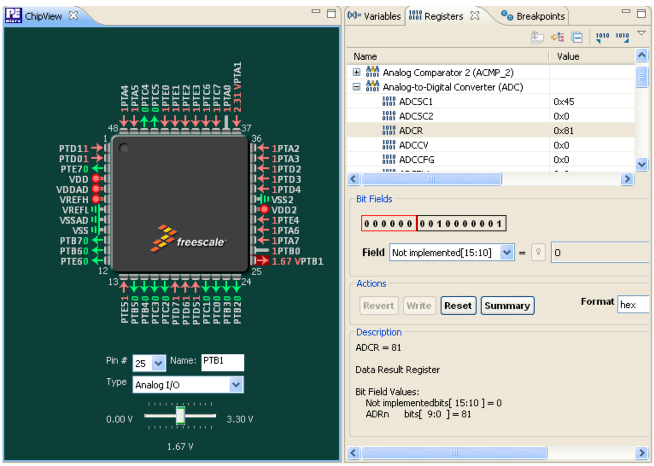
Figure 7.8 Chip View with Analog Pin Configuration Options



Chip GUI - Analog to Digital Module Support

The Analog to Digital (ATD) Module has a higher priority than the General Pin I/O module. Therefore, if you have an ATD channel enabled and the ATD input buffer is empty, current input value on a pin will be converted and displayed in the ATD data conversion register (Figure 7.9).

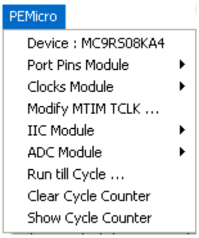
Figure 7.9 Chip View with ATD



Module Options

The PEMicro menu (Figure 7.10) includes the Full Chip Simulation options for the modules that have specialty commands associated with them for a chosen device.

Figure 7.10 PEMicro Menu



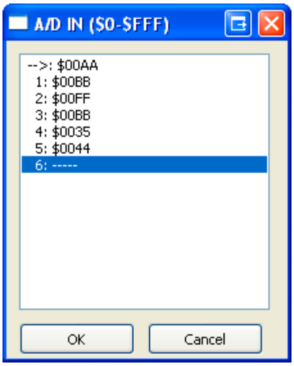
The options available are:

- ADC Module
- Internal Clock Source Module
- Inter-Integrated Circuit Module Option
- Keyboard Interrupt Module
- Liquid Crystal Display Driver Module Option
- Modulo Timer Interrupt Module
- Input/Output (I/O) Ports Module
- Serial Communications Interface Module
- Serial Peripheral Interface Module
- Timer Interface Module

ADC Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Analog to Digital Conversion (ADC) module including data input on all ADC channels, flag polling, interrupt operation, and the bus and CGMXCLK reference clock sources. FCS mode uses the buffered input structure to simulate the ADC inputs. You can queue up to 256 data values. To queue the ADC Input Data, use the ADDI command in the command prompt. If the data parameter is given, the value is placed into the next slot in the input buffer. Otherwise, if no parameter is provided, a window is displayed with the input buffer values. Input values can be entered while the window is open. An arrow points to the next value to be used as input to the ADC. The conversion takes place after a proper value is written to the ADC Status and Control register. Once the conversion occurs, the arrow moves to the next value in the ADC Buffer.

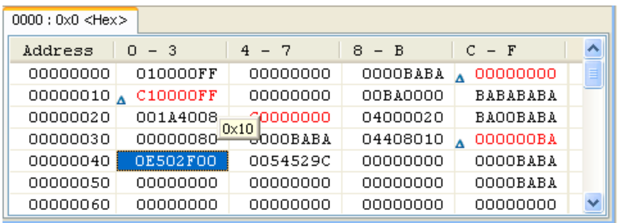
Figure 7.11 ADC IN Buffer Display



The ADCLR command can be used at any point to flush the input buffer for the ADC simulation.

After the conversion is complete, the first queued value is passed from the data buffer into the ADC data register. It can be observed in the Memory window by displaying the memory location corresponding to the ADC data register.

Figure 7.12 Memory Component Window



When the conversion is complete, FCS sets the appropriate flag. If interrupts are enabled, the Program Counter changes flow to the interrupt routine (as defined in the vector space of the MCU).

NOTE For more information on ADC configuration, refer to the Freescale user manual for your microprocessor.

ADC Module Commands

The following commands are available for the RS08/HCS08 ADC Module.

ADDI Command

The ADDI command lets you input the data into the ADC converter. If a data parameter is given, the value is placed into the next slot in the input buffer. Otherwise, if no parameter is given, a window is displayed with the input buffer values. Input values can be entered while the window is open. An arrow points to the next value to be used by the ADC. The maximum number of input values is 256 bytes.

Syntax

```
>gdi ADDI [<n>]
```

Where:

`<n>` The value to be entered into the next location in the input buffer.

Example

```
>gdi ADDI $55
```

Set the next input value to the ADDI to $55

```
>gdi ADDI
```

Pull up the data window with all the input values.

ADCLR Command

Use the ADCLR command to flush the input buffer for ADC simulation. This resets the input data buffer and clears out all values. Notice that if the ADC is currently using a value, this command does not prevent the ADC from using it. See ADDI command for information on how to access the input buffer of the ADC interface.

Syntax

```
>gdi ADCLR
```

Example

```
>gdi ADCLR
```

Clear the input buffer for ADC simulation.

Internal Clock Source Module

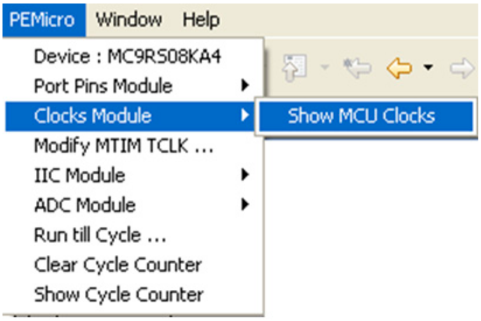
In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Internal Clock Source (ICS) Module, including:

- Phase Locked Loop (PLL) generation
- Automatic lock detection
- Interrupt
- Acquisition

- Tracking
- Flag polling

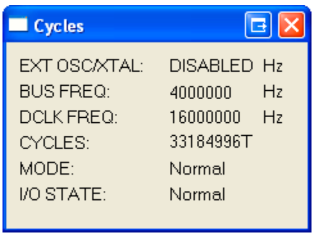
FCS mode uses a simulated External Oscillator Frequency change command (XTAL) lets you input the desired XTAL value. To check the current value of the External Oscillator, Bus Frequency and ICSCLK Frequency, open the RS08FCS menu and select Clocks Module > Show MCU Clocks.

Figure 7.13 Clocks Module Extended Menu



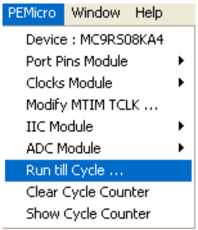
Once you select the MCU Clocks menu, the Cycles window displays all of the aforementioned Clock Frequencies, or you can select the Show Cycle Counter option within the FCS menu to get the same window.

Figure 7.14 Frequency Display



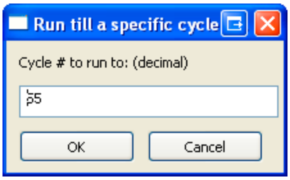
Within the FCS menu, you can select the Run till Cycle option, which lets you begin code execution and stop execution when the specified cycle count is reached. Note that the parameter given is not the number of cycles that executed, but rather the total cycle-count of the simulator (displayed in the Register Window).

Figure 7.15 Run till Cycle command



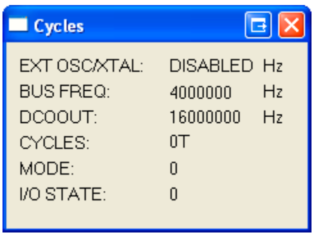
This command is extremely useful for verifying specific timings of a given event, running until a given event is complete, or just before it completes to enable stepping through the event or any application where cycle-timed execution is desired.

Figure 7.16 Run till Cycle Dialog Box



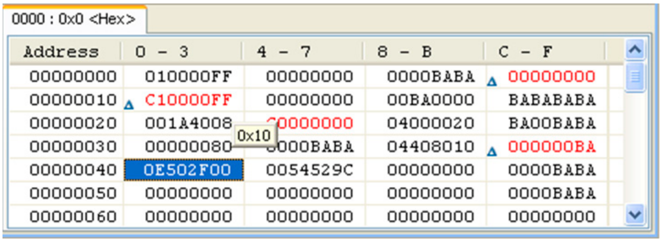
You can also select the Clear Cycle Counter option within the FCS menu, which clears the cycle counter. If you select the Show Cycle Counter option within the FCS menu, you can check to make sure that the cycle counter is zero.

Figure 7.17 Cycle Counter Dialog Box with Cleared Counter



Once the ICG is properly configured, you can monitor the status of the PLL by polling the corresponding flag. If PLL interrupt is enabled, FCS jumps to an appropriate subroutine, as long as the interrupt vector is properly defined. To observe the flag going up as a result of the corresponding CPU event, situate your Memory window on the memory location of the ICG Status and Control register.

Figure 7.18 Memory Window



For more information on how to properly configure Clock Generation, refer to the Freescale reference manual for your microprocessor.

Internal Clock Source Commands

The following commands are available for the RS08 Internal Clock Source Module.

XTAL Command

Use the XTAL command to change the value of the simulated external oscillator. This in turn affects the input to the PLL/DCO, and therefore the bus frequency. The P&E simulator is a cycle-based simulator, so changing the XTAL value does not affect the speed of simulation. It does, however, affect the ratio in which peripherals receive cycles. Certain peripherals that run directly from the XTAL will run at different speeds than those that run from the bus clock.

Syntax

```
>gdi XTAL <n>
```

Where:

• `<n>`, by default, is a hexadecimal number, representing the simulated frequency of an external oscillator. Adding the suffix `'t'` to the `'n'` parameter forces the input value to be interpreted as base 10.

Example

```
>gdi XTAL
```

Brings up an input window. The default base for this input value is 10. However, this value can be forced to a hexadecimal format through use of the suffix `'h'`.

Inter-Integrated Circuit Module Option

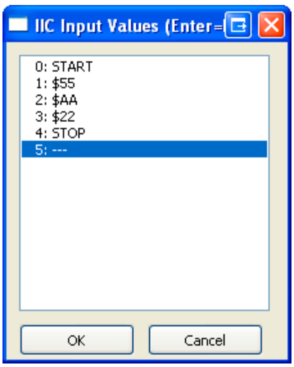
In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Inter-Integrated Circuit (IIC) module including:

- Flag polling
- Interrupt enabled mode
- Transmission and reception of external data
- Master and slave modes of operation
- START and STOP signal generation detection
- Acknowledge bit generation detection

FCS mode uses the buffered input/output structure to simulate IIC inputs. You can queue up to 256 data bytes into the input buffer. The output buffer of the USB module can also hold 256 output bytes. To queue the IIC Input Packets, use the IICDI <...> command in the command prompt. For a more detailed description of the command, refer to the IIC Commands section. If the IIC packet parameters are properly defined, the packet is placed into the next slot in the input buffer. Otherwise, if no parameters are provided, an IIC Input Buffer window is displayed.

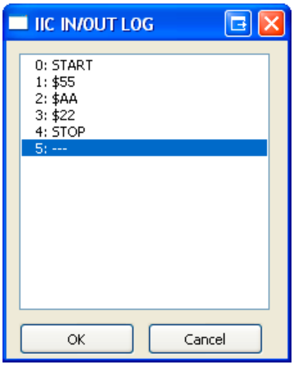
You can enter different IIC packet parameters while the window is open, including START, STOP, ACK, NACK and data bytes. An arrow points to the next byte to be used as input to the IIC. The data from the IIC input buffer is written to the IIC module registers once the IIC module is turned on and properly configured for receiving data from an external IIC device. Once simulation of the data transmission is over, the arrow moves to the next value in the IIC Input Buffer.

Figure 7.19 IIC Input Buffer Display



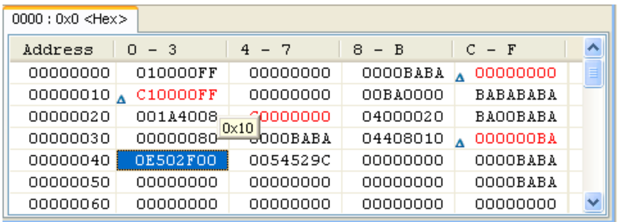
The IIC data input/output log buffer simulation lets you gain access to the past 256 IIC data bytes that have been shifted in and out of the module. To bring up the IIC IN/OUT LOG buffer dialog box, use the IICDO command.

Figure 7.20 IIC IN/OUT LOG Buffer Display



The IICCLR command may be used at any point to flush the input as well as input/output log IIC buffers. After the IIC simulated input is received, the first queued-in data byte is passed from the data buffer into the corresponding IIC module registers. It can be observed in the Memory window by displaying the appropriate register location there.

Figure 7.21 Memory Component Window



You can also observe different IIC flags in the Memory window. If you run the module in Flag Polling mode, poll the flag corresponding to the expected IIC event. If the IIC interrupts are enabled, FCS jumps to an appropriate subroutine as long as the IIC interrupt vectors are properly defined.

NOTE For more information on how to configure IIC module for desired operation, refer to the Freescale user manual for your microprocessor.

Inter-Integrated Circuit Module Commands

The following commands are available for the RS08 Inter-Integrated Circuit (IIC) module. Command function is identical even though the module names differ.

IICDI Command

The IICDI command lets you input data into a buffer of data to shift into the IIC module when it receives data from an external device. If a data parameter is given, the value is placed into the next slot in the input buffer. Otherwise, if no parameter is given, a window is displayed with the input buffer values. Input values can be entered while the window is open. The maximum number of input values is 256. This command is useful for either inputting response data from a slave target or for inputting data packets from an external master. Note that when the microprocessor attempts to read an acknowledge from an external device, and the next value in the buffer is neither ACK nor NACK, the microprocessor automatically receives an ACK signal (i.e. assumes ACK unless NACK is specified).

Syntax

```
>gdi IICDI [<n>][START][STOP][ACK][NACK]
```

Where:

- `<n>` indicates the value to be entered into the next location in the input buffer
- `START` indicates the incoming START signal
- `STOP` indicates the incoming STOP signal
- `ACK` corresponds to ACK signal
- `NACK` corresponds to NACK signal

NOTE For a detailed description of the IIC protocol and a proper way to configure the IIC module, refer to the Freescale user manual for your microprocessor.

Example

```
>gdi IICDI
```

Pulls up the data window with all the input values

```
>gdi IICDI 22 33
```

This is an example of data being returned from a slave device. Once the MCU transmits a start signal and the target address, it receives an ACK from the slave device. An ACK is implied unless a NACK is specified via the IICDI command. The next two data bytes read are 22 and 23. If the microprocessor attempts to read another byte, it gets an $FF value followed by a NACK signal (NACK because nothing remains in the input buffer). The receiving device then generates a STOP signal. A more exact input from a device designed to return two bytes is:

```
>gdi IICDI ACK 22 ACK 23 NACK
```

IIC in master mode transmits to a slave:

• If the slave device acknowledges all output bytes of the transmitting device, there is no need to specify an input packet. If the master device is going to transmit an address and two bytes, the following packet is equivalent to no packet:

```
>gdi IICDI ACK ACK ACK
```

• If, however, the slave receiver is designed to generate a NACK signal after the second received data byte, the proper response packet is:

```
>gdi IICDI ACK ACK NACK
```

• The address result being the first ACK, the first data result being the second ACK, and the second data byte being the NACK.

IIC in MASTER mode is not acknowledged by any Slave:

```
>gdi IICDI NACK
```

• If the NACK signal is entered before the master device transmits a START signal, then the master device gets a NACK when it tries to read an acknowledge after the address is output. The master device then generates a STOP signal and releases the BUS.

IIC in SLAVE mode receives a Write from an external Master:

This example is for an external master that is writing to the microprocessor configured to simulate the slave mode operation. The packet contains both START and STOP signals which puts the simulated device into the slave mode.

```
>gdi IICDI START 55 AA 22 STOP
```

This input adds five values to the input queue, which is a packet from an external master, including the following procedure values:

• A start signal comes in

• The address $55 comes in, specifying a write (slave receive). The Address Register in the current simulated device has been previously set to $55

• The data byte $AA comes in

• The data byte $22 comes in

• A STOP signal comes in

IICDO Command

The IICDO command displays a window, which shows data shifted in as well as shifted out of the IIC peripheral. An arrow points to the last output value transmitted/received. The maximum number of output values that the buffer can hold is 256.

Syntax

```
>gdi IICDO
```

Example

`>gdi IICDO`

View data from the input/output log buffer for IIC simulation.

IICCLR Command

Use the IICCLR command to flush the input and output buffers for IIC simulation. This resets the buffers and clears all values. Notice that if the IIC is currently shifting a value, this command does not prevent the IIC from finishing the transfer.

Syntax

`>gdi IICCLR`

Example

`>gdi IICCLR`

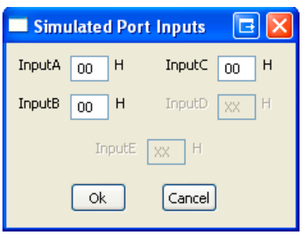
Clear input and output buffers for IIC simulation.

Keyboard Interrupt Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Keyboard Interrupt (KBI) module, including the edge-only, edge and level interrupt, and flag polling modes of operation. FCS mode uses simulated port inputs to trigger the KBI event from the proper I/O port pin.

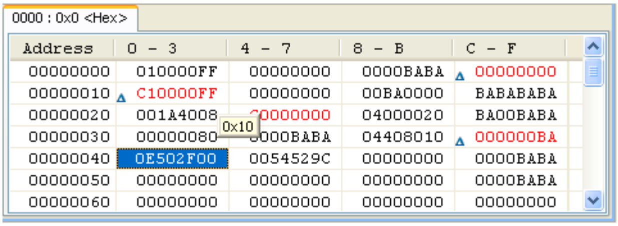
To define an input state of the specific port, enter the INPUT<x> <n> command in the Command window. The <x> represents the corresponding I/O port, while <n> stands for the input value to write to this port. At the same time, you can use the INPUTS command to bring up the Simulated Port Inputs for all general I/O ports. It displays the current simulated values to all applicable input ports. See the documentation for Timer Module Commands for more information about the various forms of this command.

Figure 7.22 Simulated Port Inputs Dialog Box



Use the Simulated Port Inputs dialog box to reconfigure the input value to any I/O port. To trigger the event, manipulate the inputs to the port in the appropriate manner, depending on whether the KBI is configured for edge-only or edge and level. Once the KBI event takes place, you can observe the KEYF Flag bit, which is a part of the Keyboard Status and Control register, in the Memory window.

Figure 7.23 Memory Component Window



You can poll the KBI Interrupt Pending flag if the Polling Mode is simulated. In Interrupt Mode, the simulator branches to an appropriate interrupt subroutine as long as the KBI interrupt vector is properly configured.

NOTE For more information on KBI configuration, refer to the Freescale user manual for your microprocessor.

Keyboard Interrupt Commands

Use the following commands for Keyboard interrupt manipulation.

INPUT<x> Command

The INPUT<x> command sets the simulated inputs to port <x>. The CPU reads this input value when port <x> is set as an input port.

Syntax

```
>gdi INPUT<x> <n>
```

Where:

<x> is the letter representing corresponding port

<n> is an eight-bit simulated value for port <x>

Example

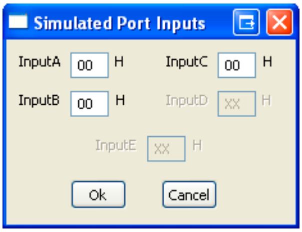
```
>gdi INPUTA AA
```

Simulate the input AA on port A.

INPUTS Command

In FCS and CPU-Only Simulation mode, the INPUTS command opens the Simulated Port Inputs dialog box shown in Figure 7.24. You may then use this box to specify the input states of port pins and IRQ.

Figure 7.24 Simulated Port Inputs Dialog Box



When using In-Circuit Simulation mode, the INPUTS command shows the simulated input values to any applicable port.

Syntax

```
>gdi INPUTS
```

Example

```
>gdi INPUTS
```

Show I/O port input values.

Liquid Crystal Display Driver Module Option

In Full Chip Simulation (FCS) Mode, this option lets you simulate all the functionality of the Liquid Crystal Display (LCD) module, including programmable LCD frame frequency, front plane pin configuration, back plane pin configuration, programmable blink frequency, and LCD interrupt flag generation. By default LCD front and back plane pins are mapped to match device use on the corresponding Freescale DEMO9RS08xx device board. These settings can be changed by you through modification of the LCDRS08V<x>_<DEVICE>.INI file, where <x> indicates the version number. This file is located in the "<*CW_Install*>\prog\P&E" folder.

Modulo Timer Interrupt Module

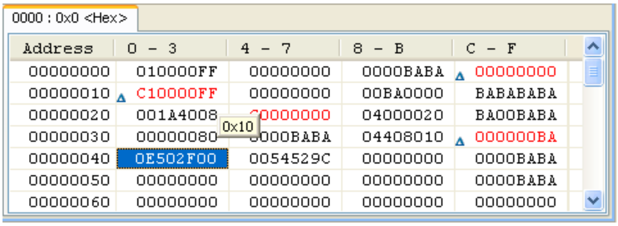
In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Modulo Timer Interrupt (MTIM) Module, including:

- Programmable MTIM clock input
- Free running or modulo up count operation
- Flag polling

- Interrupt enabled mode of operation

Once the MTIM Status and Control register properly configures the operation of the module, the MTIM Counter starts incrementing. If modulo up count operation is enabled, you can observe the MTIM overflow flag in the MTIM Status and Control register in the Memory window.

Figure 7.25 Memory Component Window

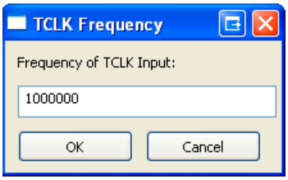


If the MTIM interrupt is enabled, the FCS jumps to an appropriate subroutine as long as the MTIM interrupt vector is properly defined.

Modify MTIM TCLK

Figure 7.26 shows the TCLK frequency dialog box.

Figure 7.26 TCLK Frequency Dialog Box



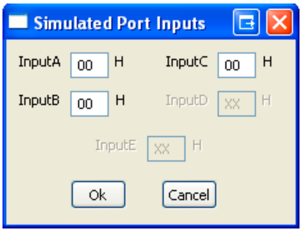
This dialog box lets you set the frequency of the TCLK signal for the MTIM peripheral. In order for this value to have any effect, the TCLK must be selected as the clock source for the MTIM.

Input/Output (I/O) Ports Module

In Full Chip Simulation (FCS) mode, this module simulates all input and output functionality of the Input/Output (I/O) Ports module. FCS mode uses a set of designated commands to simulate the input and output activity on corresponding I/O port pins. To define an input state of the specific port, write the INPUT <x> <n> command in the Command window. The <x> represents the corresponding I/O port, while the <n> stands for the input value to write to this port. At the same time, you can use the INPUTS command to bring up the Simulated Port Inputs for all general I/O ports. It displays the current simulated values to all applicable input ports.

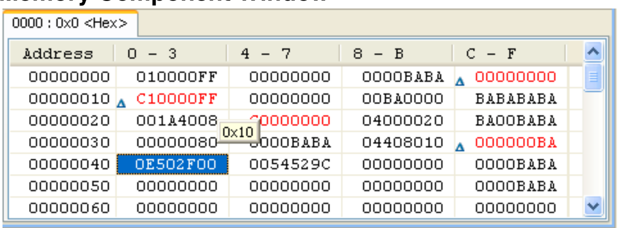
NOTE See Input/Output Ports User Commands and IRQ Commands for more information about the various forms of this command.

Figure 7.27 Simulated Port Inputs Dialog Box



Use the Simulated Port Inputs dialog box to reconfigure the input value to any I/O port. Use the INPUTS command to reconfigure the output values on any relevant I/O port. You can observe the manipulation of I/O port pins in the Memory window.

Figure 7.28 Memory Component Window



Note that if the regular I/O pins are multiplexed to be used by a different MCU Module, they might not be available for general I/O functionality.

NOTE For more information on how to properly configure I/O pins, refer to the Freescale user manual for your microprocessor.

Input/Output Ports User Commands

Use the following commands for general I/O ports manipulation.

INPUT<x> Command

The INPUT<x> command sets the simulated inputs to port <x>. The CPU reads this input value when port <x> is set as an input port.

Syntax

```
>gdi INPUT<x> <n>
```

Where:

<x> is the letter representing corresponding port

<n> Eight-bit simulated value for port <x>

Example

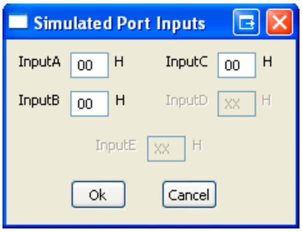
```
>gdi INPUTA AA
```

Simulate the input AA on port A.

INPUTS Command

In FCS and CPU-Only Simulation modes, the INPUTS command opens the Simulated Port Inputs dialog box shown in Figure 7.29. You may then use this box to specify the input states of port pins and IRQ.

Figure 7.29 Simulated Port Inputs Dialog Box



When using In-Circuit Simulation mode, the INPUTS command shows the simulated input values to any applicable port.

Syntax

```
>gdi INPUTS
```

Example

```
>gdi INPUTS
```

Show I/O port input values.

Serial Communications Interface Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Serial Peripheral Interface (SPI) module including:

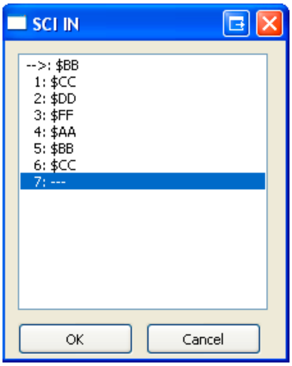
- Flag polling
- Interrupt enabled mode
- 8- or 9-bit length data codes

- Odd and even parity modes
- Transmission and reception of external data

FCS mode uses the buffered input/output structure to simulate SCI inputs. You can queue up to 256 data values into the input buffer. The output buffer of the SCI module can also hold 256 output values. To queue the SCI Input Data, use the SCDI <n> command in the command prompt. If <n> (the data parameter) is given, the value is placed into the next slot in the input buffer.

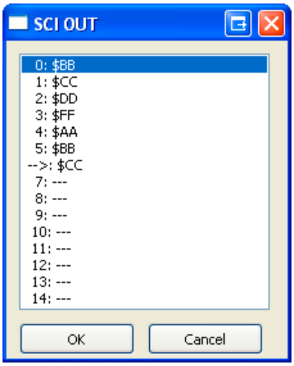
Otherwise, if no parameter is provided, a window is displayed with the input buffer values. You can enter input values while the window is open. An arrow points to the next value to be used as input to the SCI. The data from the SCI input buffer is written to the SCI data register once the SCI module has been turned on and is properly configured for receiving data from an external serial device. Once the simulation of the data transmission is over, the arrow moves to the next value in the SCI IN Buffer.

Figure 7.30 SCI IN Buffer Display



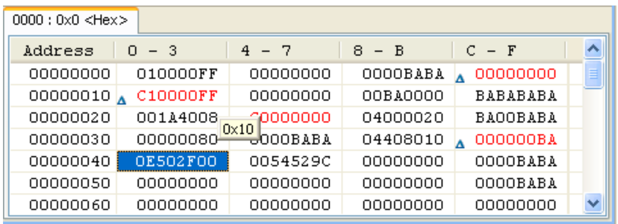
SCI Data Output Buffer simulation lets you gain access to the past 256 SCI data values transmitted out of the module. To bring up the SCI OUT buffer dialog box, use the SCDO command.

Figure 7.31 SCI OUT Buffer Display



At any point, the SCCLR command may be used to flush the input and output SCI buffers. After the SCI simulated input is received, the first queued value is passed from the data buffer into the SCI data register. It can be observed in the memory window by displaying the memory location corresponding to the SCI data register.

Figure 7.32 Memory Component Window



You can also observe different SCI flags in the Memory window. If the module is run in Flag Polling mode, poll the flag corresponding to the expected SCI event. If the SCI interrupts are enabled, the FCS jumps to an appropriate subroutine as long as the SCI interrupt vectors are properly defined.

NOTE For more information on how to configure the SCI module for desired operation, refer to the Freescale user manual for your microprocessor.

SCI Commands

Use the following commands for serial communication interface manipulation.

SCCLR Command

Use the SCCLR command to flush the input and output buffers for SCI simulation. This resets the buffers and clears out all values. Note that if the SCI is in the process of shifting a value, this command allows the SCI to finish the transfer. See the SCDI and SCDO commands for accessing the input and output buffers of the SCI interface.

Syntax

`>gdi SCCLR`

Example

`>gdi SCCLR`

Clear input and output buffer for SCI simulation

SCDI Command

The SCDI command lets you input data into the SCI. If a data parameter is given, the value is placed into the next slot in the SCI input buffer. If no parameter is given, a window displays the input buffer values. Input values can be entered while the window is open. An arrow points to the next value to be used as input to the SCI. The maximum number of input values is 256 bytes.

Syntax

`>gdi SCDI [<n>]`

Where:

`<n>` The value to be entered into the next location in the input buffer

Example

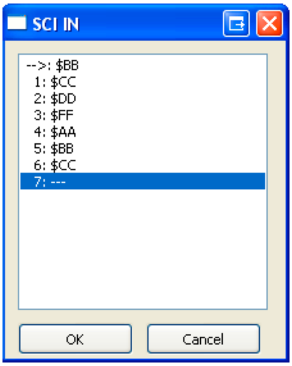
`>gdi SCDI $55`

Set the next input value to the SCI to $55

`>gdi SCDI`

Pull up the data window with all the input values.

Figure 7.33 SCI IN buffer display



SCDO Command

The SCDO command displays the output buffer from the SCI. A window is opened that shows all the data that the SCI has shifted out. An arrow points to the last output value transmitted. The maximum number of output values that the buffer holds is 256 bytes.

Syntax

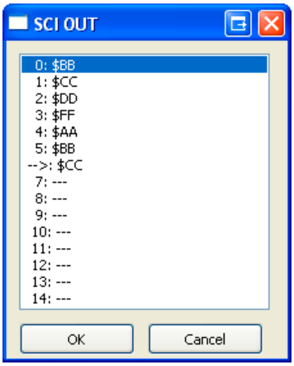
```
>gdi SCDO
```

Example

```
>gdi SCDO
```

View data from the output buffer for the SCI simulation.

Figure 7.34 SCI OUT Buffer Display



Serial Peripheral Interface Module

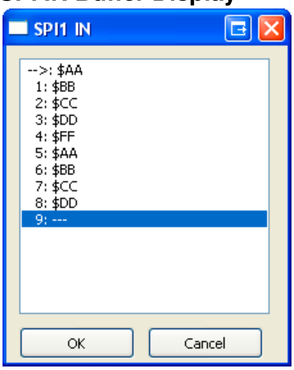
In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Serial Peripheral Interface (SPI) module including:

- Flag polling
- Interrupt enabled mode
- Master and slave modes
- Slave input clock
- Transmission and reception of external data

FCS mode uses the buffered input/output structure to simulate SPI inputs. You can queue up to 256 data values into the input buffer. The output buffer of the SPI module can also hold 256 output values. To queue the SPI Input Data, use the SPDI <n> command at the command prompt. If <n> (the data parameter) is given, the value is placed into the next slot in the input buffer.

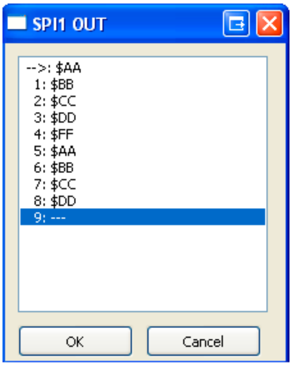
Otherwise a window is displayed with the input buffer values. You can enter input values while the window is open. An arrow points to the next input value to the SPI. The data from the SPI input buffer is written to the SPI data register once the SPI module is turned on and is properly configured for receiving data from an external serial device. Once the simulation of the data transmission is over, the arrow moves to the next value in the SPI IN Buffer.

Figure 7.35 SPI IN Buffer Display



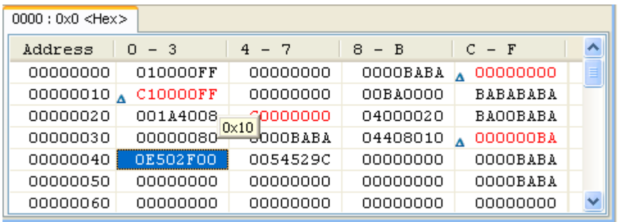
SPI data output buffer simulation lets you gain access to the past 256 SPI data values transmitted out of the module. To bring up the SPI OUT buffer dialog box, use the SPDO command.

Figure 7.36 SPI OUT Buffer Display



The SPCLR command may be used at any point to flush the input and output SPI buffers. After the SPI simulated input is received, the first queued value is passed from the data buffer into the SPI data register. It can be observed in the Memory window by displaying the memory location corresponding to the SPI data register.

Figure 7.37 Memory Component Window



You can also observe different SPI flags in the Memory window. If the module is run in Flag Polling mode, poll the flag corresponding to the expected SPI event. If the SPI interrupts are enabled, the FCS jumps to an appropriate subroutine as long as the SPI channel interrupt vectors are properly defined.

To simulate the frequency of the SPI slave input clock, use the SPFREQ <n> command. If the SPI is configured for slave mode, this command lets you enter the number of cycles <n> in the period of the input clock. If the SPFREQ command is not used, then clocking is set by the SPI control register.

NOTE For more information on how to configure the SPI module for desired operation, refer to the Freescale user manual for your microprocessor.

SPI Commands

The following serial peripheral interface commands are available for the RS08.

SPCLR Command

Use the SPCLR command to flush the input and output buffers for SPI simulation. This resets the buffers and clears out all values. Notice that if the SPI is currently shifting a value, this command allows the SPI to finish the transfer. See the SPDI and SPDO commands for accessing the input and output buffers of the SPI interface.

Syntax

```
>gdi SPCLR
```

Example

```
>gdi SPCLR
```

Clear input and output buffer for SPI simulation

SPDI Command

The SPDI command lets you input data into the SPI. If a data parameter is given, the value is placed into the next slot in the SPI input buffer. If no parameter is given, a window displays the input buffer values. You can enter input values while the window is open. An arrow points to the next input value to the SPI. The maximum number of input values is 256 bytes.

Syntax

```
>gdi SPDI [<n>]
```

Where:

`<n>` The value to be entered into the next location in the input buffer

Example

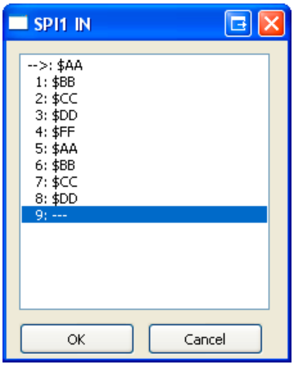
```
>gdi SPDI $55
```

Set the next input value to the SPI to $55

```
>gdi SPDI
```

Pull up the data window with all the input values.

Figure 7.38 SPI IN Buffer Display



SPDO Command

The SPDO command displays the output buffer from the SPI. A window opens that shows all the data that the SPI has shifted out. An arrow points to the last output value transmitted. The maximum number of output values that the buffer holds is 256 bytes.

Syntax

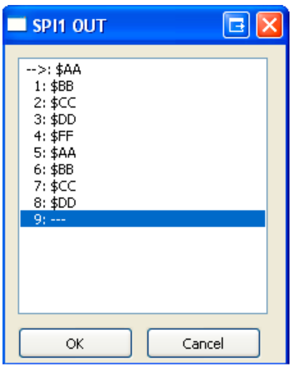
```
>gdi SPDO
```

Example

```
>gdi SPDO
```

View data from the output buffer for the SPI simulation.

Figure 7.39 SPI OUT Buffer Display



SPFREQ Command

The SPFREQ command lets you set the frequency of the SPI slave input clock. If the SPI is configured for the slave mode, this command lets you enter the number of cycles <n> per one input clock period. If no value is given, a window appears and you are prompted for a value. If this command is not used, then the clocking is assumed to be set by the SPI control register.

Syntax

```
>gdi SPFREQ [<n>]
```

Where:

`<n>` The number of cycles for the period of the input clock.

Example

```
>gdi SPFREQ 8
```

Set the period of the input slave clock to 8 cycles (total shift = 8*8 cycles per bit =

64 cycles)

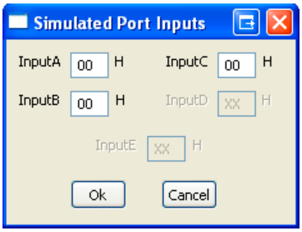
Timer Interface Module

In Full Chip Simulation (FCS) mode, this module simulates all functionality of the Timer Interface module, including:

- Input capture/output compare
- Pulse width modulation
- Internal or external clock input
- Free running or modulo up count operation
- Flag polling
- Interrupt enabled mode of operation

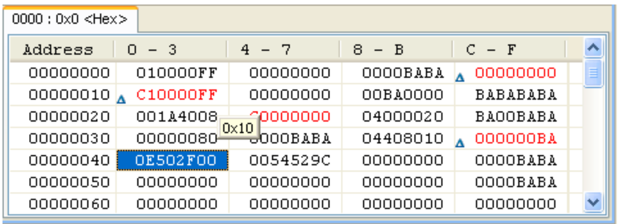
FCS mode uses the simulated port inputs to trigger the input capture on a given timer channel. To define an input state of the specific port, use the INPUT<x> <n> command in the Command window. The <x> represents the corresponding I/O port, while <n> stands for the input value to write to this port. At the same time, you can use the INPUTS command to display the Simulated Port Inputs for all general I/O ports. It displays the current simulated values to all applicable input ports. See the documentation for Timer Module Commands for more information about the various forms of this command.

Figure 7.40 Simulated Port Inputs Dialog Box



Use the Simulated Port Inputs dialog box to reconfigure the input value to any I/O port. To trigger the event, first set the port inputs high or low and then invert them to an opposite value, depending on whether the input capture is set for rising/falling edge. Once the Input Capture event takes place, you can observe the CHxF in the Channel Status and Control register in the Memory window.

Figure 7.41 Memory Component Window



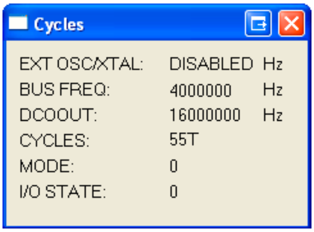
If the Timer module is configured for an Output Compare event, then once the event takes place you can observe the same CHxF Flag via the Memory window. If the timer channel interrupt is enabled, the FCS jumps to an appropriate subroutine as long as the Timer channel interrupt vector is properly defined. To observe the Timer Overflow Flag (TOF) flag being set as a result of the corresponding CPU event, situate your Memory window on the memory location of the Timer Status and Control register.

To observe the Pulse Width Modulation (PWM) operation, properly configure the Timer to operate in the Modulo up count mode, then select the toggle-on-overflow or clear/set output on compare events to create the desired duty cycle wave. Once a PWM event takes place, you can observe pin toggle/clear/set behavior corresponding to the Timer configuration in the Memory window that is displaying the I/O port associated with a given timer channel.

To observe the accuracy of the Timer module operation, you can observe the number of CPU cycles that it takes for the event to occur. The cycle counter is only incremented as you step through the code. To determine the exact amount of cycles over which the event occurs, one can either observe the cycle display in the Register window or use the built in simulation commands. To display the current number of cycles in the Command window, use the CYCLES command. To change the number of cycles in the cycle counter, use

CYCLES <n>, where <n> is the new cycle value. If the event has a pre-calculated number of cycles, use CYCLE 00 to reset the number of cycles and GOTOCYCLE <n> to run through the code until you reach the expected event.

Figure 7.42 Register Window With Cycles Display



Timer Module Commands

The following timer module commands are available for use with the HC08/HCS08 processors.

CYCLES Command

The CYCLES command changes the value of the cycles counter. The cycles counter counts the number of the processor cycles that have passed during execution. The Cycles Window shows the cycle counter. The cycle count can be useful for timing procedures.

Syntax

```
>gdi CYCLES <n>
```

Where:

`<n>` Integer value for the cycles counter

Examples

```
>gdi CYCLES 0
```

Reset cycles counter

```
>gdi CYCLES 1000
```

Set cycle counter to 1000.

GOTOCYCLE Command

The GOTOCYCLE command executes the program in the simulator beginning at the address in the program counter (PC). Execution continues until the cycle counter is equal to or greater than the specified value, until a key or the Stop button on the toolbar is pressed, until it reaches a break point, or until an error occurs.

Syntax

```
>gdi GOTOCYCLE <n>
```

Where:

<n> Cycle-counter value at which the execution stops

Example

```
>gdi GOTOCYCLE 100
```

Execute the program until the cycle counter equals 100.

INPUT<x> Command

The INPUT<x> command sets the simulated inputs to port <x>. The CPU reads this input value when port <x> is set as an input port.

Syntax

```
>gdi INPUT<x> <n>
```

Where:

<x> is the letter representing corresponding port

<n> Eight-bit simulated value for port <x>

Example

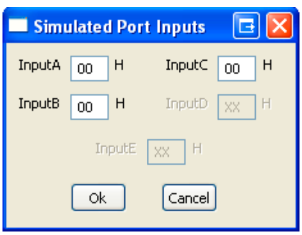
```
>gdi INPUTA AA
```

Simulate the input AA on port A.

INPUTS Command

In FCS and CPU-Only Simulation modes, the INPUTS command opens the Simulated Port Inputs dialog box shown in Figure 7.43. You may then use this box to specify the input states of port pins and IRQ.

Figure 7.43 Simulated Port Inputs Dialog Box



When using In-Circuit Simulation mode, the INPUTS command shows the simulated input values to any applicable port.

Syntax

```
>gdi INPUTS
```

Example

```
>gdi INPUTS
```

Show I/O port input values.

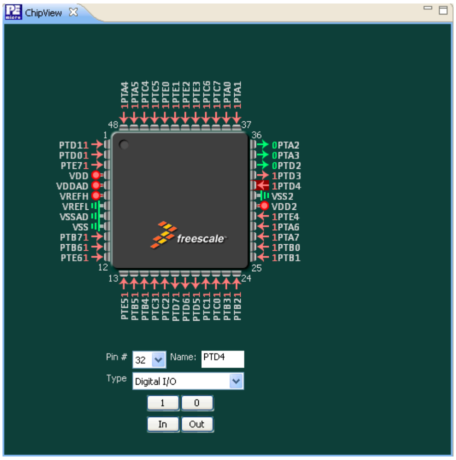
P&E RS08 Multilink\Cyclone Pro

This section describes the RS08 P&E Multilink/Cyclone Pro Connection options, and also Chip View, which is a time-saving ICD feature that makes the debugging process much easier. The RS08 P&E Multilink/Cyclone Pro Connection setting permits a connection to RS08 Freescale devices via P&E Multilink/Cyclone Pro hardware interfaces. This connection mode lets you debug code, as the firmware is fully resident in the Flash or RAM of the microprocessor.

Chip View

Chip View is an innovative feature designed to simplify Full Chip Simulation (FCS) and In-Circuit Debugging (ICD) sessions. The **Chip View** provides instantaneous access to internal modules of the chip and lets you instantly change any of the features by clicking them. Each pin features the current pin direction, input/output value, and the name of the signal that reflects the current module that controls it. These data features are updated every 50ms throughout a running FCS or ICD session.

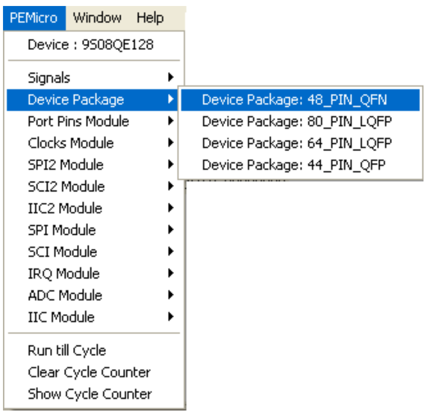
Figure 7.44 Chip View



To open **Chip View**, perform these steps.

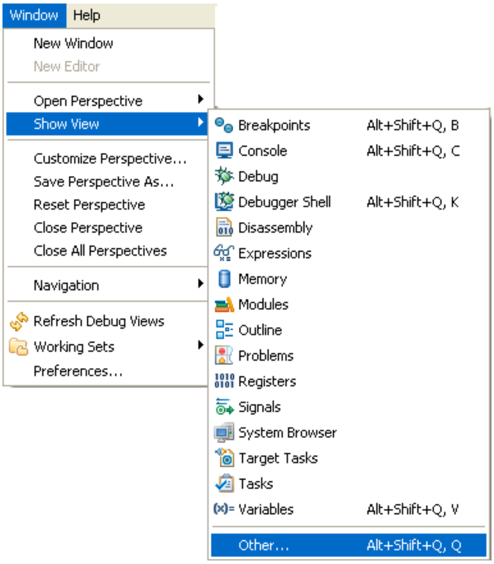
1. From the IDE menu bar, select **PEMicro > Device Package > Device Package:<** *Pin*>, where < *Pin*> is the pin package you would like to work with. (See Figure 7.45). The Device Package can be changed before or after the Chip View window is invoked within the CodeWarrior IDE.

Figure 7.45 Device Package Extended Menu



2. From the IDE menu bar, select **Window > Show View > Others** (Figure 7.46).

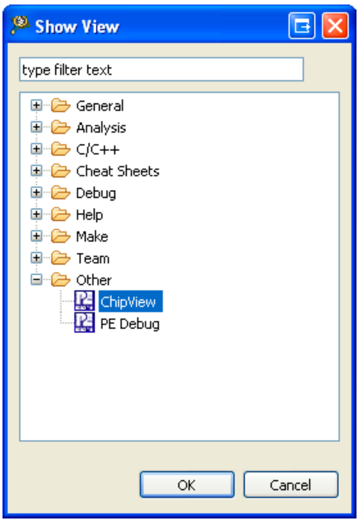
Figure 7.46 Show View Extended Menu



The **Show View** dialog box appears.

3. Expand **Other** and select **Chip View** (Figure 7.47).

Figure 7.47 Show View Menu



4. To change direction and values of the pin, double-click on the corresponding arrow or the number value. Details are listed below.

NOTE If you close the **Chip View** Window during debug session, the Chip View will not be accessible. You must reopen the **Chip View** window and restart the current debugging session and to open the **Chip View** window again. Closing **Chip View** should slightly improve the performance during existing debug session.

Chip GUI - Ports Module Support

You have the option of changing the pin's direction and values by double-clicking on the corresponding arrow or number value. Figure 7.48 is an example of what the Chip View may look like before any changes are made. When the pin direction is input, the pin will display the current pin input value. When the pin direction is output, you have the option to double-click the number value to control the output value for the pin. Figure 7.49 is an example of the PTA2 pin value being changed from 0 to 1 by double-clicking on the number value.

Figure 7.48 Chip View Display Before Change

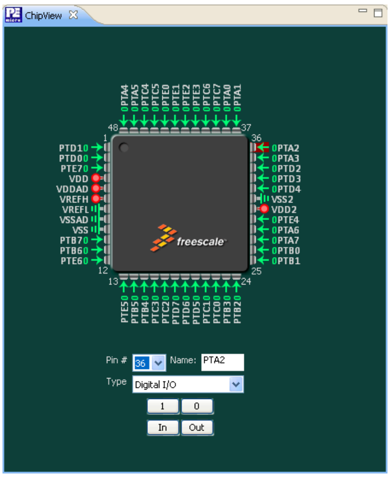
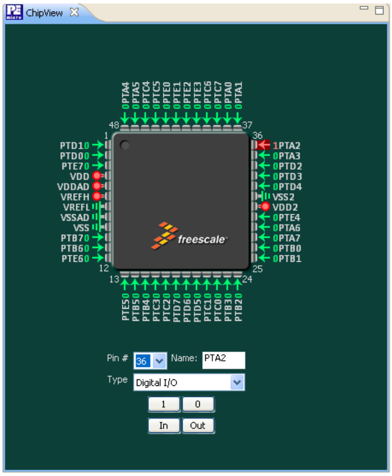
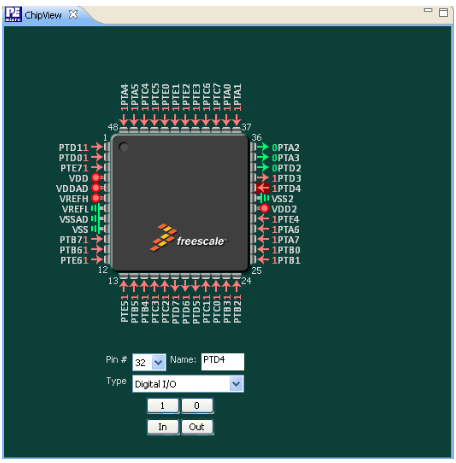


Figure 7.49 Chip View Display After Change



When you double-click the pin's value or the direction, a pin configuration dialog appears underneath the Chip View diagram (Figure 7.50). In the pin configuration options, you have the option of changing analog and digital I/O settings for a given pin. You can select a pin from the pin-number drop-down box, select between analog and digital signals, and switch pin directions. For the digital I/O signal, you can switch between high or low signals (Figure 7.50).

Figure 7.50 Chip View with Digital Pin Configuration Options



Connection Options

This topic describes all P&E Multilink\Cyclone connection options, which are common to all P&E USB BDM Multilink, P&E Cyclone Pro Serial, P&E Cyclone PRO USB, and P&E Cyclone PRO TCP-IP connections.

The options include:

- Changing P&E Connection Settings
- Connection Assistant
- Launch Configuration Settings
- Active Mode Menu Options
- Advanced Programming/Debug Options
- View Register Files Option
- P&E RS08 Multilink\Cyclone Pro Connection-Specific Options

Changing P&E Connection Settings

All connection settings for P&E hardware interfaces are configured in the Launch Configurations dialog box.

Figure 7.51 P&E RS08 BDM Launch Configuration Dialog Box

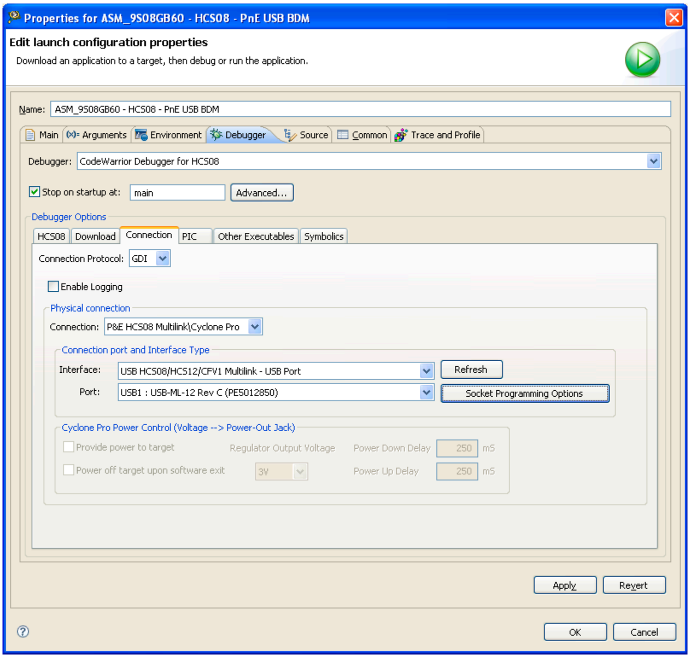


Table 7.1 describes the options for this view.

WARNING! An improper voltage setting can damage the board.

Table 7.1 Connection Parameter Options for P&E RS08 Multilink/Cyclone Pro

Option	Description
Interface	Use this option to select the interface type. Select a supported interface from the list box. The options are: • USBHCS08\HCS12\CFV1 Multilink - USB Port • Cyclone PRO - Serial Port • Cyclone PRO - USB Port • Cyclone PRO - Ethernet Port
Port	This option selects the port over which debug communications is conducted. Select an available port from the list box.
Refresh	Click this button to have the workstation scan for a valid interface and port. Valid interfaces and ports appear in the `Interface` and `Port` list boxes.
Socket Programming Options	The Socket Programming Options button brings up a dialog that provides you with a graphical representation of the signals that must be connected from the BDM header to the pins of the microprocessor, in order to use Freescale socket adapters.
(Cyclone Pro only) Provide power to target	This option determines whether the Cyclone Pro (circuitry) provides power to the target hardware via the probe. Check this option to have the Cyclone Pro (circuitry) supply power to the hardware target Uncheck this option to not provide power.

Table 7.1 Connection Parameter Options for P&E RS08 Multilink/Cyclone Pro

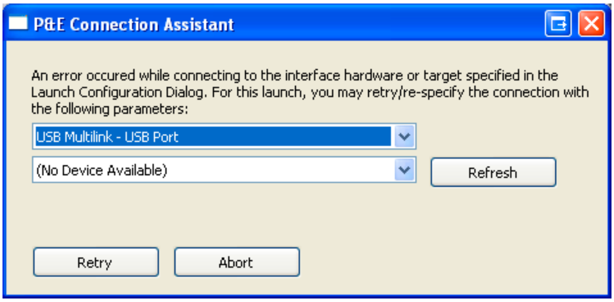
Option	Description
(Cyclone Pro only) Power off target upon software exit	This option determines whether Cyclone Pro hardware interface provides power to the target hardware via VDD of the BDM cable. Check this option to turn off the power when the program terminates. Uncheck this option to leave the hardware target powered continuously.
(Cyclone Pro only) Regulator Output Voltage	This option adjusts the output voltage that powers the hardware target. Select a voltage value from this option's list box.
(Cyclone Pro only) Power down delay	This option specifies amount of time for which the target will be turned off during a RESET power cycling sequence. Enter the delay interval (in milliseconds) in this option's text box.
(Cyclone Pro only) Power up delay	This option specifies amount of time for which the target will remain powered prior to a RESET power cycling sequence. Enter the delay interval (in milliseconds) in this option's text box.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Multilink/Cyclone Pro as your debugger connection:

1. Select the P&E device that you are using from the first drop-down menu and click **Refresh**. See Figure 7.52.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the Retry button

Figure 7.52 RS08 Connection Assistant Interface Selected



Launch Configuration Settings

To set the launch configurations for the debugger:

1. Find the debugger icon and click on the drop-down arrow to bring up the debugger menu. See Figure 7.53.
2. Select Debug Configurations
3. On the left column, select the project download type you would like to set the launch configurations. See Figure 7.54
4. On the right column, click on the Debugger tab.
5. Set your configurations and click **Debug** to start the debugger.

Figure 7.53 Debugger Drop-down Menu

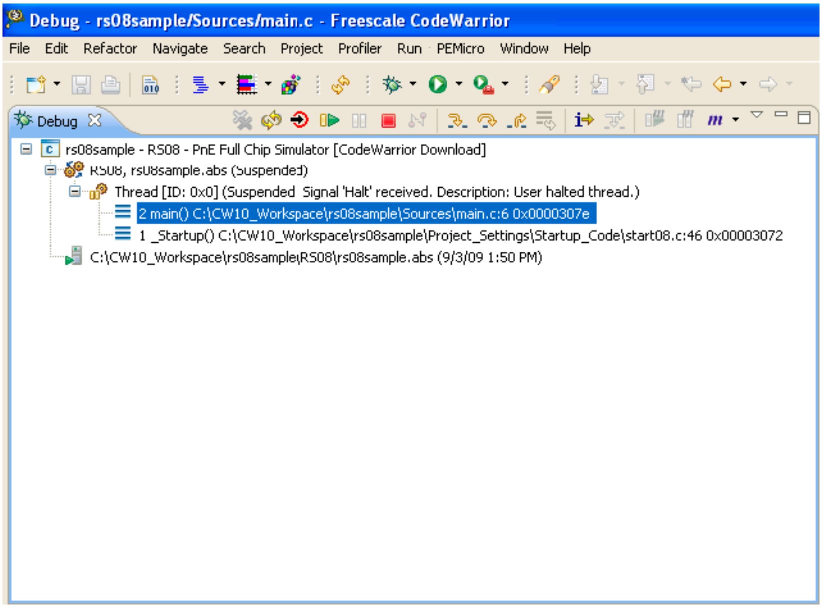
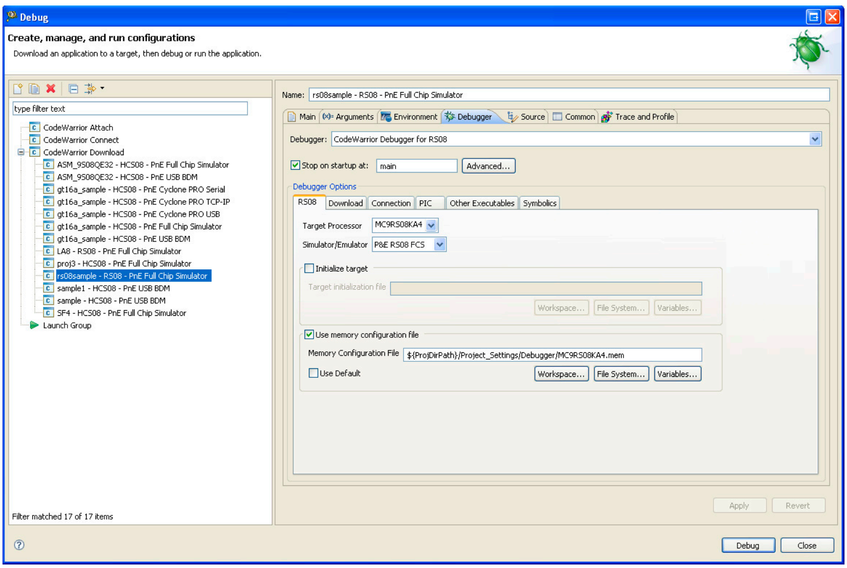


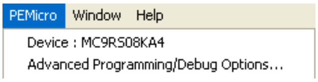
Figure 7.54 Debugger Configuration Settings Dialog



Active Mode Menu Options

When the microprocessor is connected, the active mode menu shows the name of the microprocessor and gives you the access to the Advanced Programming/Debug Options. When the microprocessor is not connected, the menu is not available.

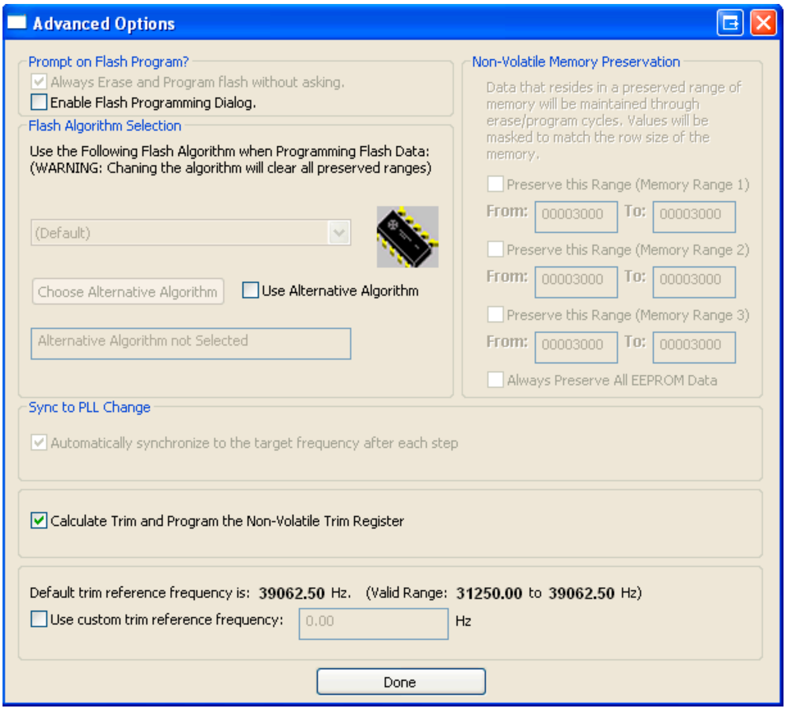
Figure 7.55 Additional Connection Menu Options



Advanced Programming/Debug Options

The Advanced Programming/Debug Options menu option takes you to the Advanced Options dialog box, where you can configure the software settings for the Flash programming procedure.

Figure 7.56 Advanced Options Dialog Box



Prompt on Flash Program Checkbox

Setting the "Always Erase and Program flash without asking" checkbox in this dialog box allows the software to transparently program the microprocessor every time the debugger is started. Setting the “Enable Flash Programming Dialog" lets you view the steps taken by the Flash Programmer.

Trim Options

The Calculate Trim and Program the Non-Volatile Trim Register checkbox enables automatic calculation and programming of the trim value to a designated Non-Volatile memory location.

Non-Volatile Memory Preservation

You have the option of preserving up to three independent ranges of non-volatile memory (on devices with EEPROM, the entire EEPROM array may optionally be preserved as well). Ranges that are designated as “preserved” are read before an erase and re-programmed immediately afterwards, thereby preserving the data in these ranges. Any attempts to program data into a preserved range is ignored. When entering an address into the preserved range field (hexadecimal input is expected), the values are masked according to the row size of the device. This ensures that the reprogramming of preserved data does not cause any conditions that disturb programming.

Sync to PLL Change Checkbox

The debugger requires the Sync to PLL Change to synchronize the software/hardware connection with the microprocessor during the Flash erasing/programming procedure.

Trim Control

The Use custom trim reference frequency option lets you select a custom trim value for the target device (valid only for devices with an Internal Clock). You can input any value within the valid internal clock frequency range; the allowable trim value is limited only by the device itself.

NOTE The valid internal clock frequency range and the default trim value for the currently selected device/algorithm are displayed as well.

NOTE For more information about the specific functionality of the internal clock source, see the Freescale Data Sheet for your specific device.

Alternative Algorithm Functionality

Once you create a project for a specific HCS08/RS08 microprocessor, the debugger specifies a default algorithm to use during all Flash programming operations. The debugger uses this algorithm for nearly all programming requirements. The default algorithm can be found in the <*CW_Install*>/prog/P&E directory.

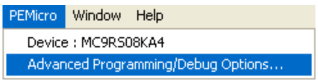
However, the default algorithm may be overridden via the Alternative Algorithm function, located in the Advanced Programming/Debug Options menu. You can use this feature to select a custom programming algorithm, or simply select another one of P&E's many programming algorithms for use with a specific project.

CAUTION Selecting the wrong programming algorithm may damage their device, lead to under/over programming situations, or simply not program portions of the project file. You are recommended to use the default algorithm unless there is a compelling reason to do otherwise.

Use these steps to override the default algorithm:

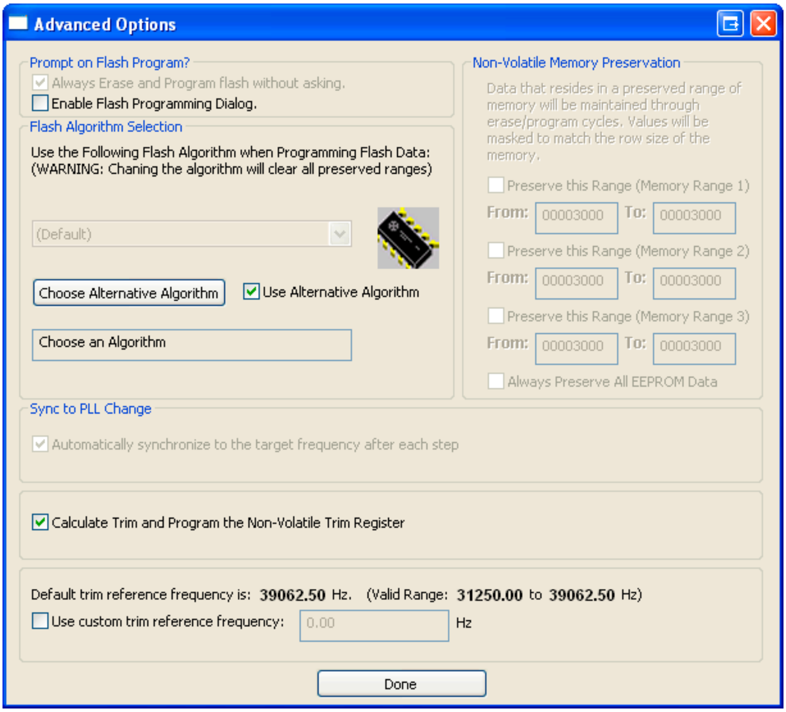
1. Select the Advanced Programming/Debug Options selection from the PEMicro menu.

Figure 7.57 Advanced Programming/Debug Options Menu Selection



2. Check the Use Alternative Algorithm checkbox.

Figure 7.58 Advanced Options - Alternative Algorithm Checkbox



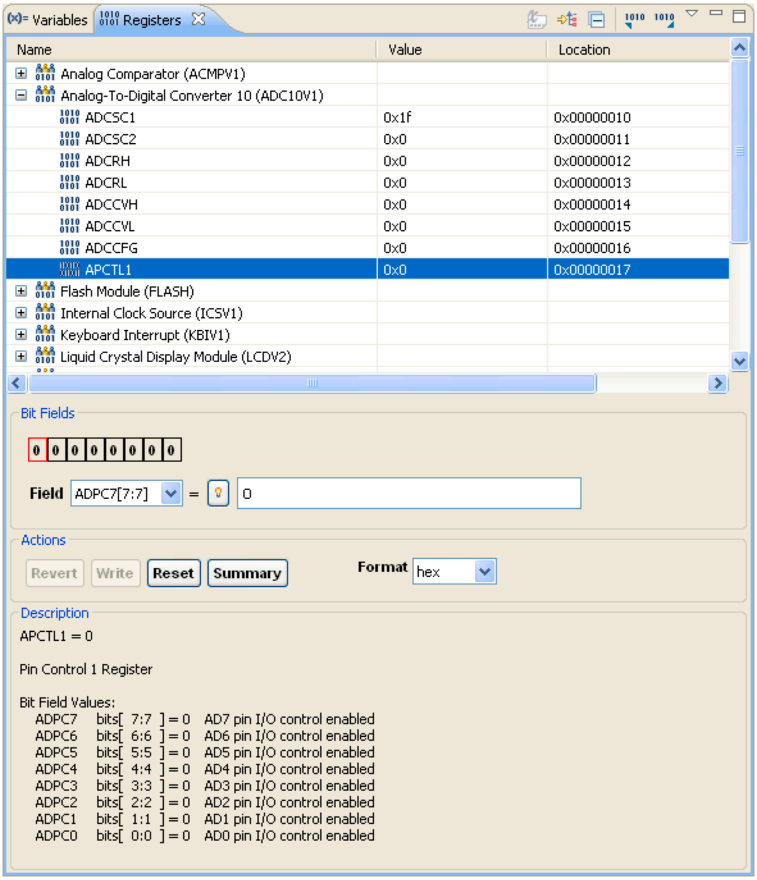
3. Click the **Choose Alternative Algorithm** button, which lets you browse for an alternative algorithm.
4. Once you select the alternative algorithm, the name of the algorithm along with its full path appears in the text field below the **Choose Alternative Algorithm** button.

At this point, the current project performs all future Flash programming operations using the alternative algorithm. You may revert to the default algorithm at any time by clearing the Use Alternative Algorithm checkbox.

View Register Files Option

The Register Files tab in the debugger gives you the option of viewing and editing the register files. If register files are available for the device that you have chosen, the Registers tab in the debugger (see Figure 7.59) is populated.

Figure 7.59 Debug Register File Tab



To view the Register Files of the device that you have chosen:

1. Find the debugger icon and click it to enter debug mode and open the debugging window
2. Select the “Registers” tab on the right side of the debugging window, or select the Window menu -> Show View -> Registers to open the Register window.
3. Expand a module by clicking on the plus/minus button to view the registers within the module
4. Select a desired register to view its bit fields and bit descriptions in the window below.

In the Registers tab, all of the available modules are listed, and under each module all of its registers are displayed with their current values. Selecting a register brings up the Bit field, Actions box, and Description box. In the Bit field, you can view the bits in binary format. The Actions box is used when a bit needs to be modified. You can revert changes, write a new value, reset all of the bits, and view a summary of the register. You can also change the format of the value written in the bit field. The Description box displays the values and significance of each bit in the register. When a bit is modified, the description will change.

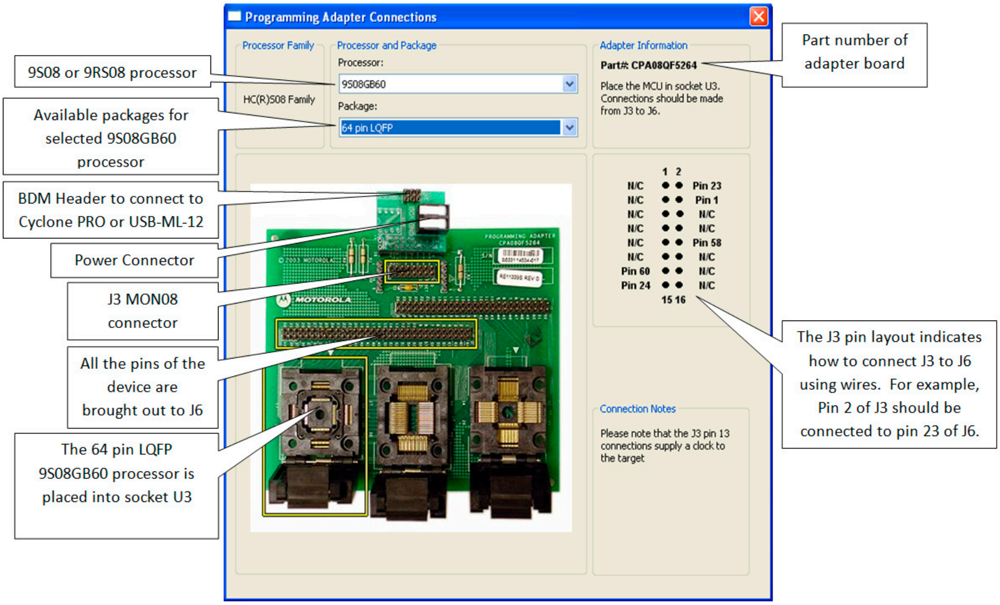
You can modify each bit by selecting it in the drop-down box under the Bit field, or by clicking the bit on the Bit field. Note that bits that are read-only will not allow you to modify the bit values. A new value can be written into the edit box, or you can click the light bulb button next to the edit box to view all of the options, and then double-click the changes.

Socket Programming Options Button

The Programming Adapter Connections dialog assistant is designed to facilitate the use of an extensive set of Freescale programming socket adapters. This dialog can be used to get a graphical representation of the signals that must be connected from the BDM header to the pins of the microprocessor. Making these connections lets you establish communication with a given device via a hardware debug interface.

The Socket Programming Options button in the BDM Launch Configuration dialog box (see Figure 7.51) takes you to the Programming Adapter Connections dialog box (see Figure 7.60), where you can look up pin connection settings for the selected package type of the target processor. Only available package types for each target processor are listed in the Package drop-down menu. Once you have selected a package type, the Adapter Information section provides the part number of the adapter board, the socket number where the processor should be placed, and a pair of header numbers that indicate which connections should be made between them. Immediately below the Adapter Information section you will find a pin layout that displays the required connections between the aforementioned pair of headers.

Figure 7.60 Programming Adapter Connections Dialog Box



P&E RS08 Multilink\Cyclone Pro Connection-Specific Options

This topic describes the connection-specific options. The connections include:

- P&E USB BDM Multilink
- P&E Cyclone Pro Serial
- P&E Cyclone PRO USB
- P&E Cyclone PRO TCP-IP

P&E USB BDM Multilink

The P&E USB BDM Multilink Connection setting permits a connection to USB BDM Multilink devices. P&E USB BDM Multilink mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

To select P&E USB BDM Multilink as the debugger connection:

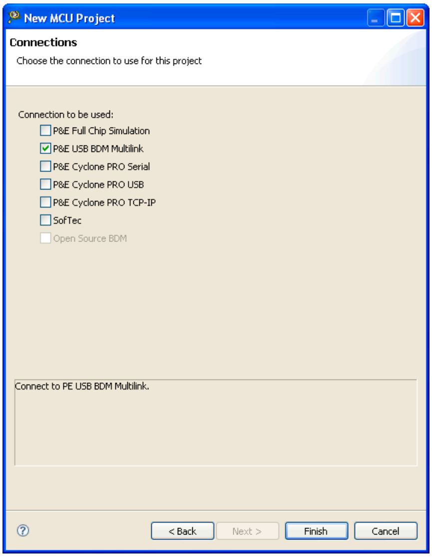
1. Select **Project > Change Device/Connection** from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse t**o specify a different location for the new project. By default, the Use default location checkbox is checked.

3. Click **Next**. The **Device and Connection** page appears.
4. Expand the **RS08** tree control and select the derivative or board you would like to use. For example, select **RS08 > RS08KA Family > RS08KA2**.
5. Click **Next**.

   The **Connections** page appears.
6. Check the P**&E USB BDM Multilink** checkbox. See Figure Figure 7.61.

Figure 7.61 RS08 P&E USB BDM Multilink Selected



7. Click Finish.

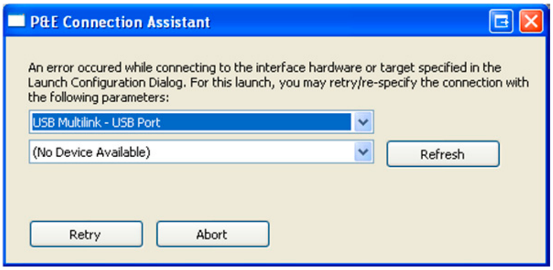
The wizard creates a project for the RS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E USB BDM Multilink as your debugger connection:

1. Select USB Multilink – USB Port from the first drop-down menu and click **Refresh**. See Figure 7.62.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the Retry button

Figure 7.62 RS08 Connection Assistant Interface Selected



P&E Cyclone Pro Serial

The P&E Cyclone Pro Serial Connection setting permits a connection to Cyclone Pro Serial devices. P&E Cyclone Pro Serial mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

To select P&E Cyclone Pro Serial as the debugger connection:

1. Select Project > Change Device/Connection from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location checkbox** is checked.

3. Click **Next**.

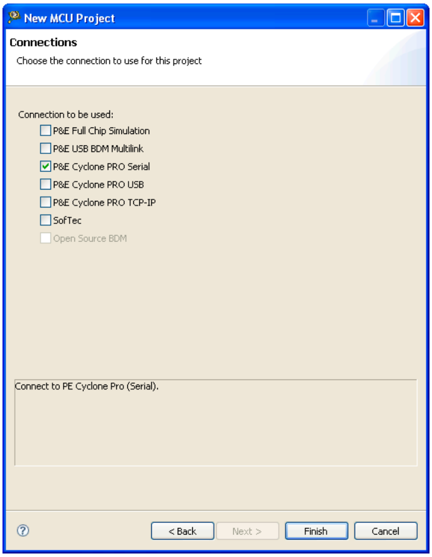
   The **Device and Connection** page appears.
4. Expand the **RS08** tree control and select the derivative or board you would like to use. For example, select **RS08 > RS08KA Family > RS08KA2**.

5. Click **Next**.

   The **Connections** page appears.

6. Check the **P&E Cyclone Pro Serial** checkbox. See Figure 7.63.

Figure 7.63 RS08 P&E Cyclone Pro Serial Selected



7. Click Finish.

The wizard creates a project for the RS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

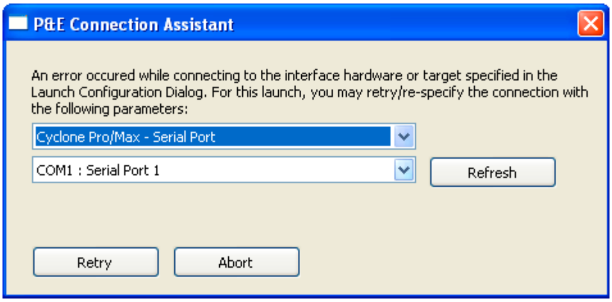
The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro Serial as your debugger connection:

1. Select USB Multilink – USB Port from the first drop-down menu and click **Refresh**. See Figure 7.64.

2. Using the second drop-down menu, select the port on which the interface is connected.

3. Click the Retry button

Figure 7.64 RS08 Connection Assistant Interface Selected



P&E Cyclone PRO USB

The P&E Cyclone Pro USB Connection setting permits a connection to Cyclone Pro USB devices. P&E Cyclone Pro USB mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

To select P&E Cyclone Pro USB as the debugger connection:

1. Select **Project > Change Device/Connection** from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

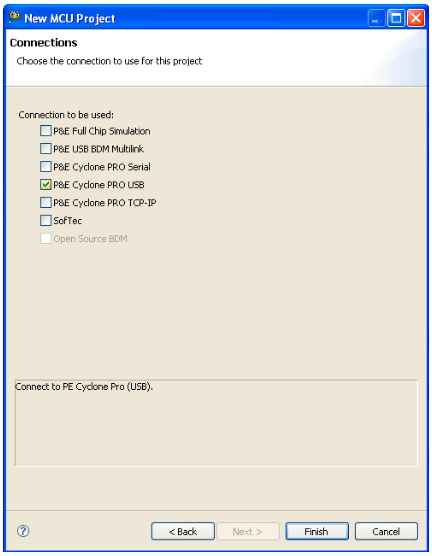
NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location checkbox** is checked.

3. Click **Next**.

   The **Device and Connection** page appears.
4. Expand the **RS08** tree control and select the derivative or board you would like to use. For example, select **RS08 > RS08KA Family > RS08KA2**.
5. Click **Next.**

   The **Connections** page appears.
6. Check the **P&E Cyclone Pro USB** checkbox. See Figure 7.65.

Figure 7.65 RS08 P&E Cyclone Pro USB Selected



7. Click **Finish**.

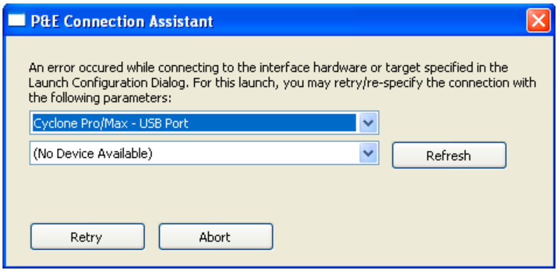
The wizard creates a project for the RS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro USB as your debugger connection:

1. Select **USB Multilink – USB Port** from the first drop-down menu and click **Refresh**. See Figure 7.66.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the **Retry** button.

Figure 7.66 RS08 Connection Assistant Interface Selected



P&E Cyclone PRO TCP-IP

The P&E Cyclone Pro TCP-IP Connection setting permits a connection to Cyclone Pro TCP-IP devices. P&E Cyclone Pro TCP-IP mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

To select P&E Cyclone Pro TCP-IP as the debugger connection:

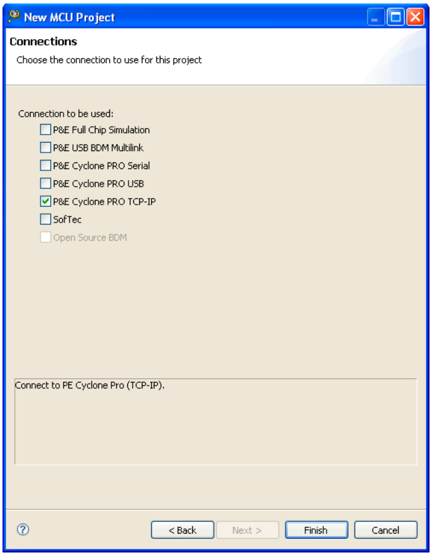
1. Select **Project > Change Device/Connection** from the IDE menu bar. The **Device/ Connection Change** wizard appears.
2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location checkbox i**s checked.

3. Click **Next**. The **Device and Connection** page appears.
4. Expand the RS08 tree control and select the derivative or board you would like to use. For example, select **RS08 > RS08KA Family > RS08KA2.**
5. Click **Next**.

   The **Connection**s page appears.
6. Check the **P&E Cyclone Pro TCP-IP** checkbox. See Figure 7.67.

Figure 7.67 RS08 P&E Cyclone Pro TCP-IP Selected



7. Click **Finish**.

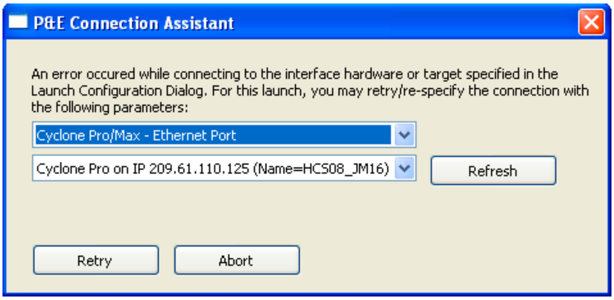
The wizard creates a project for the RS08 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro TCP-IP as your debugger connection:

1. Select **USB Multilink – USB Port** from the first drop-down menu and click **Refresh**. See Figure 7.68.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the **Retry** button

Figure 7.68 Connection Assistant Interface Selected



Softec

This topic will contain information specific to Softec connection.

Open Source BDM

This topic will contain information specific to OSBDM connection.

8 Connections — ColdFire V1

This chapter describes the features and settings of the connections that interface the CodeWarrior debugger with the ColdFire V1-based bare board target.

For the IDE to communicate with the target hardware, you must specify several key items: the debugger protocol, a connection type, and any connection parameters. You enter the first two items of information using options in the **Connection** tab view of the **Debug** window. These options are:

- The **Connection Protocol** option determines what *debugger protocol* the debugger uses to communicate with the target.
- The **Physical Connection** option specifies the hardware probe or *connection type* that physically connects the workstation hosting CodeWarrior to the target board under debug. After you make the option of physical connection, the view changes to display configuration options specific for the hardware probe.

The topics in this chapter discuss the features and settings of the connections that interface the CodeWarrior debugger with the ColdFire V1-based bare board target.

The topics of this chapter are:

Changing Connection in IDE

To change connection in the IDE, perform these steps.

1. Select **Project > Change Device/Connection** from the IDE menu bar.

   The **Device/Connection Change** wizard appears.

2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location** checkbox is checked.

3. Click **Next**.

   The **Device and Connection** page appears.

4. Expand the tree control and select the derivative or board you would like to use.
5. Click **Next**.

   The **Connections** page appears.

6. Select the desired connection.

NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

7. Click **Finish**.

   The wizard creates a simulator project according to your specifications. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

8. Build the new project. For more information, refer to the topic Building Projects.
9. Debug the new project. For more information, refer to the topic Debugging Projects.

P&E USB BDM Multilink/Cyclone Pro

This option specifies that the hardware connection is either a P&E Microsystems Multilink or a P&E Multisystems Cyclone Pro. The **Connection** tab displays options that can be used to specify the connection parameters, such as the probe interface type and the port that it uses (Figure 8.1).

Figure 8.1 GDI — P&E Multilink/Cyclone Pro Connection

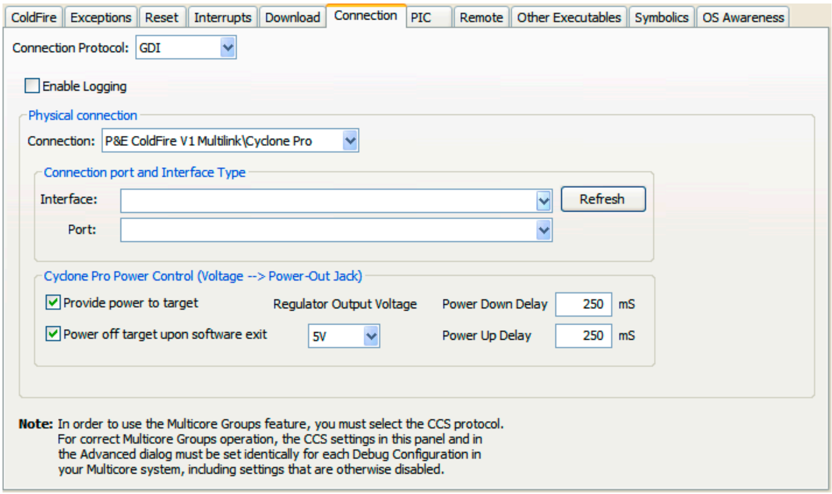


Table 8.1 describes the options for this view.

Table 8.1 Connection Parameter Options for P&E Multilink/Cyclone Pro

Option	Description
Interface	Use this option to select the interface type. Select a supported interface from the list box.
Port	This option selects the port over which debug communications is conducted. Select an available port from the list box.
Refresh	Click this button to have the workstation scan for a valid interface and port. Valid interfaces and ports appear in the `Interface` and `Port` list boxes.
Socket Programming Options	The Socket Programming Options button brings up a dialog that provides you a graphical representation of the signals that must be connected from the BDM header to the pins of the microprocessor, in order to use Freescale socket adapters.

Table 8.1 Connection Parameter Options for P&E Multilink/Cyclone Pro (*continued*)

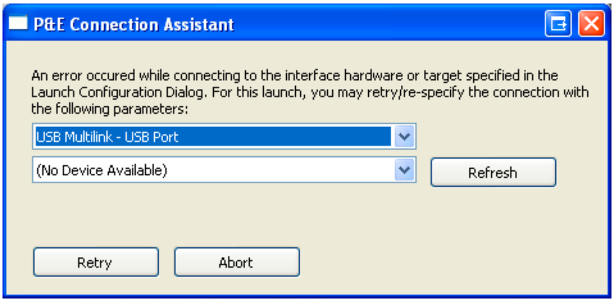
Option	Description
(Cyclone Pro only) Provide power to target	This option determines whether the Cyclone Pro (circuitry) provides power to the target hardware via the probe. Check this option to have the Cyclone Pro (circuitry) supply power to the hardware target Uncheck this option to not provide power.
(Cyclone Pro only) Power off target upon software exit	This option determines whether Cyclone Pro hardware interface provides power to the target hardware via VDD of the BDM cable. Check this option to turn off the power when the program terminates. Uncheck this option to leave the hardware target powered continuously.
(Cyclone Pro only) Regulator Output Voltage	This option adjusts the output voltage that powers the hardware target. Select a voltage value from this option's list box. Note: An improper voltage setting can damage the board.
(Cyclone Pro only) Power down delay	This option specifies amount of time for which the target will be turned off during a RESET power cycling sequence. Enter the delay interval (in milliseconds) in this option's text box.
(Cyclone Pro only) Power up delay	This option specifies amount of time for which the target will remain powered prior to a RESET power cycling sequence. Enter the delay interval (in milliseconds) in this option's text box.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug but the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Multilink/Cyclone Pro as your debugger connection:

1. Select the P&E device that you are using from the first drop-down menu and click **Refresh**. See Figure 8.2.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the Retry button

Figure 8.2 CFV1 Connection Assistant Interface Selected

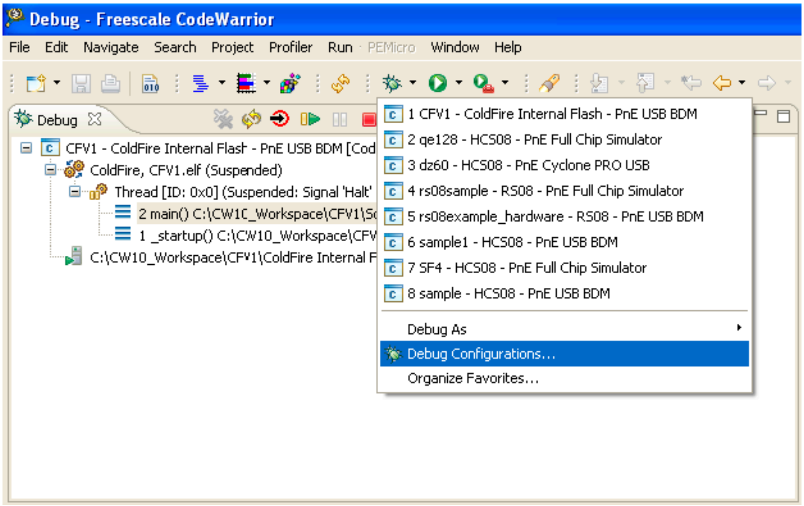


Launch Configuration Settings

To set the launch configurations for the debugger:

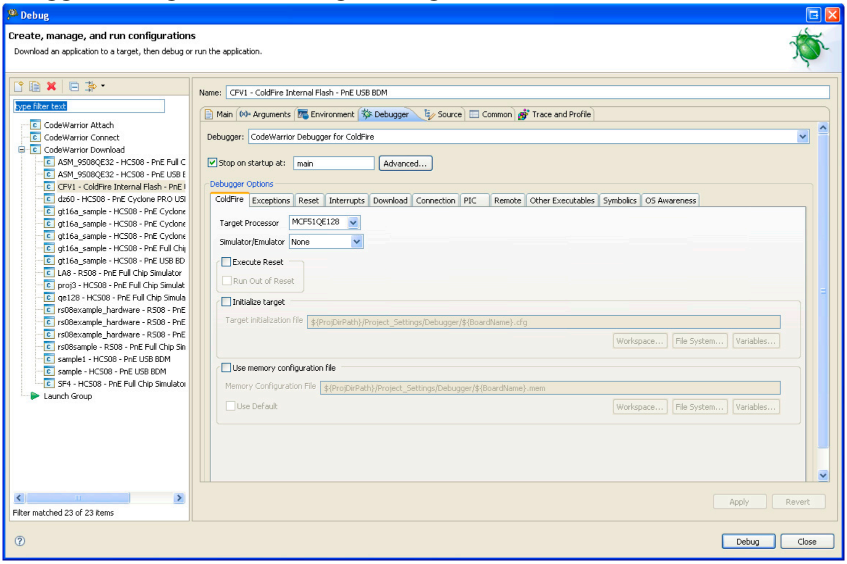
1. Find the debugger icon and click on the drop-down arrow to bring up the debugger menu. See Figure 8.2.
2. Select Debug Configurations
3. In the left column, select the project download type for which you would like to set the launch configurations. See Figure 8.3
4. In the right column, click on the **Debugger** tab.
5. Set your configurations and click **Debug** to start the debugger.

Figure 8.3 Debugger Drop-down Menu



DRAFT

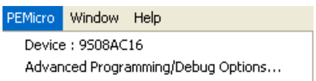
Figure 8.4 Debugger Configuration Settings Dialog Box



Active Mode Menu Options

When the microprocessor is connected, the active mode menu shows the name of the microprocessor and gives you access to the Advanced Programming/Debug Options. When the microprocessor is not connected, the menu is not available.

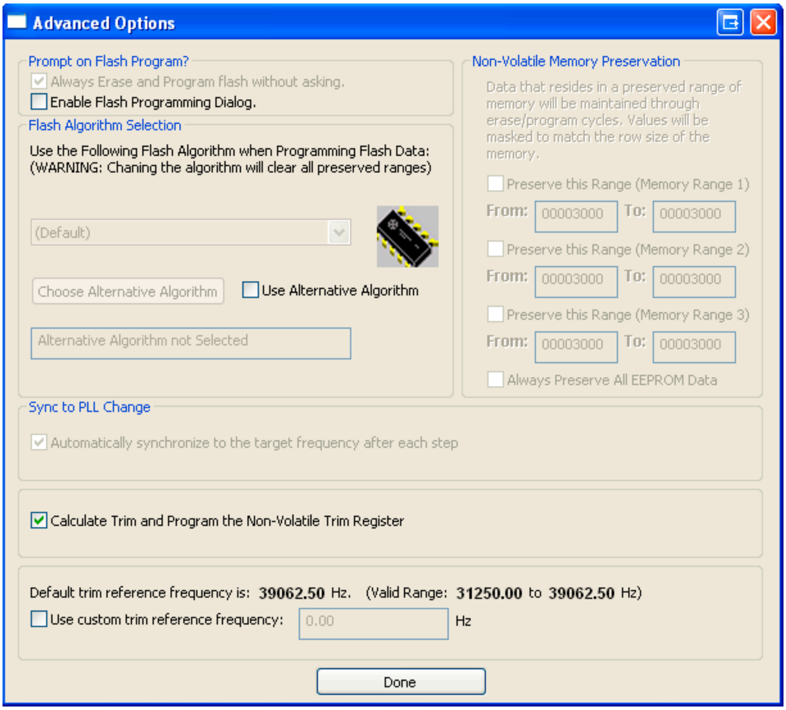
Figure 8.5 Additional Connection Menu Options



Advanced Programming/Debug Options

The Advanced Programming/Debug Options menu option takes you to the Advanced Options dialog box, where you can configure the software settings for the Flash programming procedure.

Figure 8.6 Advanced Options Dialog Box



Prompt on Flash Program Checkbox

Setting the "Always Erase and Program flash without asking" checkbox in this dialog box allows the software to transparently program the microprocessor every time the debugger is started. Setting the "Enable Flash Programming Dialog" lets you view the steps taken by the Flash Programmer.

Trim Options

The Calculate Trim and Program the Non-Volatile Trim Register checkbox enables automatic calculation and programming of the trim value to a designated Non-Volatile memory location.

Non-Volatile Memory Preservation

You have the option of preserving up to three independent ranges of non-volatile memory (on devices with EEPROM, the entire EEPROM array may optionally be preserved as well). Ranges that are designated as "preserved" are read before an erase and re-programmed immediately afterwards, thereby preserving the data in these ranges. Any attempts to program data into a preserved range are ignored. When entering an address into the preserved range field (hexadecimal input is required), the values are masked according to the row size of the device. This ensures that the reprogramming of preserved data does not cause any conditions that disturb programming.

Sync to PLL Change Checkbox

The debugger requires the Sync to PLL Change to synchronize the software/hardware connection with the microprocessor during the Flash erase/program procedure.

Trim Control

The Use custom trim reference frequency option lets you select a custom trim value for the target device (valid only for devices with an Internal Clock). You can input any value within the valid internal clock frequency range; the allowable trim value is limited only by the device itself. Note that the valid internal clock frequency range and the default trim value for the currently selected device/algorithm are displayed as well. For more information about the specific functionality of the internal clock source, see the Freescale Data Sheet for your specific device.

Alternative Algorithm Functionality

Once you create a project for a specific HCS08/RS08 microprocessor, the debugger specifies a default algorithm to use during all Flash programming operations. The debugger uses this algorithm for nearly all programming requirements. The default algorithm can be found in the `<`*`CW_Install`*`>/prog/P&E` directory.

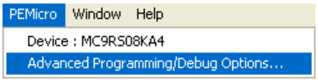
However, the default algorithm may be overridden via the Alternative Algorithm function, located in the Advanced Programming/Debug Options menu. You can use this feature to select a custom programming algorithm, or simply select another one of P&E's many programming algorithms for use with a specific project.

CAUTION Selecting the wrong programming algorithm may damage their device, lead to under/over programming situations, or simply not program portions of the project file. It is therefore recommended using the default algorithm unless there is a compelling reason to do otherwise.

Use these steps to override the default algorithm:

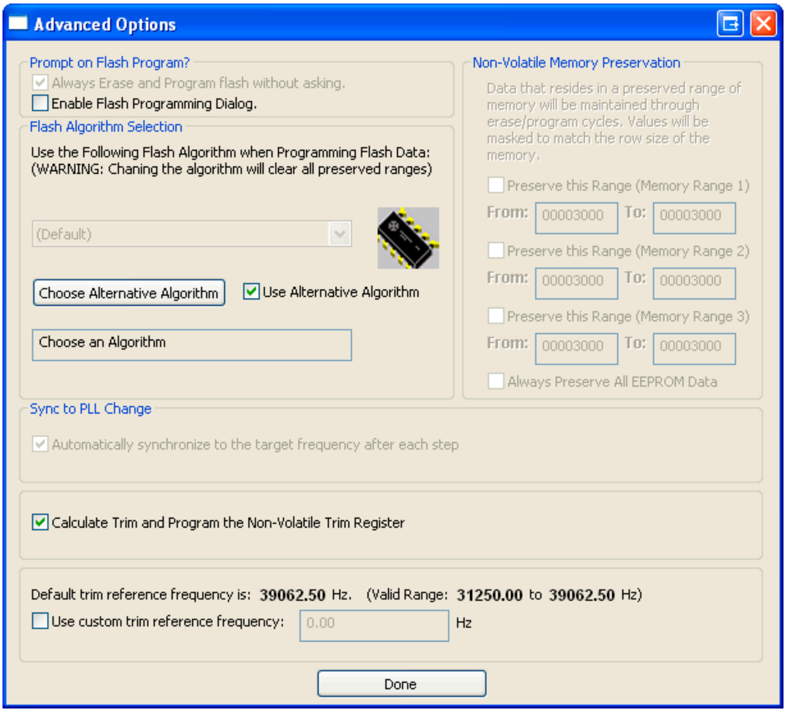
1. Select the Advanced Programming/Debug Options selection from the PEMicro menu.

Figure 8.7 Advanced Programming/Debug Options Menu Selection



2. Check the Use Alternative Algorithm checkbox.

Figure 8.8 Advanced Options - Alternative Algorithm Checkbox



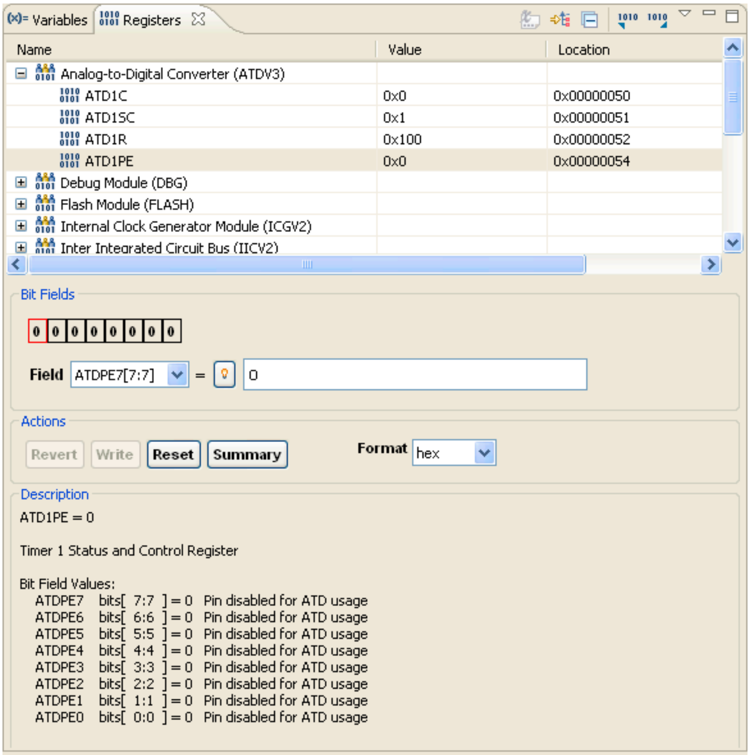
3. Click the **Choose Alternative Algorithm** button, which lets you browse for an alternative algorithm.
4. Once you select the alternative algorithm, the name of the algorithm along with its full path appears in the text field below the **Choose Alternative Algorithm** button.

At this point, the current project performs all future Flash programming operations using the alternative algorithm. You may revert to the default algorithm at any time by clearing the Use Alternative Algorithm checkbox.

View Register Files Options

The Register Files tab in the debugger gives you the option of viewing and editing the register files. If register files are available for the device that you have chosen, the Registers tab in the debugger (see Figure 8.9) is populated.

Figure 8.9 Debug Register File Tab



To view the Register Files of the device that you have chosen:

1. Find the debugger icon and click it to enter debug mode and open the debugging window
2. Select the “Registers” tab on the right side of the debugging window, or select the Window menu -> Show View -> Registers to open the Register window.
3. Expand a module by clicking on the plus/minus button to view the registers within the module
4. Select a desired register to view its bit fields and bit descriptions in the window below.

In the Registers tab, all of the available modules are listed, and under each module all of its registers are displayed with their current values. Selecting a register brings up the Bit field, Actions box, and Description box. In the Bit field, you can view the bits in binary format. The Actions box is used when a bit needs to be modified. You can revert changes, write a new value, reset all of the bits, and view a summary of the register. You can also change the format of the value written in the bit field. The Description box displays the values and significance of each bit in the register. When a bit is modified, the description will change.

You can modify each bit by selecting it in the drop-down box under the Bit field, or by clicking the bit on the Bit field. Note that bits that are read-only will not allow you to modify the bit values. A new value can be written into the edit box, or you can click the light bulb button next to the edit box to view all of the options, and then double-click the changes.

P&E USB BDM Multilink\Cyclone Pro Connection-Specific Options

This topic describes the connection-specific options. The connections include:

- P&E USB BDM Multilink
- P&E Cyclone Pro Serial
- P&E Cyclone Pro USB
- P&E Cyclone Pro TCP-IP

P&E USB BDM Multilink

The P&E USB BDM Multilink Connection setting permits a connection to USB BDM Multilink devices. P&E USB BDM Multilink mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

To select P&E USB BDM Multilink as the debugger connection:

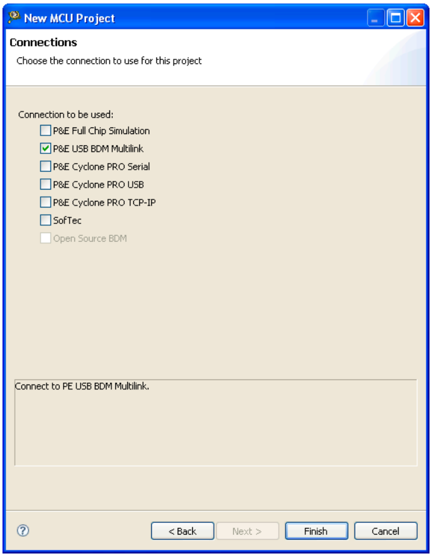
1. Select Project > Change Device/Connection from the IDE menu bar. The Device/ Connection Change wizard appears.
2. Type a name for the project, in the New Project Name text box. By default, it is the existing project name.

NOTE Clear the Use default location checkbox and click Browse to specify a different location for the new project. By default, the Use default location checkbox is checked.

3. Click Next. The Device and Connection page appears.

4. Expand the RS08 tree control and select the derivative or board you would like to use. For example, select ColdFire V1 > MCF51QE Family > MCF51QE128.
5. Click Next. The Connections page appears.
6. Check the P&E USB BDM Multilink checkbox. See Figure 8.10.

Figure 8.10 ColdFire V1 P&E USB BDM Multilink Selected



7. Click Finish.

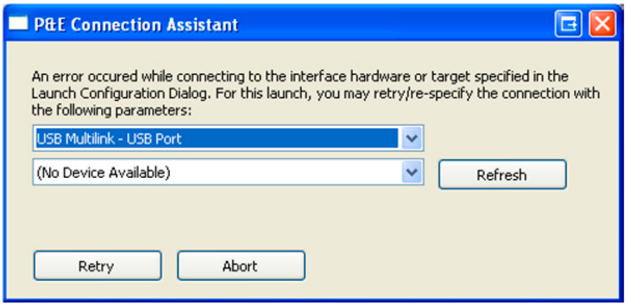
The wizard creates a project for the ColdFire V1 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E USB BDM Multilink as your debugger connection:

1. Select **USB Multilink – USB Port** from the first drop-down menu and click **Refresh**. See Figure 8.11.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the Retry button

Figure 8.11 ColdFire V1 Connection Assistant Interface Selected



P&E Cyclone Pro Serial

The P&E Cyclone Pro Serial Connection setting permits a connection to Cyclone Pro Serial devices. P&E Cyclone Pro Serial mode lets you debug code, as the firmware is fully resident in the Flash of themicroprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

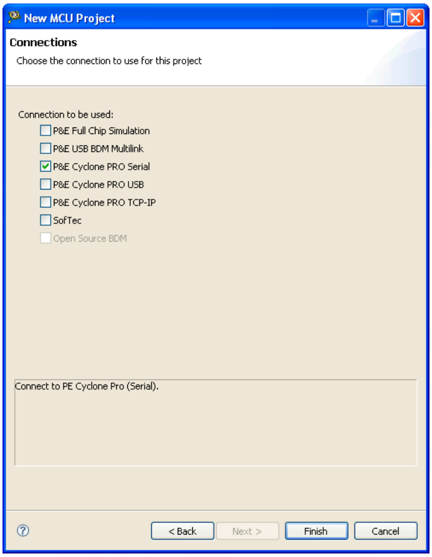
To select P&E Cyclone Pro Serial as the debugger connection:

1. Select Project > Change Device/Connection from the IDE menu bar. The Device/ Connection Change wizard appears.
2. Type a name for the project, in the New Project Name text box. By default, it is the existing project name.

NOTE Clear the Use default location checkbox and click Browse to specify a different location for the new project. By default, the Use default location checkbox is checked.

3. Click Next. The Device and Connection page appears.
4. Expand the ColdFire V1 tree control and select the derivative or board you would like to use. For example, select ColdFire V1 >MCF51QE Family > MCF51QE128.
5. Click Next. The Connections page appears.
6. Check the P&E Cyclone Pro Serial checkbox. See Figure 8.12.

Figure 8.12 ColdFire V1 P&E Cyclone Pro Serial Selected



7. Click Finish.

The wizard creates a project for the ColdFire V1 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

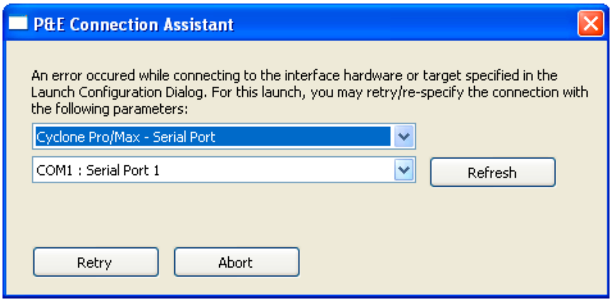
The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro Serial as your debugger connection:

1. Select USB Multilink – USB Port from the first drop-down menu and click **Refresh**. See Figure 8.13.

2. Using the second drop-down menu, select the port on which the interface is connected.

3. Click the Retry button

Figure 8.13 ColdFire V1 Connection Assistant Interface Selected



P&E Cyclone Pro USB

The P&E Cyclone Pro USB Connection setting permits a connection to Cyclone Pro USB devices. P&E Cyclone Pro USB mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

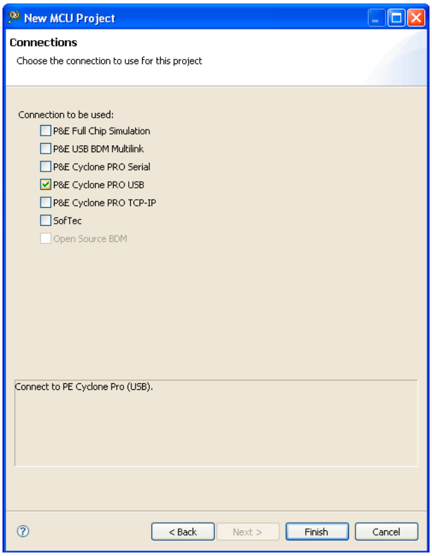
To select P&E Cyclone Pro USB as the debugger connection:

1. Select Project > Change Device/Connection from the IDE menu bar. The Device/ Connection Change wizard appears.
2. Type a name for the project, in the New Project Name text box. By default, it is the existing project name.

NOTE Clear the Use default location checkbox and click Browse to specify a different location for the new project. By default, the Use default location checkbox is checked.

3. Click Next. The Device and Connection page appears.
4. Expand the ColdFire V1 tree control and select the derivative or board you would like to use. For example, select ColdFire V1 > MCF51QE Family > MCF51QE128.
5. Click Next. The Connections page appears.
6. Check the P&E Cyclone Pro USB checkbox. See Figure 8.14.

Figure 8.14 ColdFire V1 P&E Cyclone Pro USB Selected



7. Click Finish.

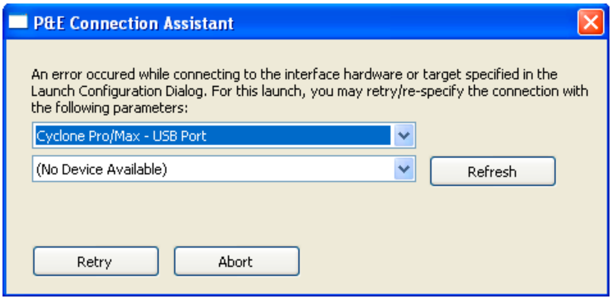
The wizard creates a project for the ColdFire V1 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro USB as your debugger connection:

1. Select USB Multilink – USB Port from the first drop-down menu and click **Refresh**. See Figure 8.15.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the Retry button

Figure 8.15 ColdFire V1 Connection Assistant Interface Selected



P&E Cyclone Pro TCP-IP

The P&E Cyclone Pro TCP-IP Connection setting permits a connection to Cyclone Pro TCP-IP devices. P&E Cyclone Pro TCP-IP mode lets you debug code, as the firmware is fully resident in the Flash of the microprocessor. The operation of all modules fully reflects the actual operation of the onboard resources.

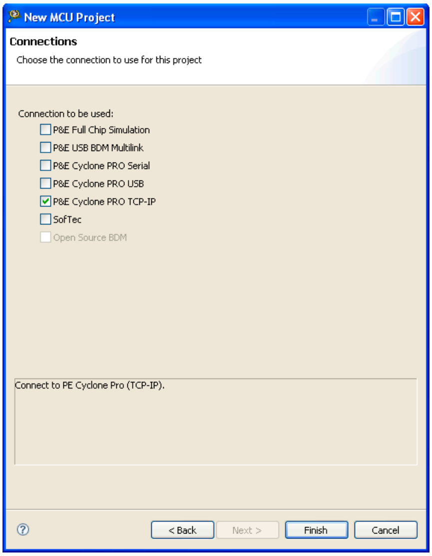
To select P&E Cyclone Pro TCP-IP as the debugger connection:

1. Select Project > Change Device/Connection from the IDE menu bar. The Device/ Connection Change wizard appears.
2. Type a name for the project, in the New Project Name text box. By default, it is the existing project name.

NOTE Clear the Use default location checkbox and click Browse to specify a different location for the new project. By default, the Use default location checkbox is checked.

3. Click Next. The Device and Connection page appears.
4. Expand the ColdFire V1 tree control and select the derivative or board you would like to use. For example, select ColdFire V1 > MCF51QE Family > MCF51QE128.
5. Click Next. The Connections page appears.
6. Check the P&E Cyclone Pro TCP-IP checkbox. See Figure 8.16.

Figure 8.16 ColdFire V1 P&E Cyclone Pro TCP-IP Selected



7. Click Finish.

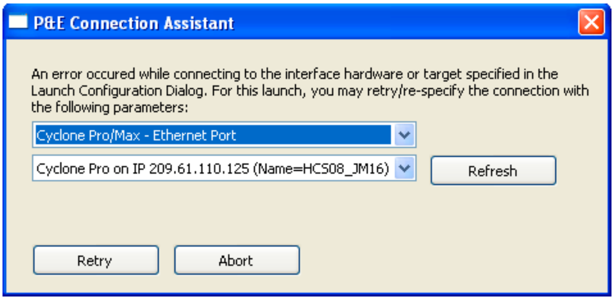
The wizard creates a project for the ColdFire V1 architecture according to your specifications. You can access the project from the CodeWarrior Projects view in the Workbench window.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug and the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Cyclone Pro TCP-IP as your debugger connection:

1. Select USB Multilink – USB Port from the first drop-down menu and click **Refresh**. See Figure 8.17.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the Retry button

Figure 8.17 ColdFire V1 Connection Assistant Interface Selected



Abatron

This section discusses the option of different hardware probes supported by the Abatron BDI debugger protocol and their settings options. The supported hardware connections are:

- TCP/IP
- Serial

TCP/IP

This option specifies that the physical connection uses TCP/IP as the interface for debugging communications. The tab view displays the connection parameters this connection type uses (Figure 8.18).

Figure 8.18 Abatron — TCP/IP Connection

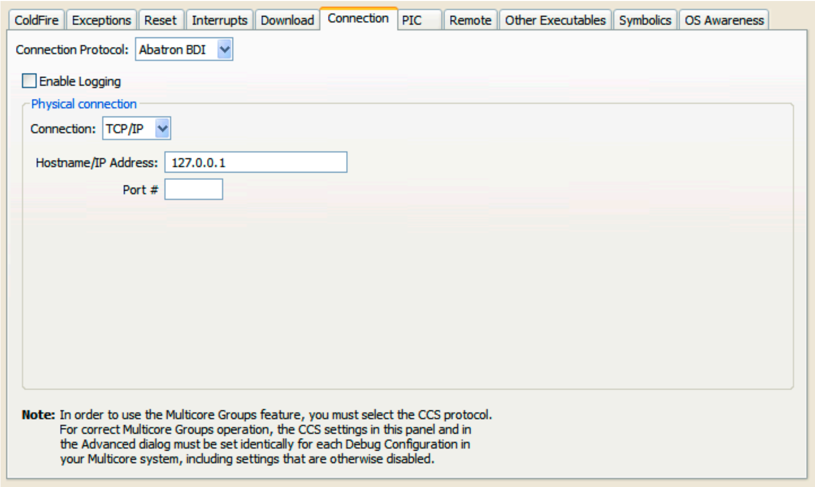


Table 8.2 describes the options displayed by this page.

Table 8.2 Connection Parameter Options for Abatron TCP/IP Connection

Option	Description
Hostname/IP Address	This option specifies the IP address used to communicate with the hardware target. Enter the IP address into the `Hostname/IP address` text box.
Port #	This option specifies the IP port number used to communicate with the hardware target. Enter the value for the port number into `Port #` text box.

Serial

This option specifies that the physical connection uses a serial connection as the interface for debugging communications. The tab view displays the connection parameters this connection type uses (Figure 8.19).

Figure 8.19 Abatron — Serial Connection

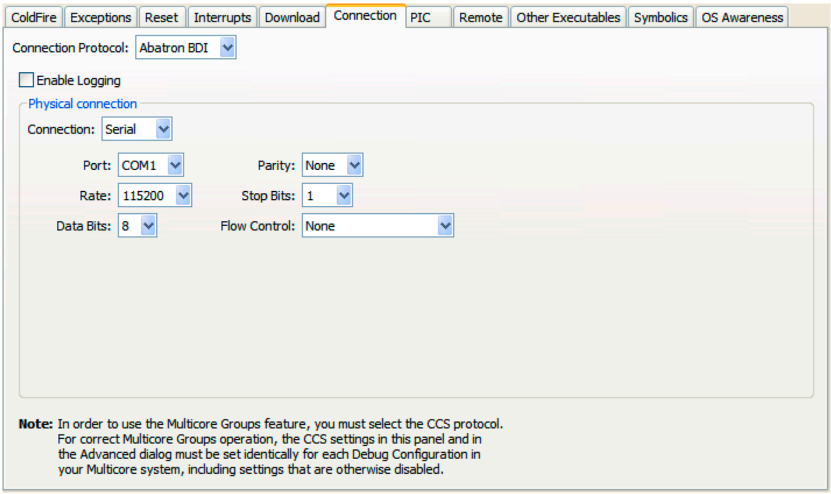


Table 8.3 explains the various settings used to configure the serial connection. Adjust these to match the configuration of the serial port on the hardware target.

Table 8.3 Connection Parameters Option for Abatron Serial Connection

Option	Description
Port	Specifies the serial port the host system uses. Options are: • COM1 • COM2 • COM3 • COM4
Rate	Specifies the bit-rate of the serial interface. Options are: • 300 • 1200 • 2400 • 4800 • 9600 • 19200 • 34800 • 57600 • 115200 • 230400
Data Bits	Specifies the bit size of the characters sent through the serial interface. Options are: • 4 • 5 • 6 • 7 • 8
Parity	Specifies if a parity bit is included with the character for error-correction. Options are: • None • Odd • Even

Table 8.3 Connection Parameters Option for Abatron Serial Connection (*continued*)

Option	Description
Stop Bits	Specifies if a termination bit is appended to the character. Options are: • • 1.5 • 2
Flow Control	Specifies how the serial transfer of characters is controlled to prevent data over-runs. Options are: • None • Hardware (RTS/CTS) • Software (XON/XOFF)

CCS

This section discusses the option of different hardware probes supported by the CCS debugger protocol and their settings options. The supported hardware connections are:

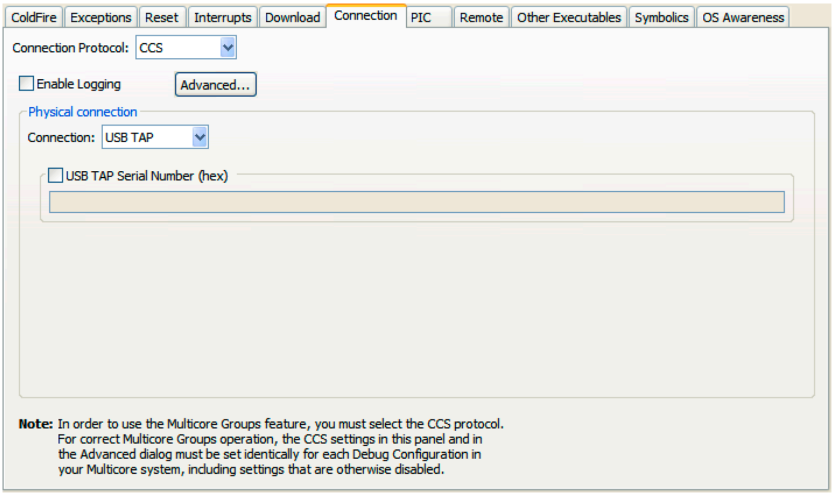
- Generic
- USB TAP
- Ethernet

NOTE The Generic connection is not supported for this release.

USB TAP

This option specifies that the physical connection uses USB TAP run control as the interface for debugging communications. The tab view displays the connection parameters this connection type uses (Figure 8.20).

Figure 8.20 CCS — USB Connection



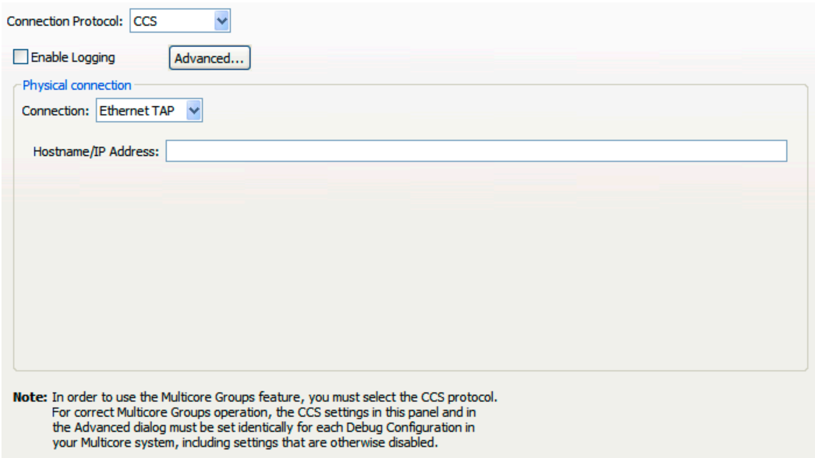
You use the option **USB TAP Serial Number (hex)** to enter an optional serial number for the USB hardware probe. Enter the serial number into the text box as a hexadecimal value.

NOTE For more information on the **Advanced** option presented on these views, consult the section *Connection Tab — ColdFire* in the *Working with the Debugger* chapter,

Ethernet

This option specifies that the physical connection uses Ethernet run control as the interface for debugging communications. The tab view displays the connection parameters this connection type uses ().

Figure 8.21 CCS — Ethernet TAP Connection



Enter the IP address of the Ethernet TAP into the **Hostname/IP Addres**s text box. Enter this value as a dotted decimal number, such as 127.0.0.1.

NOTE For more information on the **Advanced** option presented on these views, consult the section *Connection Tab — ColdFire* in the *Working with the Debugger* chapter,

9

Connections — ColdFire V2/3/4

This chapter describes the features and settings of the connections that interface the CodeWarrior debugger with the ColdFire V2/3/4-based bare board target.

For the IDE to communicate with the target hardware, you must specify several key items: the debugger protocol, a connection type, and any connection parameters. You enter the first two items of information using options in the **Connection** tab view of the **Debug** window. These options are:

- The **Connection Protocol** option determines what *debugger protocol* the debugger uses to communicate with the target.
- The **Physical Connection** option specifies the hardware probe or *connection type* that physically connects the workstation hosting CodeWarrior to the target board under debug. After you make the option of physical connection, the view changes to display configuration options specific for the hardware probe.

The topics in this chapter discuss the features and settings of the connections that interface the CodeWarrior debugger with the ColdFire V2/3/4-based bare board target.

The topics of this chapter are:

Changing Connection in IDE

To change connection in the IDE, perform these steps.

1. Select **Project > Change Device/Connection** from the IDE menu bar.

   The **Device/Connection Change** wizard appears.

2. Type a name for the project, in the **New Project Name** text box. By default, it is the existing project name.

NOTE Clear the **Use default location** checkbox and click **Browse** to specify a different location for the new project. By default, the **Use default location** checkbox is checked.

3. Click **Next**.

   The **Device and Connection** page appears.

4. Expand the tree control and select the derivative or board you would like to use.
5. Click **Next**.

   The **Connections** page appears.

6. Select the desired connection.

NOTE You can select multiple connections by checking appropriate checkboxes in the **Connections** page.

7. Click **Finish**.

   The wizard creates a simulator project according to your specifications. You can access the project from the **CodeWarrior Projects** view in the **Workbench** window.

8. Build the new project. For more information, refer to the topic Building Projects.
9. Debug the new project. For more information, refer to the topic Debugging Projects.

P&E ColdFire Multilink/Cyclone MAX

This option specifies that the hardware connection is either a P&E Microcomputer Systems Multilink or a P&E Microcomputer Systems Cyclone MAX. The **Connection** tab displays options that can be used to specify the connection parameters, such as the probe interface type and the port that it uses (Figure 9.1).

Figure 9.1 GDI — P&E Multilink/Cyclone MAX Connection

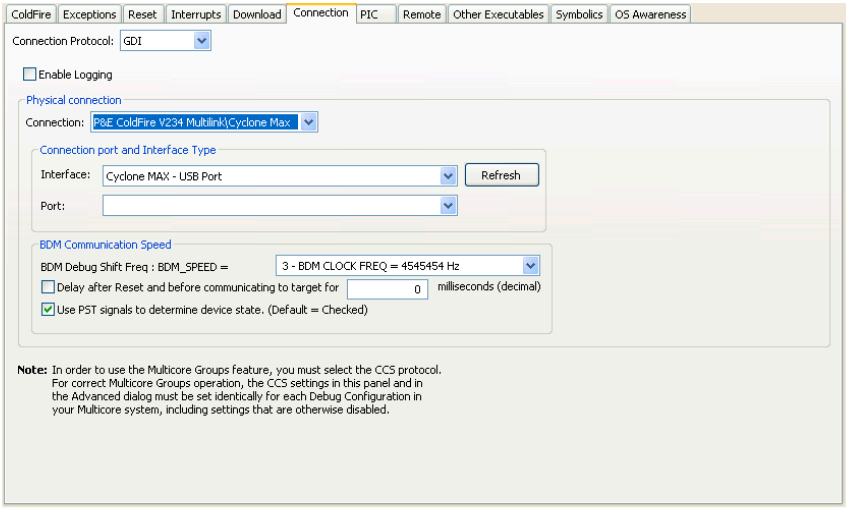


Table 9.1 describes the options for this view.

Table 9.1 Connection Parameter Options for P&E Multilink/Cyclone MAX

Option	Description
Interface	Use this option to select the interface type. Select a supported interface from the list box.
Port	This option selects the port over which debug communications is conducted. Select an available port from the list box.
Refresh	Click this button to have the workstation scan for a valid interface and port. Valid interfaces and ports appear in the `Interface` and `Port` list boxes.

Table 9.1 Connection Parameter Options for P&E Multilink/Cyclone MAX (*continued*)

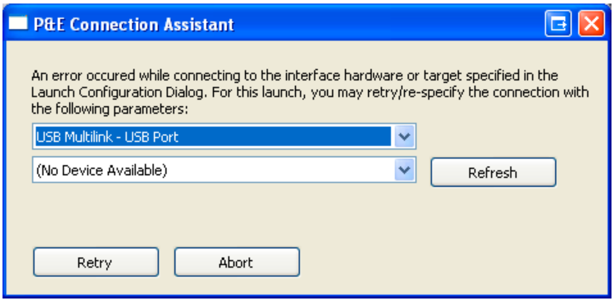
Option	Description
BDM Debug Shift Freq.	This option lets you to set the BDM shift clock speed of P&E's BDM interfaces. This integer value may be used to determine the speed of communications according to the following equations: Cyclone Max : (50000000/(2*N+5)) Hz USB-ML-CF : (1000000/(N+1)) Hz The value n should be between 0 and 31. This shift clock takes effect after the commands in the top of the programming algorithm are executed so that these commands can increase the target frequency and allow a faster shift clock. This clock can't generally exceed a div 4 of the processor bus frequency.
Delay After Reset	Specifies a delay after the programmer resets the target that we check to see if the part has properly gone into background debug mode. This is useful if the target has a reset driver which hold the MCU in reset after the programmer releases the reset line. The n value is a delay in milliseconds.
Use PST Signals	When the checkbox is set, the software will use the PST pins to determine if the part is running in user mode or halted in debug mode. When the checkbox is cleared, the software will use the BDM communications pins to determine the processor status. Using the BDM communications pins to determine the status results in a slight slowdown in communication and download rates. The advantage is that the target board no longer has to wire the PST signals to the debug connectors.

Connection Assistant

The P&E Connection Assistant is displayed when you attempt to debug but the program cannot connect to the interface hardware specified in the Launch Configuration Dialog. To select the P&E Multilink/Cyclone Pro as your debugger connection:

1. Choose the P&E device that you are using from the first drop-down menu and click **Refresh**. See Figure 9.2.
2. Using the second drop-down menu, select the port on which the interface is connected.
3. Click the Retry button

Figure 9.2 CFV2/3/4 Connection Assistant Interface Selected



Launch Configuration Settings

To set the launch configurations for the debugger:

1. Find the debugger icon and click on the drop-down arrow to bring up the debugger menu. See Figure 9.2.
2. Select Debug Configurations
3. In the left column, select the project download type for which you would like to set the launch configurations. See Figure 9.3
4. In the right column, click on the **Debugger** tab.
5. Set your configurations and click **Debug** to start the debugger.

Figure 9.3 Debugger Drop-down Menu

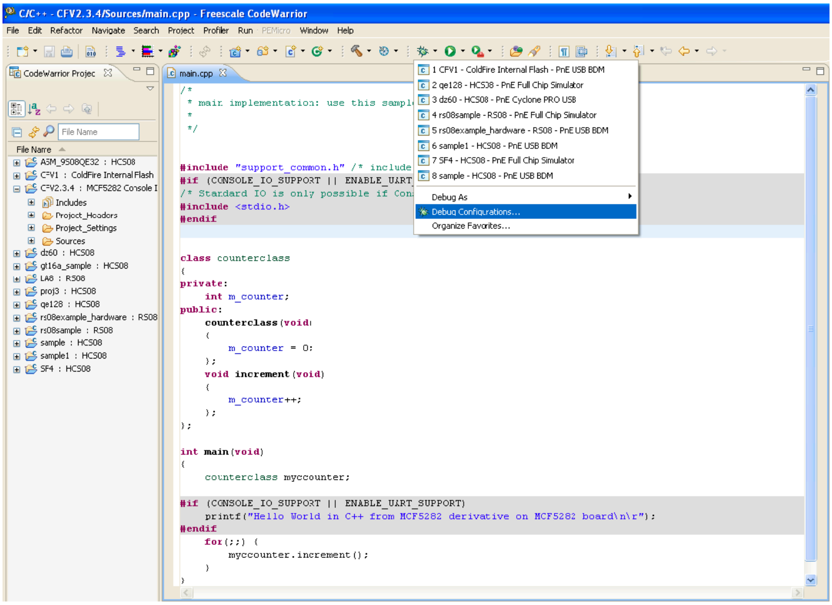
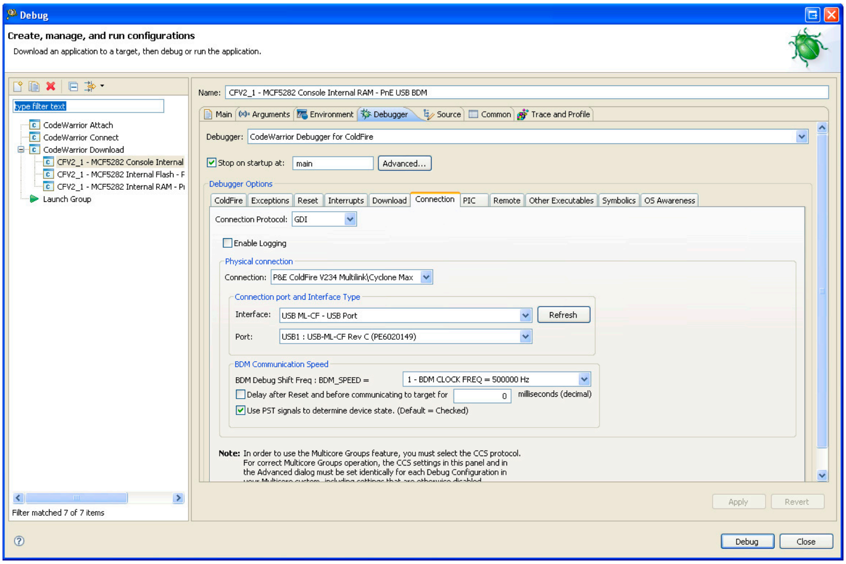


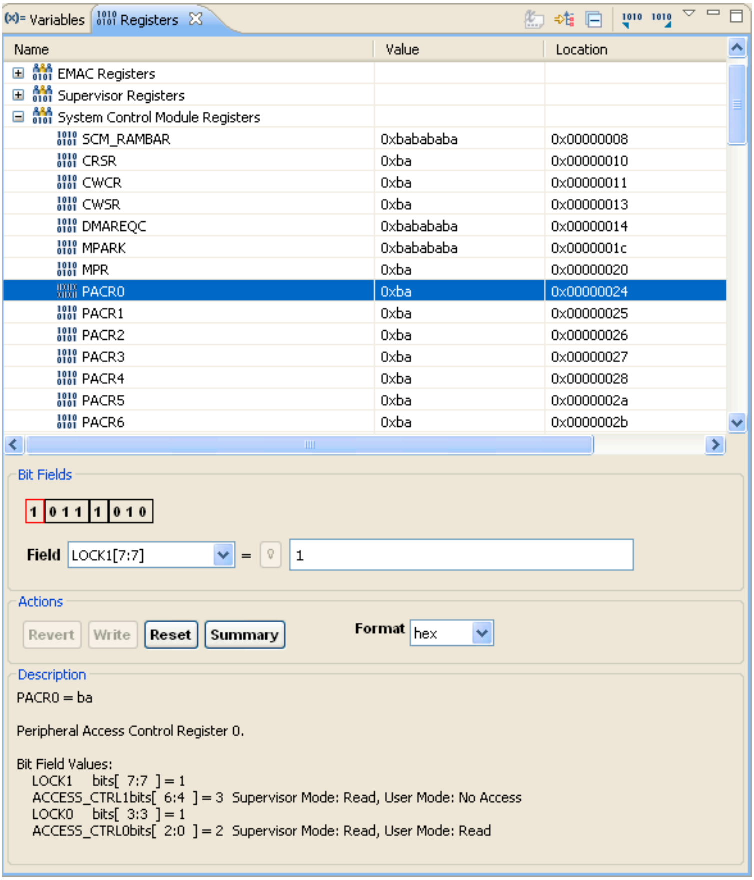
Figure 9.4 Debugger Configuration Settings Dialog Box



View Register Files Options

The Register Files tab in the debugger gives you option of viewing and editing the register files. If register files are available for the device that you have chosen, the Registers tab in the debugger (see Figure 9.5) is populated.

Figure 9.5 Debug Register File Tab



To view the Register Files of the device that you have chosen:

1. Find the debugger icon and click it to enter debug mode and open the debugging window
2. Select the “Registers” tab on the right side of the debugging window, or select the Window menu -> Show View -> Registers to open the Register window.
3. Expand a module by clicking on the plus/minus button to view the registers within the module
4. Select a desired register to view its bit fields and bit descriptions in the window below.

In the Registers tab, all of the available modules are listed, and under each module all of its registers are displayed with their current values. Selecting a register brings up the Bit field, Actions box, and Description box. In the Bit field, you can view the bits in binary format. The Actions box is used when a bit needs to be modified. You can revert changes, write a new value, reset all of the bits, and view a summary of the register. You can also change the format of the value written in the bit field. The Description box displays the values and significance of each bit in the register. When a bit is modified, the description will change.

You can modify each bit by selecting it in the drop-down box under the Bit field, or by clicking the bit on the Bit field. Note that bits that are read-only will not allow you to modify the bit values. A new value can be written into the edit box, or you can click the light bulb button next to the edit box to view all of the options, and then double-click the changes.

Abatron

This section discusses the option of different hardware probes supported by the Abatron BDI debugger protocol and their settings options. The supported hardware connections are:

- TCP/IP
- Serial

TCP/IP

This option specifies that the physical connection uses TCP/IP as the interface for debugging communications. The tab view displays the connection parameters this connection type uses (Figure 9.6).

Figure 9.6 Abatron — TCP/IP Connection

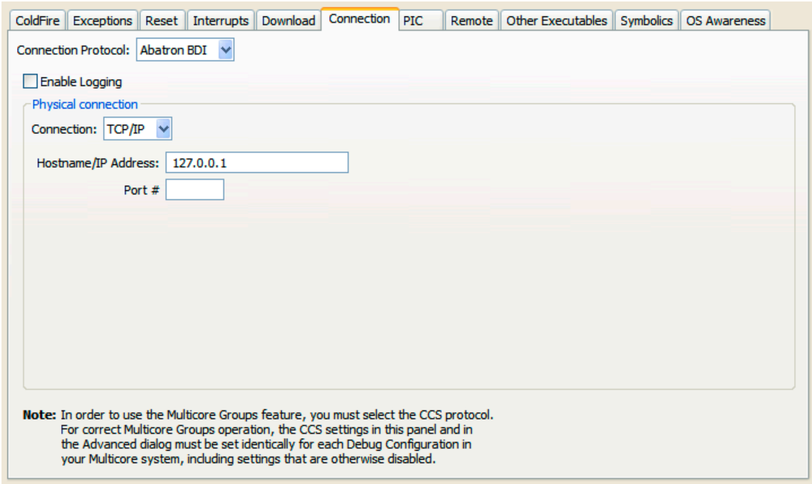


Table 9.2 describes the options displayed by this page.

Table 9.2 Connection Parameter Options for Abatron TCP/IP Connection

Option	Description
Hostname/IP Address	This option specifies the IP address used to communicate with the hardware target. Enter the IP address into the `Hostname/IP address` text box.
Port #	This option specifies the IP port number used to communicate with the hardware target. Enter the value for the port number into `Port #` text box.

Serial

This option specifies that the physical connection uses a serial connection as the interface for debugging communications. The tab view displays the connection parameters this connection type uses (Figure 9.7).

Figure 9.7 Abatron — Serial Connection

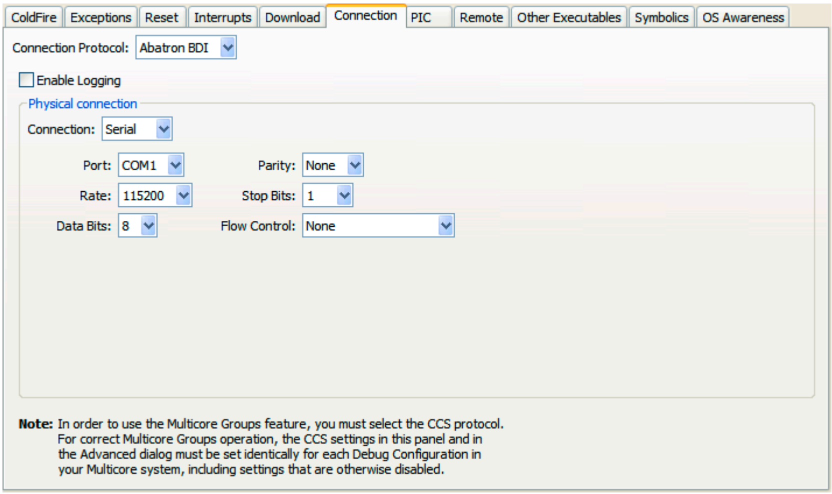


Table 9.3 explains the various settings used to configure the serial connection. Adjust these to match the configuration of the serial port on the hardware target.

Table 9.3 Connection Parameters Option for Abatron Serial Connection

Option	Description
Port	Specifies the serial port the host system uses. Options are: • COM1 • COM2 • COM3 • COM4
Rate	Specifies the bit-rate of the serial interface. Options are: • 300 • 1200 • 2400 • 4800 • 9600 • 19200 • 34800 • 57600 • 115200 • 230400
Data Bits	Specifies the bit size of the characters sent through the serial interface. Options are: • 4 • 5 • 6 • 7 • 8
Parity	Specifies if a parity bit is included with the character for error-correction. Options are: • None • Odd • Even

Table 9.3 Connection Parameters Option for Abatron Serial Connection (*continued*)

Option	Description
Stop Bits	Specifies if a termination bit is appended to the character. Options are: • • 1.5 • 2
Flow Control	Specifies how the serial transfer of characters is controlled to prevent data overruns. Options are: • None • Hardware (RTS/CTS) • Software (XON/XOFF)

CCS

This section discusses the option of different hardware probes supported by the CCS debugger protocol and their settings options. The supported hardware connections are:

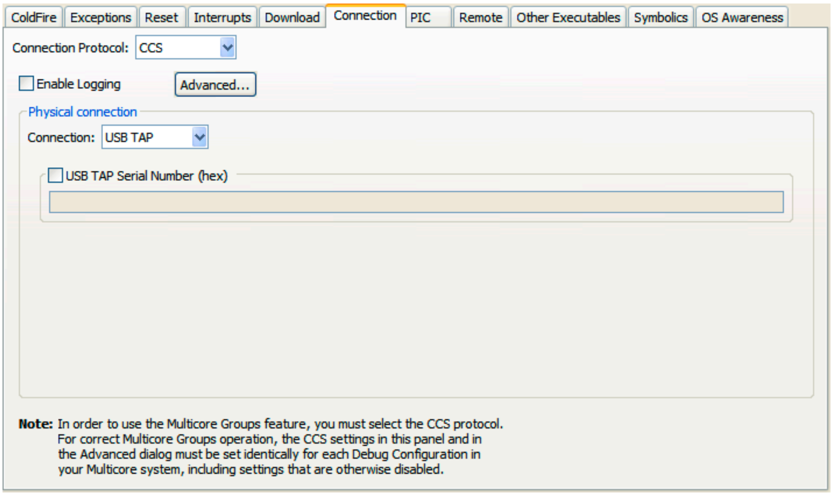
- Generic
- USB TAP
- Ethernet

NOTE The Generic connection is not supported for this release.

USB TAP

This option specifies that the physical connection uses USB TAP run control as the interface for debugging communications. The tab view displays the connection parameters this connection type uses (Figure 9.8).

Figure 9.8 CCS — USB Connection



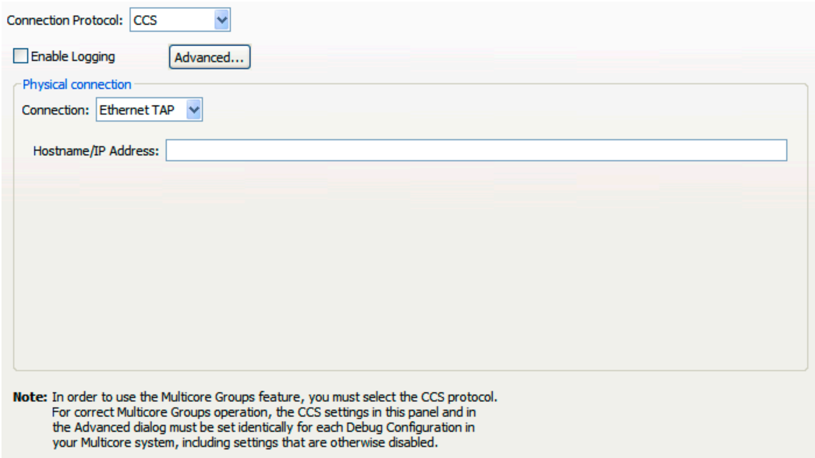
You use the option **USB TAP Serial Number (hex)** to enter an optional serial number for the USB hardware probe. Enter the serial number into the text box as a hexadecimal value.

NOTE For more information on the **Advanced** option presented on these views, consult the section *Connection Tab — ColdFire* in the *Working with the Debugger* chapter,

Ethernet

This option specifies that the physical connection uses Ethernet run control as the interface for debugging communications. The tab view displays the connection parameters this connection type uses ().

Figure 9.9 CCS — Ethernet TAP Connection



Enter the IP address of the Ethernet TAP into the **Hostname/IP Addres**s text box. Enter this value as a dotted decimal number, such as 127.0.0.1.

NOTE For more information on the **Advanced** option presented on these views, consult the section *Connection Tab — ColdFire* in the *Working with the Debugger* chapter,

10

Common Connection Features

This chapter explains how to use the CodeWarrior hardware tools. Use these tools for board bring-up, test, and analysis.

The topics in this chapter are:

- Working with Flash Programmer
- Quick Access to Target Tasks
- Flash Programmer Tutorials
- Working with Hardware Diagnostics Window
- Manipulating Target Memory

Working with Flash Programmer

The CodeWarrior Flash Programmer can program the flash memory of the target board with code from any CodeWarrior IDE project or any individual files. The Flash Programmer (FP) feature is a target task that lets you run a series of actions on a flash: internal or present on a board (NOR, NAND, etc). The supported operations are:

- **Program** — Program an image in flash (address restrictions may apply).
- **Erase** — Erase the flash at a sector/block level, and all flash if possible.
- **Blank Check** — At sector level and when possible, all flash.
- **Verify** — Verify the programmed image (address restrictions may apply).
- **Checksum** — Checksum of a written image (file on target, file on host, memory range on target, and all flash).

The CodeWarrior Flash Programmer lets you program the flash memory of any of the supported target boards, from within the IDE. You can do this using either the pre-defined tasks provided with the CodeWarrior installation, or create your own specialized tasks. Each of these options is described in the following topics:

- Use Pre-Defined Programming Task
- Create Flash Programmer Task

Use Pre-Defined Programming Task

To use a pre-defined flash programming task, you first import its `*.xml` file into the **Target Tasks** view. CodeWarrior for Microcontrollers provides default flash configuration files for a wide variety of supported target boards. The pre-defined task files are in the following directories:

`*CWInstallDir*/MCU_*version*/bin/plugins/support/TargetTask/Flash_Programmer/HC08`

`*CWInstallDir*/MCU_*version*/bin/plugins/support/TargetTask/Flash_Programmer/ColdFire`

After you have imported the task, it appears in the **Target Tasks** view, where you can execute it.

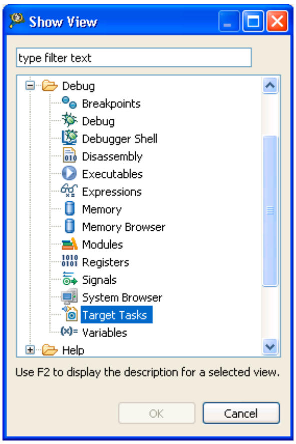
To import a pre-defined Flash Programmer task, perform these steps.

1. From the CodeWarrior menu bar, select **Window > Show View > Other**.

   The **Show View** dialog box appears.

2. Expand the **Debug** tree control and select **Target Tasks**. See Figure 10.1.

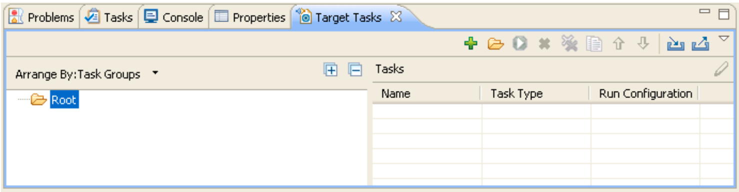
Figure 10.1 Show View Dialog Box



3. Click **OK**.

   The **Target Tasks** view appears. See Figure 10.2.

Figure 10.2 Target Tasks View



4. Right-click in the **Target Tasks** view and select **Import**. Alternatively, click the icon on the **Target Tasks** view toolbar.

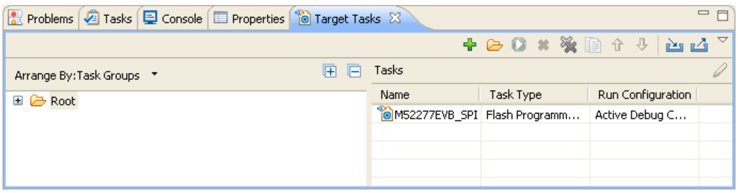
   The **Open** dialog box appears.

5. Navigate to the pre-defined tasks folder at `<CW MCU install>\MCU_10.0\bin\plugins\support\TargetTask\Flash_Programmer\` and select the desired `.xml` file for your hardware target. For example, select `MCF5213_INTFLASH.xml`

6. Click **Open**.

   The selected task appears in the **Target Tasks** view (Figure 10.3).

Figure 10.3 Pre-defined Task in Target Tasks View



7. Right-click on the task's name and select **Execute**.

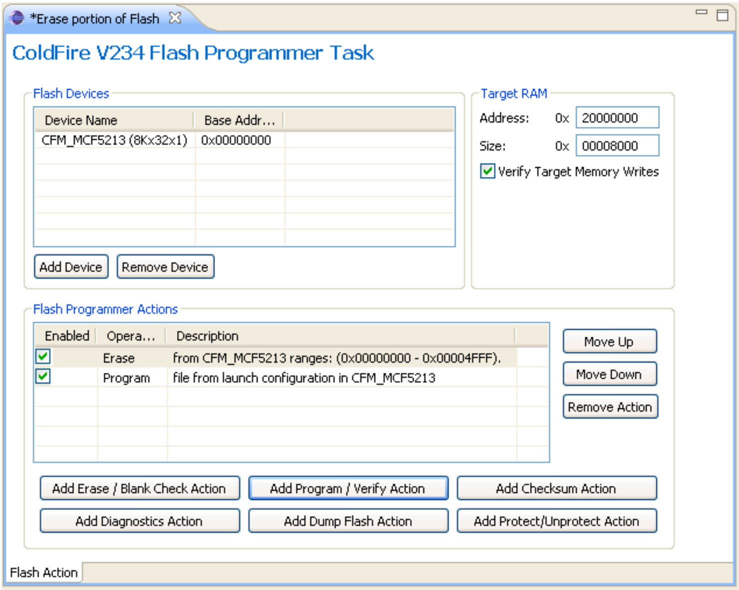
   The task's Flash Programmer actions execute in sequence. First, they erase the hardware target's flash memory.

NOTE When a predefined flash programmer task is imported, its **Run Configuration** is set as `Active Debug Context`. If the task is imported without any active debug session, then the icon will be disabled as in Figure 10.3. Associate the selected target task to a different Run Configuration to enable the icon.

8. Double-click on the task's name, to examine the task's stored Flash Programmer actions.

   The ***<target>*** **Flash Programmer Task** editor window appears, and displays the actions in the **Flash Programmer Actions** group (Figure 10.4).

Figure 10.4 *<target>* Flash Programmer Task Editor Window Displaying Stored Actions



If you are working with special hardware that require a different sequence of Flash Programmer actions, you can create your own target tasks.

NOTE For more information on creating Flash Programmer target tasks, refer to the Create Flash Programmer Task topic.
For more information on the various options available in the ***<target>* Flash Programmer Task** editor window, refer to the *Freescale Eclipse Extensions Guide*.

Create Flash Programmer Task

In the Eclipse IDE, the Flash Programmer runs like a target task.

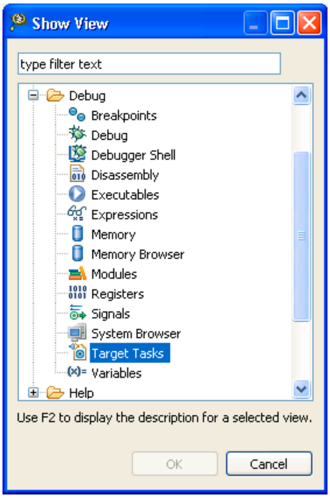
To create a Flash Programmer target task, perform these steps.

1. From the CodeWarrior main menu bar, select **Window > Show View > Other**.

   The **Show View** dialog box appears.

2. Expand the **Debug** tree control and select **Target Tasks**. See Figure 10.5.

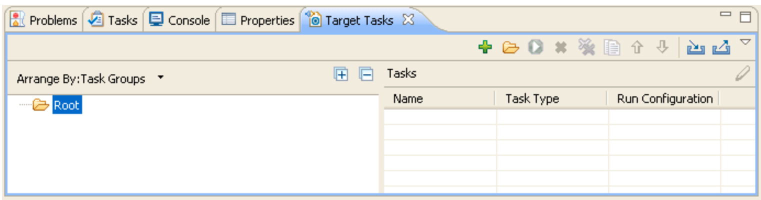
Figure 10.5 Show View Dialog Box



3. Click **OK**.

   The **Target Tasks** view appears. See Figure 10.6.

Figure 10.6 Target Tasks View



4. Click  from the **Target Tasks** view toolbar to create a new target task.

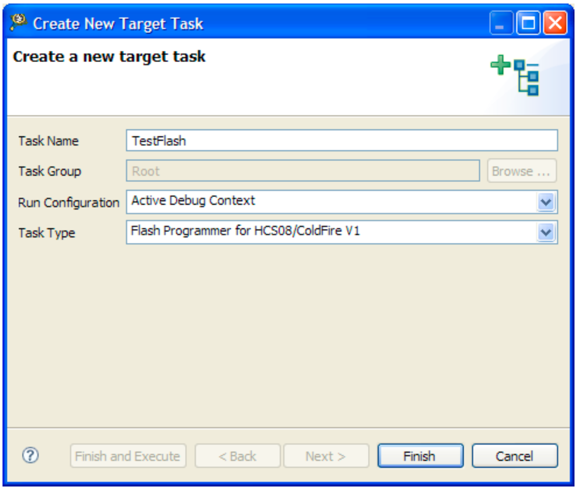
   The **Create New Target Task** wizard appears.

5. In the **Task Name** text box, enter the name of the target task.
6. From the **Run Configuration** drop-down list, select a configuration.

NOTE Select **Active Debug Context** from the **Run Configuration** drop-down list, if you want to use Flash Programmer over an active debug session, else select any of the specified debug context from the list.

7. From the **Task Type** drop-down list, select the appropriate **Flash Programmer**. See Figure 10.7. If necessary, select `Flash Programmer for HCS08/ColdFire V1` from the drop-down list.

Figure 10.7 Create New Target Task Wizard

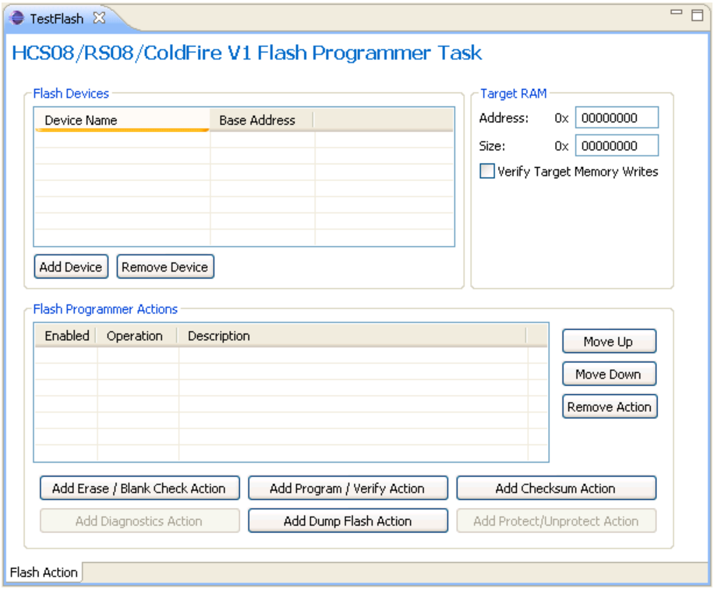


8. Click **Finish**.

   The **<*target*> Flash Programmer Task** editor window appears as seen in Figure 10.8.

NOTE The **<*target*> Flash Programmer Task** editor window has groups to define flash devices, Flash Programmer actions, and target RAM settings.

Figure 10.8 *<target>* Flash Programmer Task Editor Window



9. Click **Add Device** from the **Flash Devices** group to add a new hardware device.

   The **Add Device** dialog box appears with a list of supported devices.

   a. Select the specific device from the list.

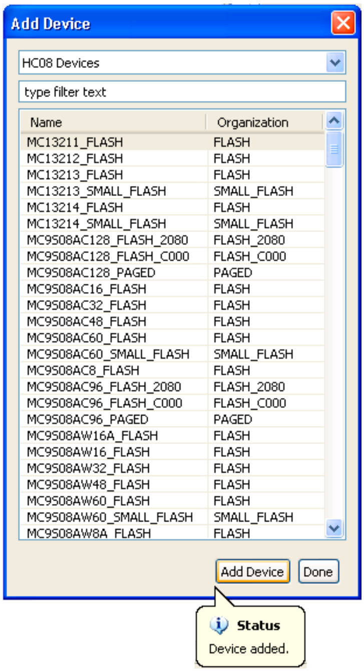
   b. Change the device’s memory organization (if required).

NOTE To change the device memory organization, click the adjacent value in the **Organization** column. Click the  icon, and select the required organization.

   c. Click **Add Device**.

   You get a popup with a status that the device is added.

Figure 10.9 Add Device Dialog Box - Popup with Status



d. You can select other devices, if required.

e. Click **Done**.

The **Add Device** dialog box closes. The devices appear in the **Flash Devices** group of the ***<target>*** **Flash Programmer Task** editor window.

10. Enter the first address from target memory used by the flash algorithm (running on the target) in the **Address** text box of the **Target RAM** group.

a. Enter the size of the memory that the flash algorithm is allowed to use in the **Size** text box.

b. Check the **Verify Target Memory Writes** checkbox to verify all write operations to the hardware RAM during Flash programming.

11. From the **Flash Programmer Actions** group, you can use any of the buttons listed in Table 10.1 to add various Flash Programmer actions.

Table 10.1 Task Actions and Sequence Organization

Button	Usage
Add Erase / Blank Check Action	Lets you add erase or blank check actions for flash devices
Add Program / Verify Action	Lets you add program or verify flash actions for flash devices
Add Checksum Action	Lets you add checksum actions for flash devices
Add Diagnostics Action	Lets you add a diagnostics action to the actions table.
Add Dump Flash Action	Lets you dump a portion of the flash or the entire flash.
Add Protect/Unprotect Action	Lets you modify the protection of a sector.
Remove Action	Lets you remove a sector, a group of sector, or an entire device from the **Flash Programmer Actions** table, depending on the flash capabilities.
Move Up	Lets you move a selected flash action up in the **Flash Programmer Actions** table, so that it executes before other actions beneath it in the table.
Move Down	Lets you move a selected flash action down in the **Flash Programmer Actions** table, so that the action executes after other actions above of it in the table execute.

NOTE See the *Freescale Eclipse Extension Guide* for detailed documentation on the various options available in the **Flash Programmer** window.

Quick Access to Target Tasks

The **Target Task** toolbar helps quickly access the **Flash Programmer**, **Hardware Diagnostics** , or **Import/Export Memory** target tasks. The toolbar is populated with the last executed target tasks corresponding to the related provider and will give the possibility to faster execute any of the last executed target tasks.

Target Task Toolbar

Figure 10.10 shows the Target Task toolbar.

Figure 10.10 Target Task Toolbar

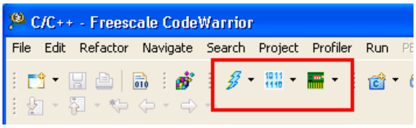
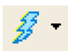


Table 10.2 lists the icons available on the **Target Task** toolbar.

NOTE The icons provide fast access to the view, import predefined tasks, and execute recently executed tasks.

Table 10.2 Target Task Toolbar Icons

Option	Description
	Enables fast access to the **Flash Programmer** target task. It also lets you access **Simple Flash** programmer to load files on target. Refer Fast Access to Flash Programmer and Tutorial J: Programming with Simple Flash.
	Enables fast access to the **Hardware Diagnostics** target task. Refer Fast Access to Hardware Diagnostics.
	Enables fast access to the **Import/Export Memory** target task. Refer Fast Access to Import/Export Memory.

Fast Access to Flash Programmer

The quickly access the **Flash Programmer** target task, click the  icon.

Table 10.3 lists the available **Flash Programmer** ptions.

Table 10.3 Flash Programmer Options

Option	Description
Open Flash Programmer	Select to open the **Target Tasks** view.
Import Flash Task	Select to import a Flash task using the **Open** dialog box.
Flash File to Target	Select to flash file using the **Simple Flash** dialog box.

Fast Access to Hardware Diagnostics

The quickly access the **Hardware Diagnostics** target task, click the  icon.

Table 10.4 lists the available **Hardware Diagnostics** options.

Table 10.4 Hardware Diagnostics Options

Option	Description
Open HW Diagnostic	Select to open the **Target Tasks** view.
Import HW Diagnostic Task	Select to import a hardware diagnostics task using the **Open** dialog box.

Fast Access to Import/Export Memory

The quickly access the **Import/Export Memory** target task, click the  icon.

Table 10.4 lists the available **Import/Export Memory** options.

Table 10.5 Import/Export Memory Options

Option	Description
Open Import Export Memory	Select to open the **Target Tasks** view.
Import IEM Task	Select to import a import/export memory task using the **Open** dialog box.

Flash Programmer Tutorials

This topic consists of two tutorials that demonstrate how to import and execute pre-defined target tasks. Additionally, there are tutorials on how use the ***<target>* Flash Programmer Task** editor window to create tasks, such as erasing on-chip memory, or downloading a file, and writing it into flash memory.

NOTE The Flash Programmer for RS08 works only if OSBDM connection is used.

The tutorials include:

- Tutorial A: Import and Execute HCS08 Flash Task
- Tutorial B: Import and Execute ColdFire Flash Task
- Tutorial C: Create Erase Memory Task for HCS08
- Tutorial D: Create Erase Flash Memory Task for ColdFire
- Tutorial E: Create Download Program Task for ColdFire
- Tutorial F: Create and Execute Diagnostics Action Task
- Tutorial G: Dump Entire Flash
- Tutorial H: Change Protection of Sector
- Tutorial I: Fast Access to Target Tasks Editors
- Tutorial J: Programming with Simple Flash

Tutorial A: Import and Execute HCS08 Flash Task

The goal of this tutorial is to select and import a pre-defined task that erases and programs the flash memory in a DEMOS908QG8, an evaluation board based on a Freescale MC9S08QG8 microcontroller.

Import HCS08 Program Flash Task

NOTE This procedure assumes that you have already created a project named `DEMO9S08QG8_test`. It also assumes that you have created other tasks, such that the **Target Tasks** view is visible.

TIP If it is not visible, perform the steps in the Working with Flash Programmer topic to open the **Target Tasks** view.

After you have launched CodeWarrior and connected the DEMOS908QG8 board to the workstation using a USB cable, perform these steps.

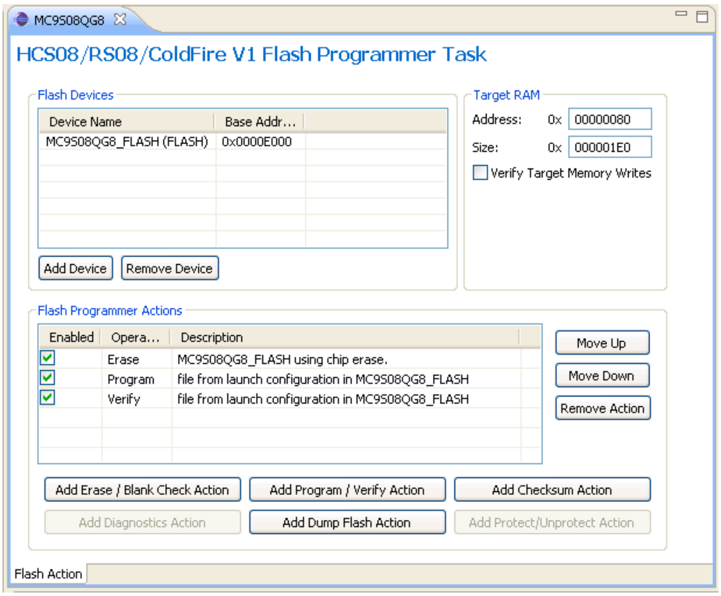
1. Go to the **Target Tasks** view in either the **C/C++** or **Debug** perspective.
2. Right-click on this view and select **Import**. Alternatively, click the icon on the **Target Tasks** view toolbar.

   The **Open** dialog box appears.
3. Navigate to `*CWInstallDir*/MCU_*version*/bin/plugins/support/TargetTask/Flash_Programmer/HC08` and select the XML file for the board's microcontroller. For this tutorial, select `MC9S08QG8.xml`.
4. Click **Open**.

   The `MC9S08QG8` task appears in the **Target Tasks** view.
5. Double-click on the `MC9S08QG8` task to examine its contents.

   The ***<target>*** **Flash Programmer Task** editor window appears, and displays the memory settings and actions for the task (Figure 10.11). Notice the actions to erase, program, and verify the contents of flash memory in the **Flash Programmer Actions** group. These actions execute in the order as they are displayed in the table, from top to bottom.

Figure 10.11 Memory Settings and Actions for MC9S08QG8 Task



Execute MC9S08QG8 Task

To execute the task, perform these steps.

1. Right-click on the `MC9S08QG8` task.
2. Select **Execute**. Alternatively, select the `MC9S08QG8` task and click the **Execute** icon on the **Target Tasks** view toolbar.

   CodeWarrior establishes contact with the DEMOS908QG8 board, erases the microcontroller's flash memory, downloads the code, and verifies that the contents of flash match those of the file.

Congratulations! You have selected and used a target task that erased and programmed the flash memory on the MC9S08QG8 microcontroller.

Tutorial B: Import and Execute ColdFire Flash Task

The goal of this tutorial is to to select and import a pre-defined task that erases and then programs the flash memory in a board based on the ColdFire MCF5213 microcontroller.

Import MCF5213 Program Flash Task

NOTE This tutorial assumes that you have already built a ColdFire project with the name `ColdFire_test`. It also assumes that you have previously created other tasks, so that the **Target Tasks** view is visible. If it is not visible, perform the steps in the Working with Flash Programmer topic to open the **Target Tasks** view.

After you have connected an MCF5213-based evaluation board to the workstation with a USB cable, perform these steps.

1. Go to the **Target Tasks** view in either the **C/C++** or **Debug** perspective.
2. Right-click on this view and select **Import**. Alternatively, click the icon on the **Target Tasks** view toolbar.

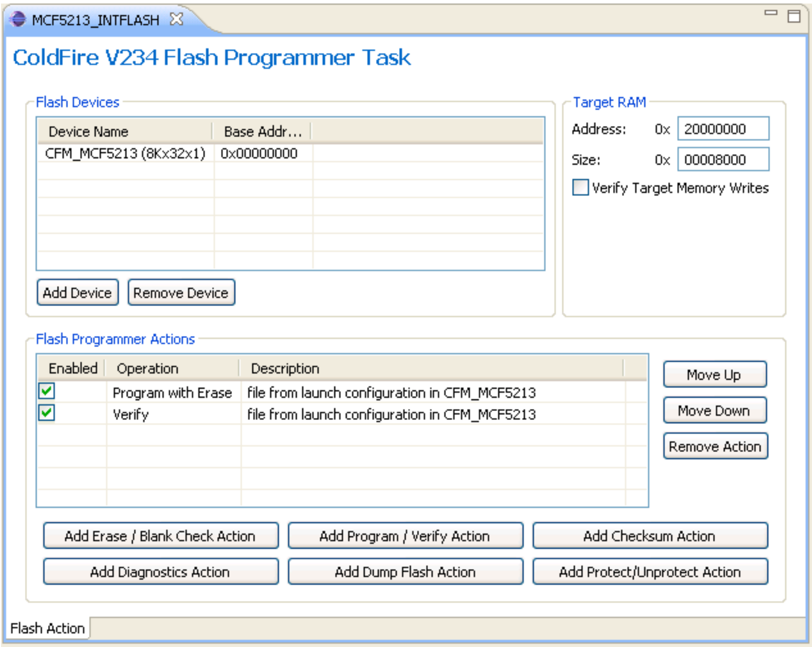
   The **Open** dialog box appears.
3. Navigate to `*CWInstallDir*/MCU_*version*/bin/plugins/support/TargetTask/Flash_Programmer/ColdFire` and select the XML file for the board's microcontroller. For this tutorial, select `MCF5213_INTFLASH.xml`.
4. Click **Open**.

   The `MCF5213_INTFLASH` task appears in the **Target Tasks** view.

5. Double-click on the `MCF5213_INTFLASH` task to examine its contents.

   The ***<target>* Flash Programmer Task** editor window appears, and displays the memory settings and actions for the task (Figure 10.12). Notice the actions to erase, program, and verify the contents of flash memory in the **Flash Programmer Actions** group. These actions execute in the order as they are displayed in the table, from top to bottom.

Figure 10.12 Memory Settings and Actions for the MCF5213_INTFLASH Task



Execute MCF5213_INTFLASH Task

To execute the task, perform these steps.

1. Right-click on the `MCF5213_INTFLASH` task.
2. Select **Execute**. Alternatively, select the `MCF5213_INTFLASH` task and click the **Execute** icon on the **Target Tasks** view toolbar.

   CodeWarrior establishes contact with the MCF5213-based board board, erases the microcontroller’s flash memory, downloads the code, and verifies that the contents of flash match those of the file.

Congratulations! You have selected and used a target task that erased and programmed the flash memory on the MCF5213 microcontroller.

Tutorial C: Create Erase Memory Task for HCS08

The goal of this tutorial is to demonstrate how to create a task that erases the flash memory in a DEMOS908QG8, an evaluation board based on a Freescale MC9S08QG8 microcontroller.

Set Up HCS08 Erase Task

NOTE This procedure assumes that you have already created a project named `DEMO9S08QG8_test`. It also assumes that you have previously created other tasks, so that the **Target Tasks** view is visible. If it is not visible, perform the steps in the Working with Flash Programmer topic to open the **Target Tasks** view.

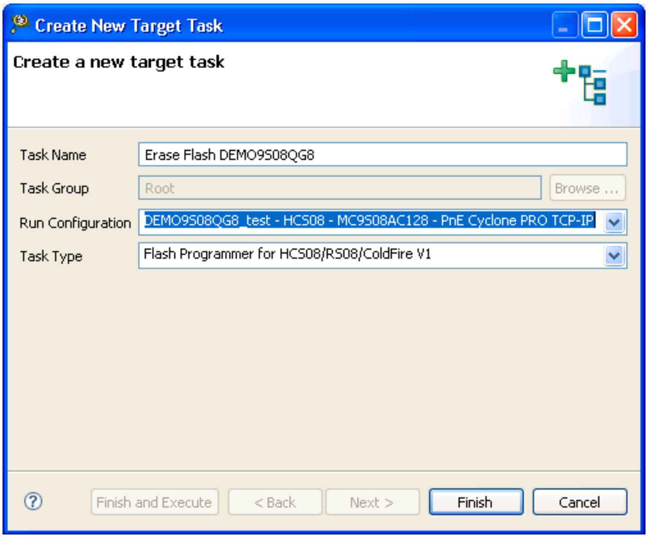
After you have launched CodeWarrior and connected the DEMOS908QG8 board to the host system using a USB cable, perform these steps.

1. Go to the **Target Tasks** view in either the **C/C++** or **Debug** perspective.
2. Right-click on this view and select **New Task**.

   The **Create New Target Task** wizard appears.
3. In the **Task Name** text box, enter the name of the target task. For example, enter `Erase Flash DEMO9S08QG8`.
4. From the **Run Configuration** drop-down list, select a run configuration. For example, select `DEMO9S08QG8_test - HCS08 - MC9S08AC128 - PnE Multilink_Cyclone PRO TCP-IP .`
5. From the **Task Type** drop-down list, select `Flash Programmer for HCS08/ ColdFire V1` from the listbox.

   The dialog box should appear as in Figure 10.13.

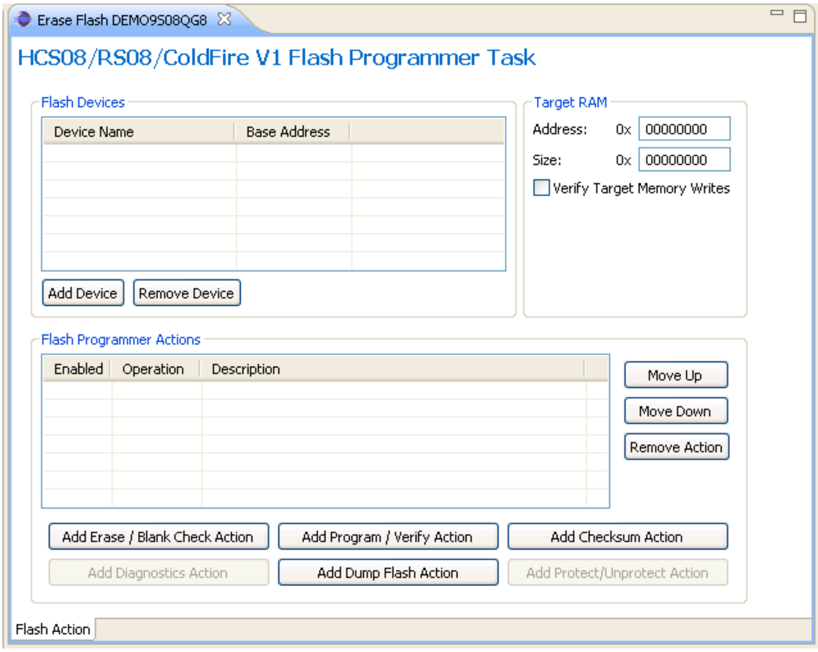
Figure 10.13 Task Settings for Erasing Flash on MC9S08QG8



6. Click **Finish** to create the task.

   The ***<target>*** **Flash Programmer Task** editor window appears, as shown in Figure 10.14.

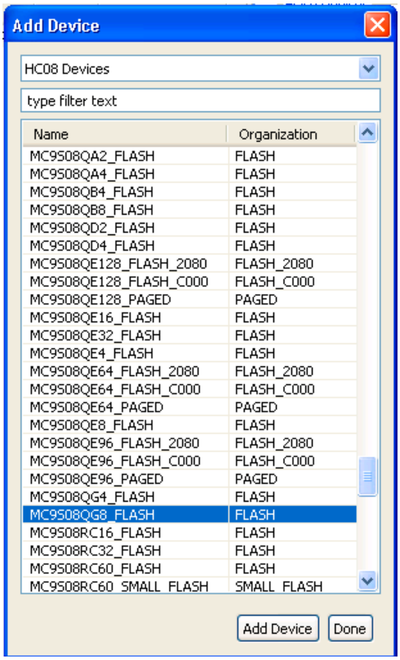
Figure 10.14 *<target>* Flash Programmer Task Editor Window to Erase HCS08 Flash



7. Click **Add Device**.

   The **Add Device** dialog box appears (Figure 10.15).

Figure 10.15 Add Device for HCS08 Derivative



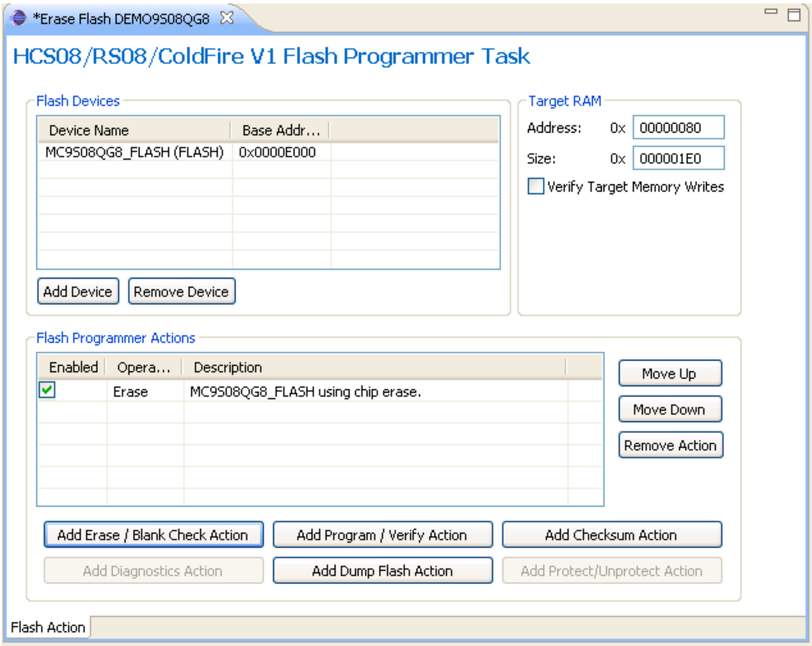
8. Scroll through the list of microcontroller derivatives and select `MC9S08QG8_FLASH`. You can also type the filter text in the given text box.
9. Click **Add Device**.
10. Click **Done**.

    You return to the ***<target>*** **Flash Programmer Task** editor window, with the selected device appearing in the **Flash Devices** group. The **Target RAM** group displays the start address of RAM memory, and its size.
11. Click **Add Erase / Blank Check Action**.

    The **Add Erase / Blank Check Action** dialog box appears. It displays the flash devices added in the task and their base addresses.
12. Click **Add Erase Action**.
13. Click **Done**.

    You return to the ***<target>*** **Flash Programmer Task** editor window, and the action appears in the **Flash Programmer Actions** group (Figure 10.15).

Figure 10.16 *<target>* Flash Programmer Task Editor Window Settings for DEMO9S08QG8



14. Click the icon to save the settings and close the ***<target>* Flash Programmer Task** editor window.

    You can access the newly-made `Erase Flash DEMO9S08QG8` task from the **Target Tasks** view.

Execute HCS08 Erase Task

To erase the Flash memory on the MC9S08QG8, you use the Erase Flash DEMO9S08QG8 task that you made in the previous topic.

To execute the task and erase the memory, perform these steps.

1. Go the **Target Tasks** view and right-click on the `Erase Flash DEMO9S08QG8` task.
2. Select **Execute**. Alternatively, select the `Erase Flash DEMO9S08QG8` task and click the **Execute** icon on the **Target Tasks** view toolbar.
3. In the **Console** view, status messages appear as the IDE connects to the board and erases the memory.

Congratulations! You have erased the on-chip Flash memory in the DEMO9S08QG8 board's microcontroller.

Tutorial D: Create Erase Flash Memory Task for ColdFire

The goal of this tutorial is to demonstrate how to use the ***<target>*** **Flash Programmer Task** editor window to create a task that erases specific topics of Flash memory in a ColdFire MCF5213.

Set Up ColdFire Erase Task

NOTE This tutorial assumes that you have already built a ColdFire project with the name `ColdFire_test`. It also assumes that you have previously created other tasks, so that the **Target Tasks** view is visible. If it is not visible, perform the steps in the Working with Flash Programmer topic to open the **Target Tasks** view.

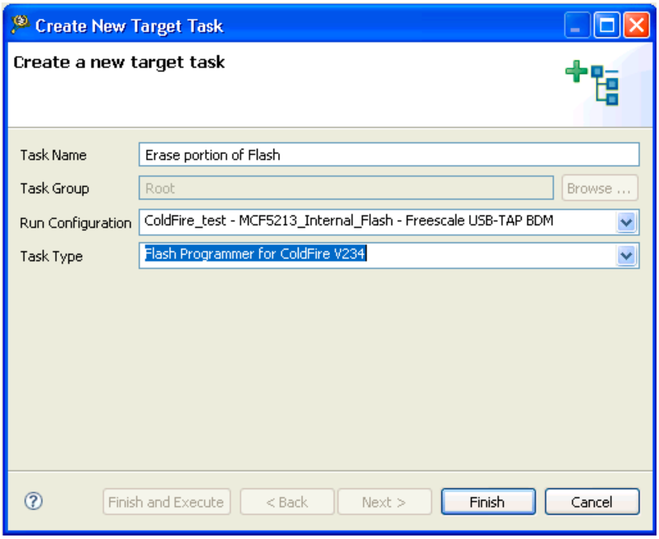
After you have connected an MCF5213-based evaluation board to the workstation with a USB cable, perform these steps.

1. Go to the**Target Tasks** view in either the **C/C++** or **Debug** perspective.
2. Right-click on this view and select **New Task**.

   The **Create New Target Task** wizard appears.
3. In the **Task Name** text box, enter the name of the target task. For example, enter `Erase portion of Flash`.
4. From the **Run Configuration** drop-down list, select a run configuration. For example, select `ColdFire_test - MCF52213 Internal Flash - Freescale USB-TAP BDM`.
5. From the **Task Type** drop-down list, select `Flash Programmer for ColdFire V234` from the listbox.

   The **Create New Target Task** wizard should appear as in Figure 10.17.

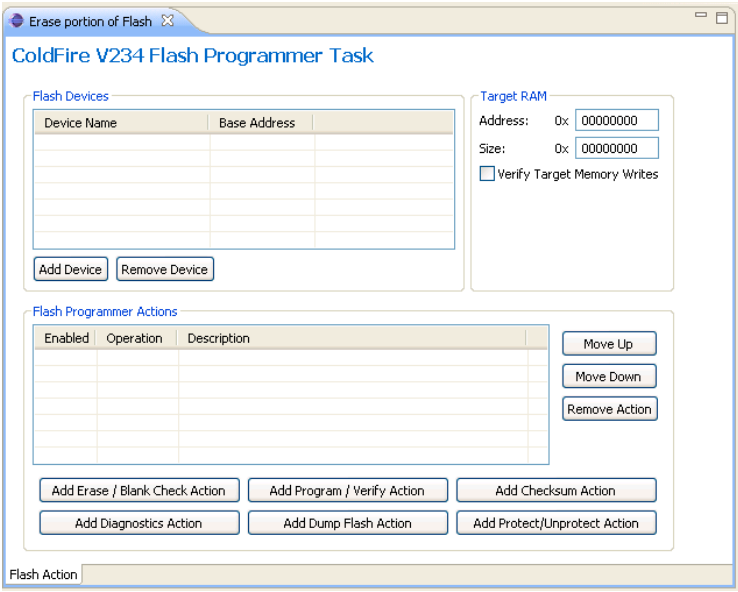
Figure 10.17 Task Settings for Erasing Flash on MCF5213



6. Click **Finish** to create the task.

The ***<target>* Flash Programmer Task** editor window appears, as shown in Figure 10.18.

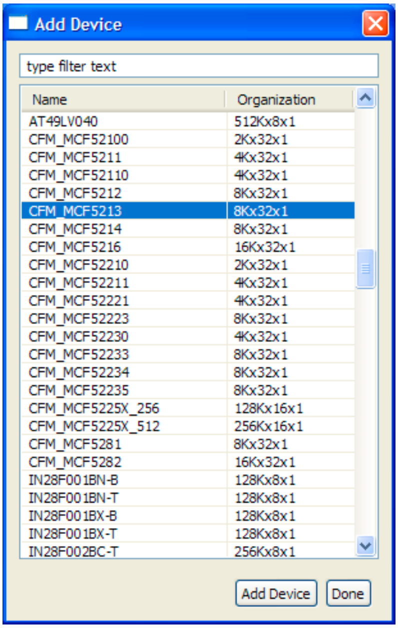
Figure 10.18 *<target>* Flash Programmer Task Editor Window



7. Click **Add Device**.

   The **Add Device** dialog box appears (Figure 10.19).

Figure 10.19 Add Device for ColdFire Derivative



8. Scroll through the list of microcontroller derivatives and select `CFM_MCF5213`.
9. Click **Add Device**.
10. Click **Done**.

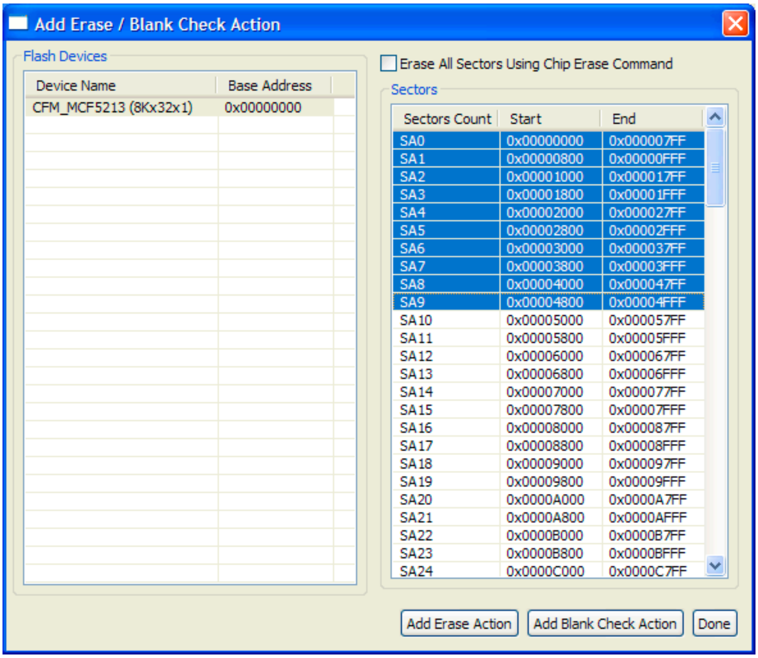
    You return to the ***<target>* Flash Programmer Task** editor window, with the selected device appearing in the **Flash Devices** group.

11. Click **Add Erase / Blank Check Action**.

    The **Add Erase / Blank Check Action** dialog box appears. It displays the the flash devices and their addresses.

12. In the **Sectors** group, click on the desired start address of the flash memory, then shift-click on the end address to select all of the sectors of Flash memory you want erased (Figure 10.20).

Figure 10.20 Add Erase / Blank Action Dialog Box for ColdFire



13. Click **Add Erase Action**.
14. Click **Done**.

NOTE To erase of all Flash memory at the same time, check **Erase All Sectors Using Chip Erase Command**.

You return to the ***<target>*** **Flash Programmer Target** editor window, and the action appears in the **Flash Programmer Actions** group.

15. To allocate a buffer of RAM to hold the erasure algorithm.

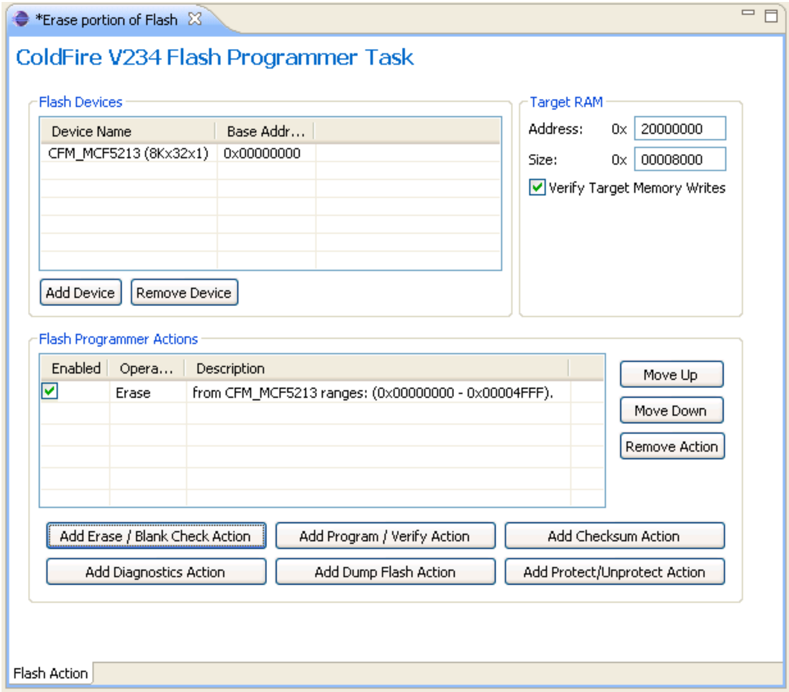
    a. Enter the start address of the RAM buffer in **Address** text box of the **Target RAM** group.

    b. In the **Size** option, enter the amount of RAM that makes up the buffer.

    c. Check the **Verify Target Memory Writes** checkbox. For this example, the start address of the buffer was `0X20000000`, and its size was `0X00008000`.

    The **Target RAM** group displays the start address of the RAM memory buffer, and its size (Figure 10.21).

Figure 10.21 Flash Programmer Task Editor Window with ColdFire Erase Settings



16. Click the icon to save the settings and close the ***<target>* Flash Programmer Task** editor window.

    You can access the newly-made `Erase portion of Flash` task from the **Target Tasks** view.

Execute ColdFire Erase Task

To erase the Flash memory on the MCF5213, you use the task that you made in the previous topic.

To execute the task, perform these steps.

1. Go the **Target Tasks** view.
2. Right-click on the `Erase portion of Flash` task.

3. Select **Execute**. Alternatively, click the **Execute** icon on the **Target Tasks** view toolbar.

   In the **Console** view, status messages appear as the IDE connects to the board and erases the flash memory.

You have erased the selected on-chip Flash memory sectors in the MCF5123 microcontroller.

Tutorial E: Create Download Program Task for ColdFire

The goal of this tutorial is to demonstrate how to create a task that downloads a program into the ColdFire microcontroller's flash memory before being debugged.

Set Up Download Task

NOTE This tutorial assumes that you have already built a ColdFire project with the name `ColdFire_test`. It also assumes that you have created the `Erase portion of Flash` task from the previous tutorial.

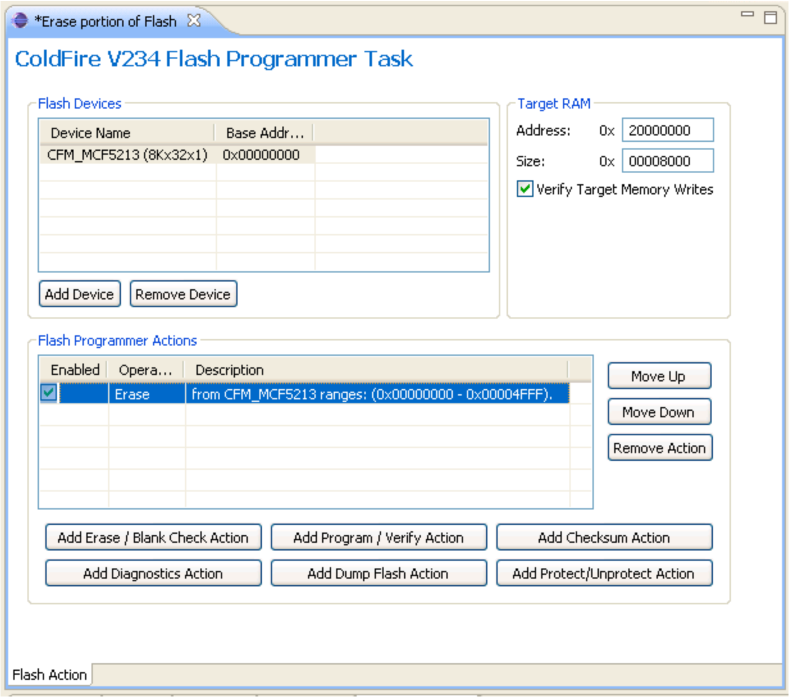
WARNING! To avoid the microcontroller getting caught in an indeterminant state, it is important that its flash memory be erased before attempting to program it. The erase memory action of this task will erase the microcontroller's flash memory before the second action, created in this topic, downloads a program into it. Do not attempt to program flash memory without erasing it first.

After you have connected an MCF5213-based evaluation board to the workstation with a USB cable, perform these steps.

1. Go to the **Target Tasks** view in either the **C/C++ or Debug** perspective.
2. Right-click on this view and double-click on the task `Erase portion of Flash` that you made in the previous topic.

   The **ColdFire V234 Flash Programmer Task** editor window appears (Figure 10.22).

Figure 10.22 Task Settings for Erasing Memory on MCF5213



3. Allocate a buffer of RAM that holds the programming algorithm, along with any program code as it is written into flash.
   a. Enter the start address of the RAM buffer in **Address** text box of the **Target RAM** group.
   b. In the **Size** text box, enter the amount of RAM that makes up the buffer.
   c. Check the **Verify Target Memory Writes** option. For this example, the start address of the buffer was `0X20000000`, and its size was `0X00008000`.

NOTE Since this configuration was taken care of when the Erase action was set up, you do not have to enter anything for this step. However, it is described here for the sake of completeness.

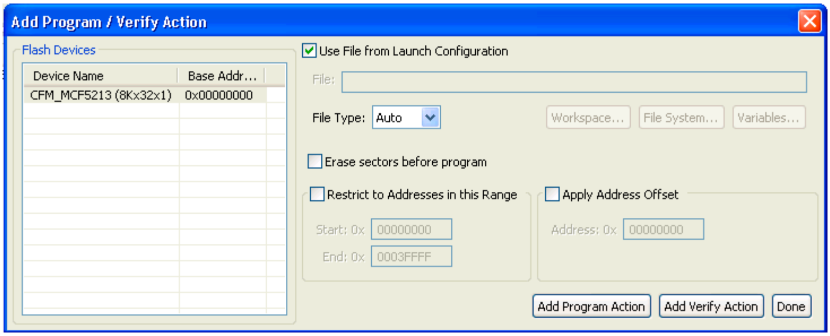
The **Target RAM** group displays the start address of the RAM memory buffer, and its size.

4. Click **Add Program / Verify Action**.

   The **Add Program / Verify Action** dialog box appears, with the ColdFire device selected.

5. Check **Use File from Launch Configuration** to use the default `.elf` file made by the project (Figure 10.23).

Figure 10.23 Adding File to Add Program / Verify Action Dialog Box



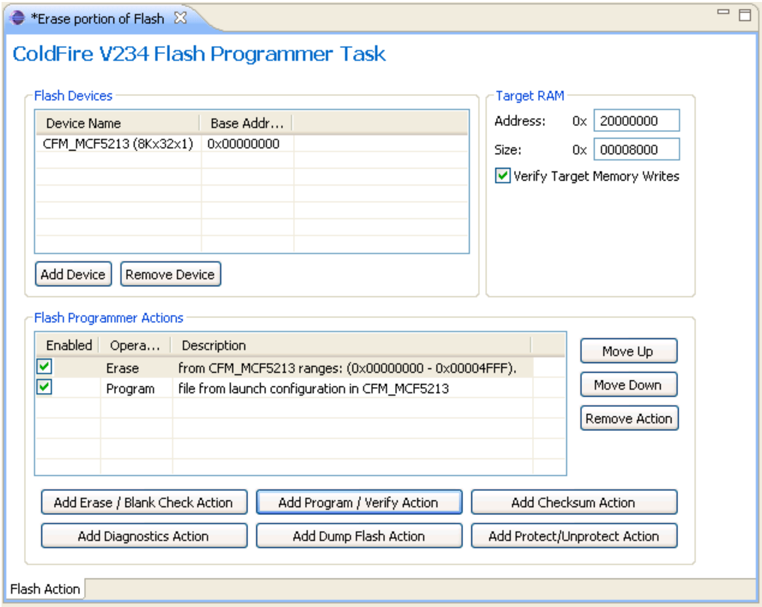
6. Click **Add Program Action**.

7. Click **Done**.

   You return to the ***<target>* Flash Programmer Target** editor window, with the program action appearing in the **Flash Programmer Actions** group (Figure 10.24).

NOTE If you want to download a file other than the launch configuration's default file, click on the **Workspace**, **File System**, or **Variables** button and navigate to the file.

Figure 10.24 Settings for Downloading Program to ColdFire Microcontroller



8. Click the  icon to save the settings and close the ***<target>* Flash Programmer Task** editor window.

   The revised `Erase portion of Flash` task is available from the **Target Tasks** view.

Execute ColdFire Program Task

To execute this task, perform these steps.

1. Go the **Target Tasks** view and right-click on the `MCF5213_INTFLASH` task.
2. Select **Execute**. Alternatively, select the `MCF5213_INTFLASH` task and click the **Execute** icon  on the **Target Tasks** view toolbar.
3. In the **Console** view, status messages appear as the IDE connects to the board and erases the memory.

Congratulations! You have erased the on-chip Flash memory in the DEMO9S08QG8 board’s microcontroller.

Tutorial F: Create and Execute Diagnostics Action Task

The goal of this tutorial is to demonstrate the steps to create and execute the diagnostics action using the flash programmer.

Set Up Diagnostics ActionTask

NOTE This procedure assumes that you have imported a pre-defined Flash Programmer task in the **Target Tasks** view. It also assumes that you have previously created other tasks, so that the **Target Tasks** view is visible. If it is not visible, perform the steps in the Working with Flash Programmer topic to open the **Target Tasks** view.

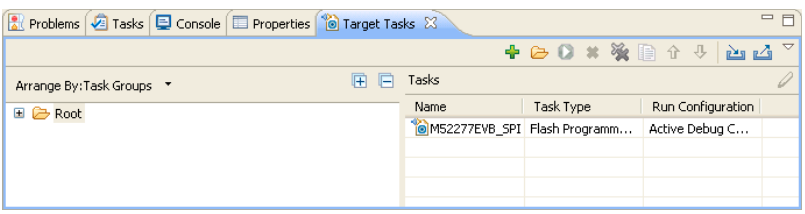
After you have launched CodeWarrior and connected the `M52277EVB_SPI` board to the host system using a USB cable, perform these steps.

1. Go to the **Target Tasks** view in either the **C/C++** or **Debug** perspective.
2. Right-click in the **Target Tasks** view and select **Import**. Alternatively, click the icon on the **Target Tasks** view toolbar.

   The **Open** dialog box appears.
3. Navigate to the pre-defined tasks folder at `<CW MCU install>\MCU_10.0\bin\plugins\support\TargetTask\Flash_Programmer\` and select the desired `.xml` file for your hardware target. For example, select `M52277EVB_SPI.xml.`
4. Click **Open**.

   The selected task appears in the **Target Tasks** view (Figure 10.25).

Figure 10.25 Pre-defined Task in Target Tasks View



NOTE The predefined erase/program tasks are not mandatory for diagnostics.

5. Right-click on the task's name and select **Execute**.

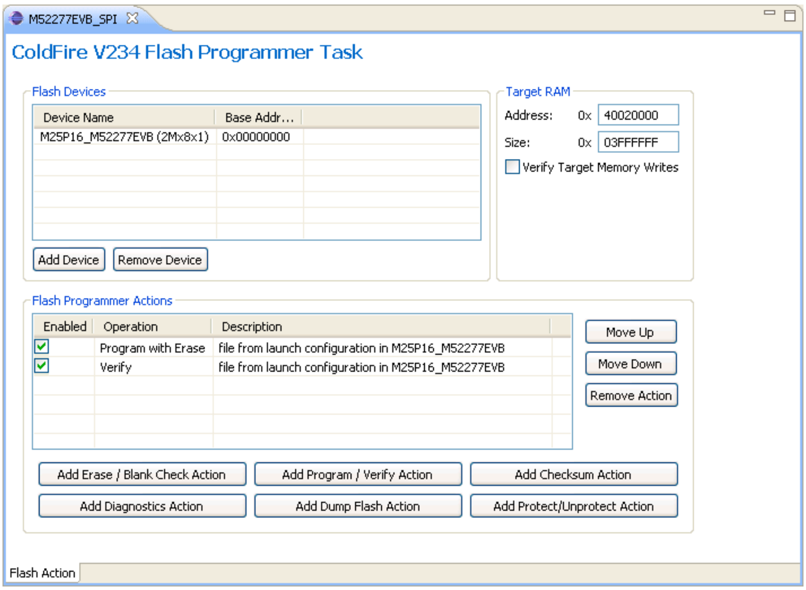
   The task's Flash Programmer actions execute in sequence. First, they erase the hardware target's flash memory. Next, they check whether the flash is correctly erased. If true, they program the file's code into the flash and check if it programmed without errors.

NOTE When a predefined flash programmer task is imported, its **Run Configuration** is set as Active Debug Context. If the task is imported without any active debug session, then the icon will be disabled as in Figure 10.25. Associate the selected target task to a different Run Configuration to enable the icon.

6. Double-click on the task name, to examine the task stored Flash Programmer actions.

   The ***<target>* Flash Programmer Task** editor window appears, as shown in Figure 10.26.

Figure 10.26 *<target>* Flash Programmer Task Editor Window



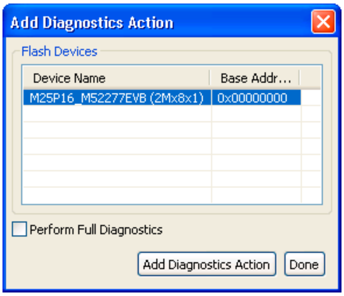
7. Click **Add Diagnostics Action**.

   The **Add Diagnostics Action** dialog box appears (Figure 10.27). It displays the the flash devices and the base addresses.

NOTE The full diagnostics does the same thing as diagnostics but also prints the blank status for sectors. It can take significantly longer to complete.

NOTE If more than one flash is available in **Flash Devices** table, the **Add Diagnostics Action** table lets you select the flash where you want to run the diagnostics.

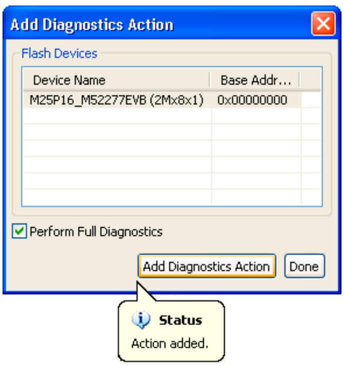
Figure 10.27 Add Diagnostics Action Dialog Box



8. Check the **Perform Full Diagnostics** checkbox if you want to perform complete diagnostics on the selected flash device.
9. Click the **Add Diagnostics Actions** button (Figure 10.27).

   You get a popup with a status that the device is added (Figure 10.28).

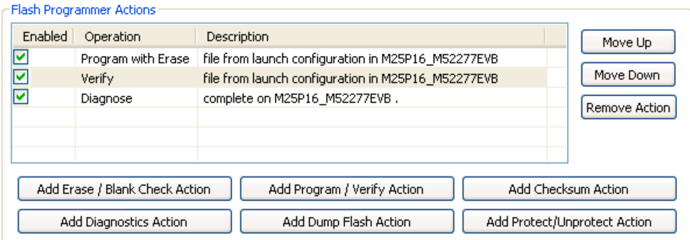
Figure 10.28 Add Diagnostics Actions Dialog Box — Popup with Status



10. Click **Done**.

    The **Add Diagnostics Action** dialog box closes. The action appears in the **Flash Programmer Actions** table of the ***<target>* Flash Programmer Task** editor window (Figure 10.29).

Figure 10.29 Flash Programmer Actions Table



Execute Diagnostics Action Task

To execute the task, perform these steps.

1. Right-click on the `M52277EVB_SPI` task.
2. Select **Execute**. Alternatively, select the `M52277EVB_SPI` task and click the **Execute** icon on the **Target Tasks** view toolbar.

   CodeWarrior establishes contact with the `M52277EVB_SPI` board, erases the microcontroller's flash memory, downloads the code, verifies, and diagnoses the contents on `M52277EVB_SPI`.

You have created and executed a diagnostic action task on the `M52277EVB_SPI` microcontroller.

Tutorial G: Dump Entire Flash

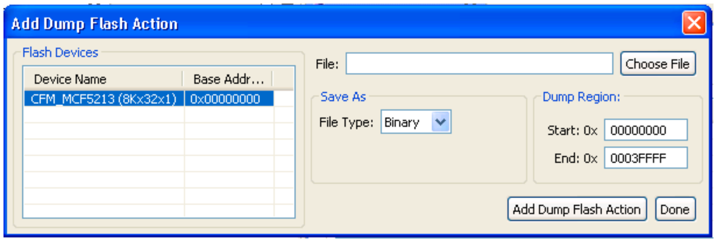
The goal of this tutorial is to demonstrate how to dump selected sectors of a flash device or the entire flash device.

To add a dump flash action:

1. Click the **Dump Flash Action** button.

   The **Add Dump Flash Action** dialog box (Figure 10.30) appears.

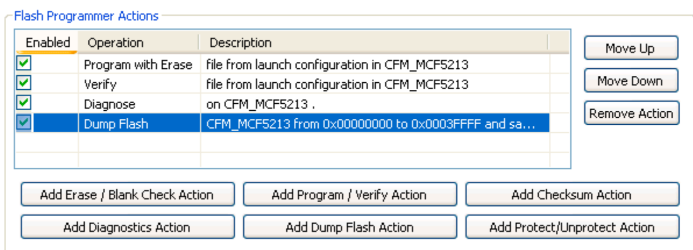
Figure 10.30 Add Dump Flash Action Dialog Box



2. Specify the file name in the **File** text box. The flash is dumped in this selected file.
3. Select the file type from the **File Type** drop-down list. You can select any one of the following file types:
   - Srec — Saves files in Motorola S-record format.
   - Binary — Saves files in binary file format.
4. Specify the memory range for which you want to add dump flash action.
   - Type the start address of the range in the **Start** text box.
   - Type the end address of the range in the **End** text box.
5. Click **Add Dump Flash Action**.
6. Click **Done**.

   The **Add Dump Flash Action** dialog box closes and the added dump flash action appear in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window (Figure 10.31).

Figure 10.31 Added Dump Flash Actions



Tutorial H: Change Protection of Sector

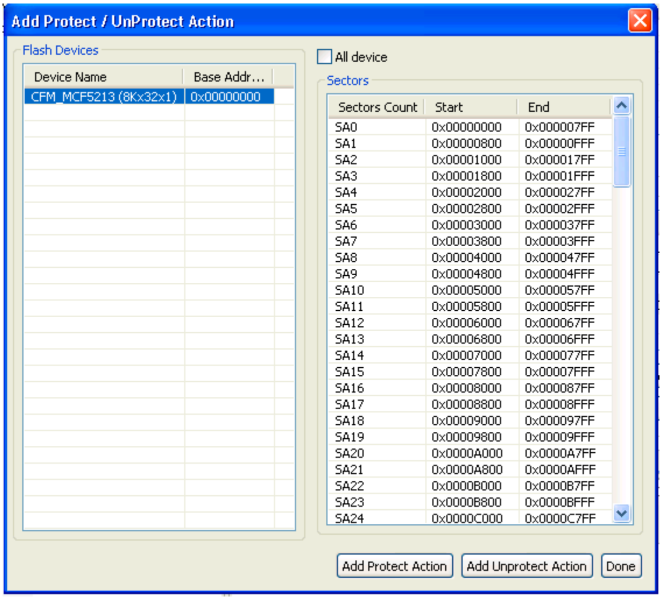
The goal of this tutorial is to demonstrate how to protect / unprotect actions enable you to change the protection of a sector in the flash device.

To add a protect / unprotect action:

1. Click the **Add Protect/Unprotect Action** button.

   The **Add Protect/Unprotect Action** dialog box (Figure 10.32) appears.

Figure 10.32 Add Protect / Unprotect Action Dialog Box



2. Select a sector from the **Sectors** table and click the **Add Protect Action** button to add a protect operation on the selected sector.

NOTE Press **CTRL** or **SHIFT** keys for selecting multiple sectors from the **Sectors** table.

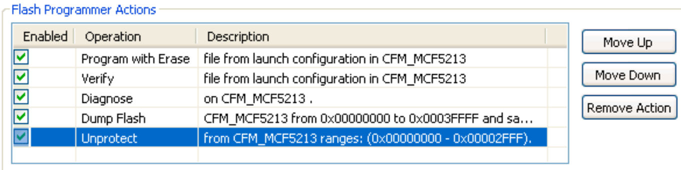
3. Click the **Add Unprotect Action** button to add an unprotect action on the selected sector.

NOTE Check the **All Device** checkbox to add action on full device.

4. Click **Done**.

   The **Add Protect/ Unprotect Action** dialog box closes and the added protect or unprotect actions appear in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window (Figure 10.33).

Figure 10.33 Protect / Unprotect Action



Tutorial I: Fast Access to Target Tasks Editors

The goal of this tutorial is to demonstrate managing and fast accessing of the target tasks' editors used by the Target Task framework.

You can access target tasks by:

- Editing tasks in a project. Refer Editing Tasks in Project.
- Editing tasks imported in aprevious session. Refer Editing Tasks Imported in Previous Session.
- Storing task to a file. Refer Storing Task to File.

Editing Tasks in Project

NOTE Before editing ensure that the target task has been added to the project by a wizard or another method and has an extension recognized by the feature (.ttf).

To edit tasks in a project:

1. Double-click on the file in the project.
2. The appropriate task editor appears.
3. The task is imported in the Target Task Framework.

Editing Tasks Imported in Previous Session

NOTE Before editing ensure that a target task has been imported and the previous Eclipse session has been closed.

To edit tasks imported in a previous session:

1. Open the **Target Tasks** view.
2. Double-click to open the desired task.

   The target task editor appears.
3. Make the appropriate changes and close the target task editor.

NOTE Changing the task will also save changes to the file in the project. The save is done to the file in project only if the task has been imported from a project (with double click). Otherwise, it will prompt to save the file.

Storing Task to File

NOTE Before storing the task ensure that the target task has been imported or created and appropriate changes have been made.

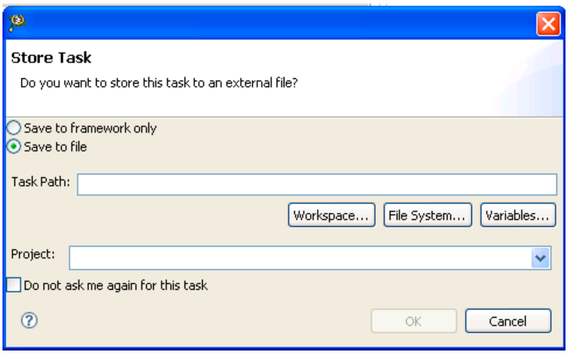
To store task to a file:

1. Open the **Target Tasks** view.
2. Double-click to open the desired task.

   The target task editor appears.
3. Make the appropriate changes and save the target task.

   The **Store Task** dialog box appears (Figure 10.34) .

Figure 10.34 Store Task Dialog Box



4. Select the **Save to File** option.

5. In the **Task Path** text box, specify the path where you want to store the task. You can use the **Workspace**, **File System**, or **Variables** buttons to navigate to the desired location.
6. From the **Project** drop-down list select the project where you want to store you target task.

NOTE Check the **Do not ask me again for this task** checkbox to save these settings for the current target task.

7. Click **OK**.

   The dialog box closes and associates the file to the specified project and saves in target task framework and not necessarily in the project.

NOTE The above mentionde feature has a preference that will not display the save as dialog and always save in target task framework. The settings are located in **Windows > Preferences > C/C++ >Debug > CodeWarrior Debugger > Show "Save As"** dialog when saving a new task.

Tutorial J: Programming with Simple Flash

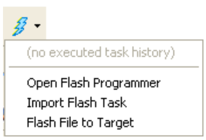
The goal of this tutorial is to demonstrate the use of CodeWarrior Simple Flash Programmer. This feature enables you to perform these basic flash operations:

- Erasing Flash Device
- Programming a File

To open the **Simple Flash** dialog box:

1. Click the **Flash Programmer** icon on the IDE toolbar (Figure 10.36).

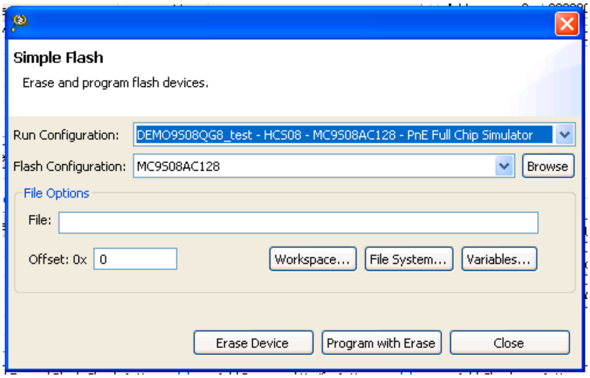
Figure 10.35 Flash Programmer Icon



2. Select **Flash File to Target**.

   The **Simple Flash** dialog box appears (Figure 10.36).

Figure 10.36 Simple Flash Dialog Box



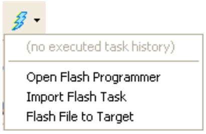
- **Run Configuration** drop-down list — Lists all run configurations defined in Eclipse. If a connection to the target has already been made the control becomes inactive and contains the text Active Debug Configuration.
- **Flash Configuration** drop-down list — Lists predefined target tasks for the processor selected in the Launch Configuration and tasks added by user with the **Browse** button. The values in this drop-down list are updated based on the processor selected in the launch configuration. For more information on launch configurations, see *<product> targeting manual*.
- **File Options** group — Allows selecting the file to be programmed on the flash device and the location.
  - **File** text box — Enables you to specify the filename. You can use the **Workspace**, **File System**, or **Variables** buttons to select the desired file.
  - **Offset** text box — Enables you to specify offset location for a file. If no offset is specified the default value of zero is used. The offset is always added to the start address of the file. If the file doesn't contain address information then zero is considered as start address.
- **Erase Device** button — Erases the flash device. In case you have multiple flash blocks on the device, all blocks are erased. If you want to selectively erase or program blocks, use the Flash Programmer feature.
- **Program with Erase** button — Erases the sectors that are occupied with data and then programs the file. If the flash device can not be accessed at sector level then the flash device is completely erased.

Erasing Flash Device

To erase a flash device, follow these steps:

1. Click the **Flash Programmer** icon on the IDE toolbar (Figure 10.37).

Figure 10.37 Flash Programmer Icon



2. Select **Flash File to Target**.
3. The **Simple Flash** dialog box appears (Figure 10.37).
4. Select a run configuration from the **Run Configuration** drop-down list.

NOTE If a connection is already established with the target, this control is disabled.

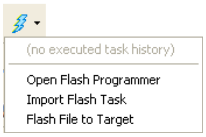
The Flash Configuration drop-down list is updated with the supported configurations for the processor from the launch configuration.

5. Select a flash configuration from the **Flash Configuration** drop-down list.
6. Click the **Erase Device** button.

Programming a File

1. Click the **Flash Programmer** icon on the IDE toolbar (Figure 10.38).

Figure 10.38 Flash Programmer Icon



2. Select **Flash File to Target**.
3. The **Simple Flash** dialog box appears (Figure 10.36).
4. Select a run configuration from the **Run Configuration** drop-down list.

NOTE If a connection is already established with the target, this control is disabled.

The Flash Configuration drop-down list is updated with the supported configurations for the processor from the launch configuration.

5. Select a flash configuration from the **Flash Configuration** drop-down list.

6. Type the file name in the **File** text box. You can use the **Workspace**, **File System**, or **Variables** buttons to select the desired file.
7. Type the offset location in the **Offset** text box.
8. Click the **Program with Erase** button.

Tutorial K: Exporting Target Tasks

The goal of this tutorial is to demonstrate how to export a target task to an external file.

To export a target task:

1. Select the target task in the **Target Task** view.
2. Click the **Export** button from the **Target Task** view toolbar. Alternatively, right-click the target task and select **Export** from the context menu.

   The **Save As** dialog box appears.
3. Type a file name in the **File name** drop-down list.
4. Click **Save**.

   The exported task is stored in XML format.

Working with Hardware Diagnostics Window

The **Hardware Diagnostics** window lets you run a series of diagnostic tests that determine if the basic hardware is functional.

These tests include:

- Memory read/write — Makes a read / write access to memory in order to read or write a byte, word (2 bytes), and long word (4 bytes) to / from memory.
- Scope loop — Makes read and write accesses to memory in a loop at target address. The the loop speed settings determine the time between accesses. The loop can only be stopped by cancelling the test.
- Memory tests — Requires you to set the access size and target address from the access settings group and the settings present in the Memory Tests group.

On the Eclipse IDE, the hardware diagnostics feature runs like a target task.

To create a hardware diagnostic target task:

1. Click **Window** > **Show View** > **Other**.

   The **Show View** dialog box appears.
2. Expand the **Debug** group and select **Target Tasks**.

3. Click **OK**.
4. Click  from the **Target Tasks** view **t**oolbar to create a new target task.

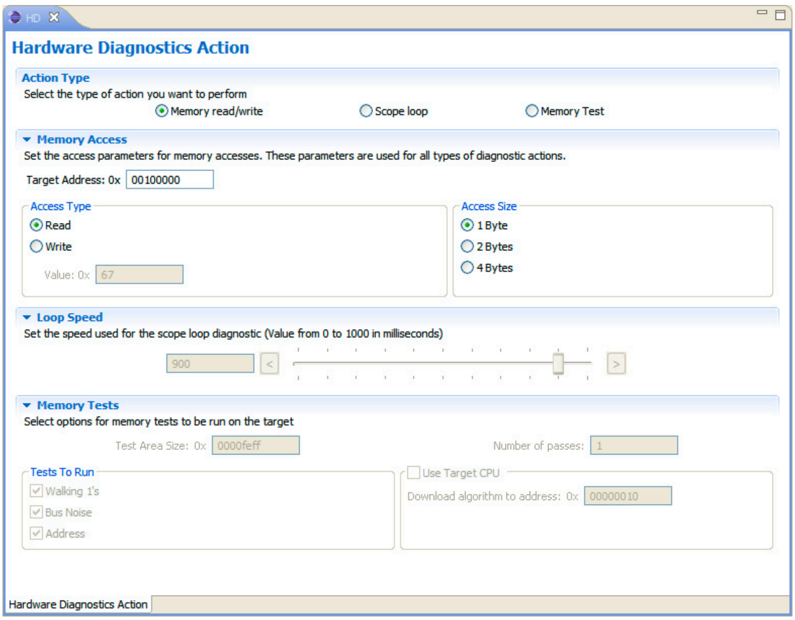
   The **Create New Target Task** wizard appears.
5. In the **Task Name** text box, enter the name of the target task.
6. From the **Run Configuration** drop-down list, select a configuration.

NOTE Select Active Debug Context from the **Run Configuration** drop-down list, if you want to use hardware diagnostics over an active debugger session, else select any of the specified debug context from the list.

7. From the **Task Type** drop-down list, select **Hardware Diagnostic**.
8. Click **Finish**.

   The **Hardware Diagnostics Action** window appears as seen in Figure 10.39.

Figure 10.39 Hardware Diagnostics Action Window



The **Hardware Diagnostics Action** window includes the following groups:

- **Action Type** — Used to set various action types. The options you select in this group enables the options in the other groups of the window.

- **Memory Access** — Configures diagnostic tests for performing memory reads and writes over the remote connection interface.
- **Loop Speed** — Configures diagnostic tests for performing repeated memory reads and writes over the remote connection interface.
- **Memory Tests** — Configures the memory tests that you can run on the target.

NOTE The **Use Target CPU** group appears grayed-out and is not applicable for the HCS08 and RS08 Target Tasks.

NOTE See the *Freescale Eclipse Extensions Guide* for detailed documentation of the various options available in the **Hardware Diagnostics Action** window.

Manipulating Target Memory

You can manipulate the target's memory in these ways:

- Import — Read encoded data from a specified file, decode that data into a specific format, and copy the decoded data into a specified memory range. For information, refer Creating Target Task to Import Memory.
- Export — Read data from a specified memory range, encode that data in a specific format, and store the encoded data in an output file. For information, refer Creating Target Task to Export Memory.
- Fill — Fill a specified memory range with a specific data pattern. For information, refer Fill Memory with Data Pattern.

Creating Target Task to Import Memory

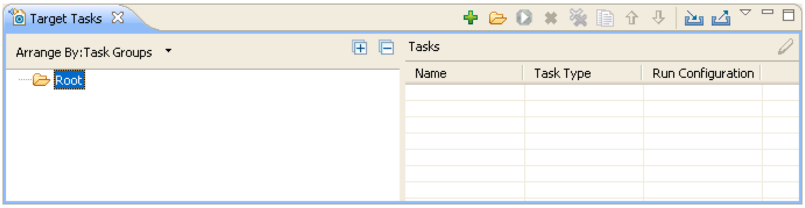
Perform these steps to create a target task to import memory:

1. Select **Window** > **Show View** > **Other**.

   The **Show View** dialog box appears.
2. From the **Debug** group, select **Target Tasks**.

   The **Target Tasks** view appears (Figure 10.40)

Figure 10.40 Target Tasks View



3. Right-click in the **Target Tasks** view and select **New Task** from the context menu.

   The **Create New Target Task** wizard appears (Figure 10.41).

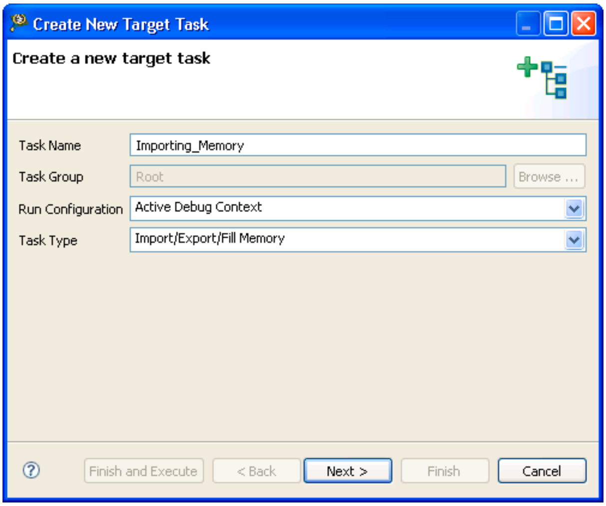
4. In the **Task Name** text box, enter a name for the new task. For example, *Importing_Memory*.

5. Use the **Run Configuration** list box to specify the configuration that the task launches and uses to connect the target. For example, select *Active Debug Context*.

NOTE If the task does not successfully launch the configuration that you specify, the **Execute** button of the **Target Tasks** view toolbar stays disabled.

6. From the **Task Type** list box, select *Import/Export/Fill Memory*.

Figure 10.41 Create New Target Task Wizard

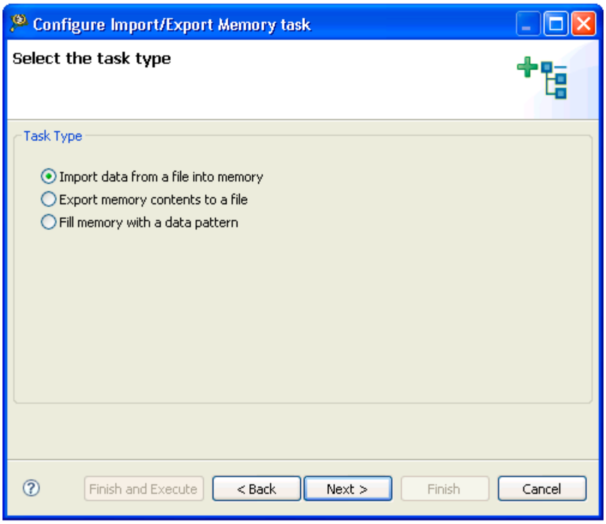


7. Click **Next**.

   The **Select the task type** page (Figure 10.42) of the **Configure Import/Export Memory task** dialog box appears.

8. Select **Import data from a file into memory** task type option.

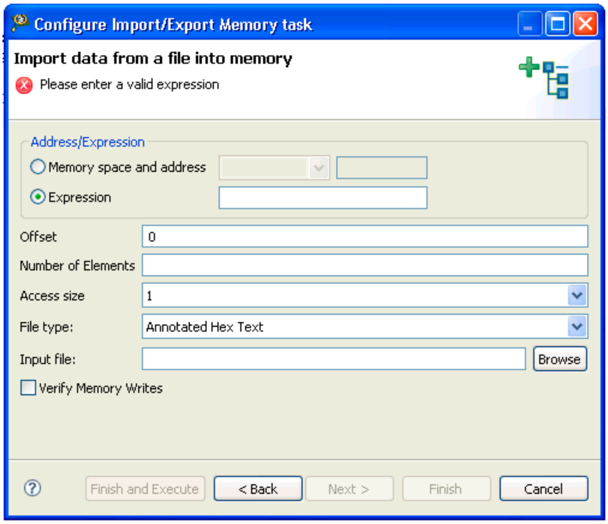
Figure 10.42 Create New Target Task Wizard — Select Task Type



9. Click **Next**.

   The **Import data from a file into memory** page (Figure 10.43) of the **Configure Import/Export Memory task** dialog box appears. This page lets you read encoded data from a user specified file, decode it, and copy it into a user specified memory range.

Figure 10.43 Import data from a file into memory Page



10. Specify options as explained in Table 10.6.

NOTE CodeWarrior IDE validates information as you enter it. If there are errors, a message appears near the page title.

Table 10.6 Import Data from a File into memory Page Options

Item	Description
Memory space and address	Enter the literal address and memory space on which the data transfer is performed. The Literal address field allows only decimal and hexadecimal values.
Expression	Enter the memory address or expression at which the data transfer starts.
Offset	Enter an value to offset addresses contained in Motorola S-Record and Annotated Hex Text data formats. The field remains disabled for all other data formats.
Number of Elements	Enter the total number of elements to be transferred.

Table 10.6 Import Data from a File into memory Page Options (*continued*)

Item	Description
Access size	Denotes the number of addressable units of memory that the debugger accesses in transferring one data element. The default values shown are 1, 2, 4, and 8 units. When target information is available, this list shall be filtered to display the access sizes that are supported by the target.
File type	Defines the format in which the wizard encodes the data it imports. By default, the following file types are supported: • Annotated Hex Text • Hex Text • Motorola S-Record • Raw Binary • Signed Decimal Text • Unsigned decimal Text
Input File	Enter the path to the file that contains the data to be imported. Click the **Browse** button to select the import file through the standard **File Open** dialog box.
Verify Memory Writes	Check the option to verify success of each data write to the memory.

11. Click **Finish**.

    CodeWarrior IDE saves your changes, closes the **Configure Import/Export Memory task** wizard, and displays the newly created import task in the **Tasks** list of the **Target Tasks** view.

NOTE Alternatively, click **Finish and Execute** to save your changes and execute the newly created import task immediately.

Creating Target Task to Export Memory

Perform these steps to create a target task to export memory:

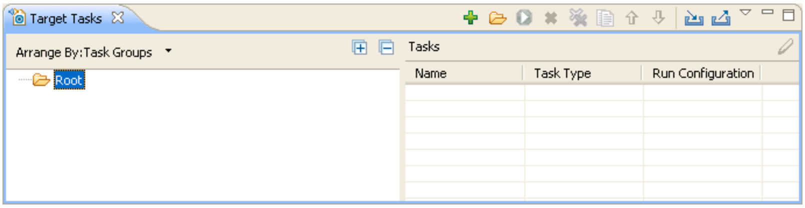
1. Select **Window** > **Show View** > **Other**.

   The **Show View** dialog box appears.

2. From the **Debug** group, select **Target Tasks**.

   The **Target Tasks** view appears (Figure 10.44)

Figure 10.44 Target Tasks View



3. Right-click in the **Target Tasks** view and select **New Task** from the context menu.

   The **Create New Target Task** wizard appears (Figure 10.45).

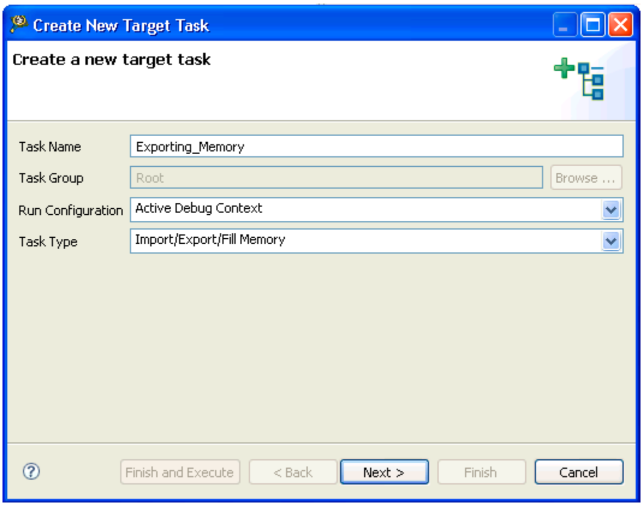
4. In the **Task Name** text box, enter a name for the new task. For example, *Exporting_Memory*.

5. Use the **Run Configuration** list box to specify the configuration that the task launches and uses to connect the target. For example, *Active Debug Context*.

NOTE If the task does not successfully launch the configuration that you specify, the **Execute** button of the **Target Tasks** view toolbar stays disabled.

6. From the **Task Type** list box, select *Import/Export/Fill Memory*.

Figure 10.45 Create New Target Task Wizard

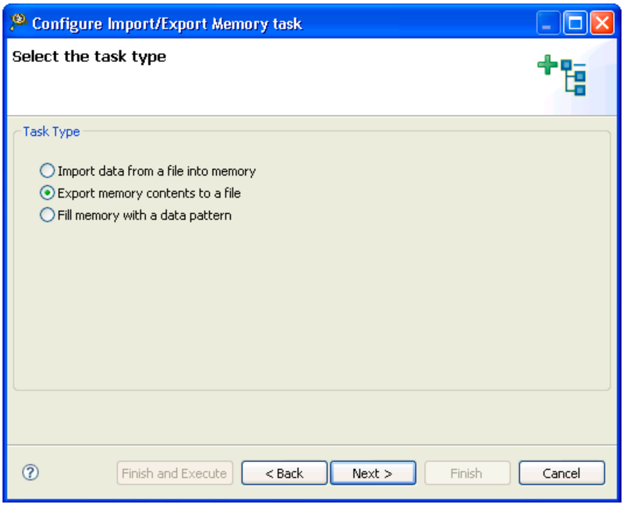


7. Click **Next**.

   The **Select the task type** page (Figure 10.46) appears.

8. Select **Export data from memory into a file** task type option.

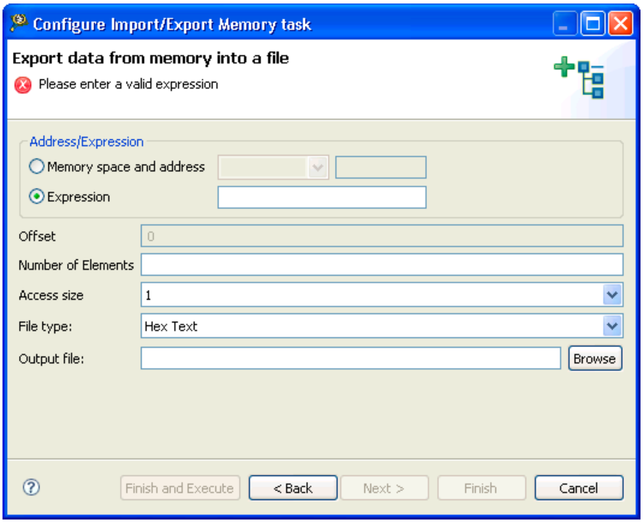
Figure 10.46 Create New Target Task Wizard — Select Task Type



9. Click **Next**.

   The **Export data from memory into a file** page (Figure 10.47) appears. This page lets you read data from a user specified memory range, encode it in a user specified format, and store this encoded data in a user specified output file.

Figure 10.47 Export data from memory into a file Page



10. Specify options as explained in Table 10.7.

NOTE CodeWarrior IDE validates information as you enter it. If there are errors, a message appears near the page title.

Table 10.7 Export Data from Memory into a File Options

Item	Description
Memory space and address	Enter the literal address and memory space on which the data transfer is performed. The Literal address field allows only decimal and hexadecimal values.
Expression	Enter the memory address or expression at which the data transfer starts.

Table 10.7 Export Data from Memory into a File Options

Item	Description
Offset	Enter a value to offset addresses contained in Motorola S-Record and Annotated Hex Text data formats. The field remains disabled for all other data formats.
Number of Elements	Enter the total number of elements to be transferred.
Access Size	Denotes the number of addressable units of memory that the debugger accesses in transferring one data element. The default values shown are 1, 2, 4, and 8 units. When target information is available, this list shall be filtered to display the access sizes that are supported by the target.
File Type	Defines the format in which the wizard encodes the data it imports. By default, the following file types are supported: • Annotated Hex Text • Hex Text • Motorola S-Record • Raw Binary • Signed Decimal Text • Unsigned decimal Text
Output File	Enter the path of the file to which the wizard will write data. Click the **Browse** button to save the export file through the standard **File Save As** dialog box.

11. Click **Finish**.

    CodeWarrior IDE saves your changes, closes the **Configure Import/Export Memory task** wizard, and displays the newly created export task in the **Tasks** list of the **Target Tasks** view.

NOTE Alternatively, click **Finish and Execute** to save your changes and execute the newly created export task immediately.

Fill Memory with Data Pattern

To fill memory with a specified data pattern, perform these steps.

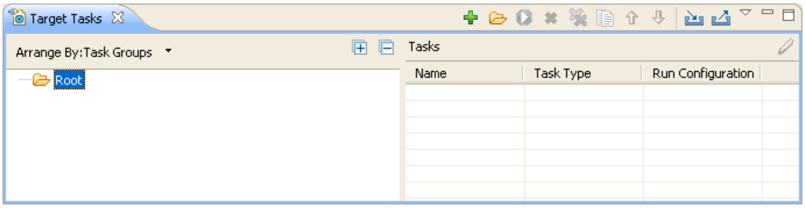
1. Select **Window** > **Show View** > **Other**.

   The **Show View** dialog box appears.

2. From the **Debug** group, select **Target Tasks**.

   The **Target Tasks** view appears (Figure 10.48)

Figure 10.48 Target Tasks View



3. Right-click in the **Target Tasks** view and select **New Task** from the context menu.

   The **Create New Target Task** wizard appears as shown in Figure 10.49.

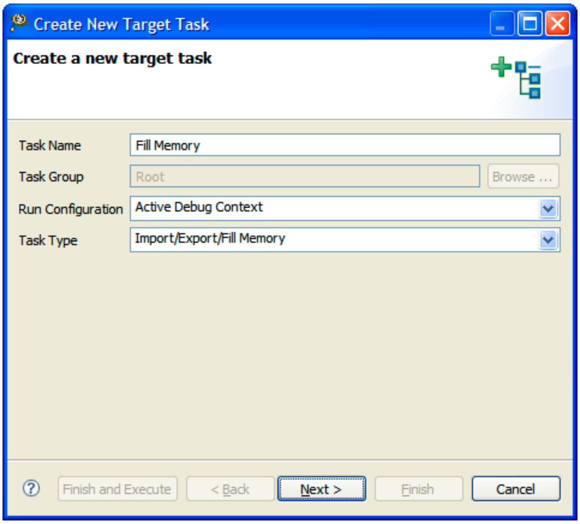
4. In the **Task Name** text box, enter a name for the new task. For example, *Fill Memory*.

5. Use the **Run Configuration** list box to specify the configuration that the task launches and uses to connect the target. For example, *Active Debug Context*.

NOTE If the task does not successfully launch the configuration that you specify, the **Execute** button of the **Target Tasks** view toolbar stays disabled.

6. From the **Task Type** list box, select **Import/Export/Fill Memory**.

Figure 10.49 Create New Target Task Wizard

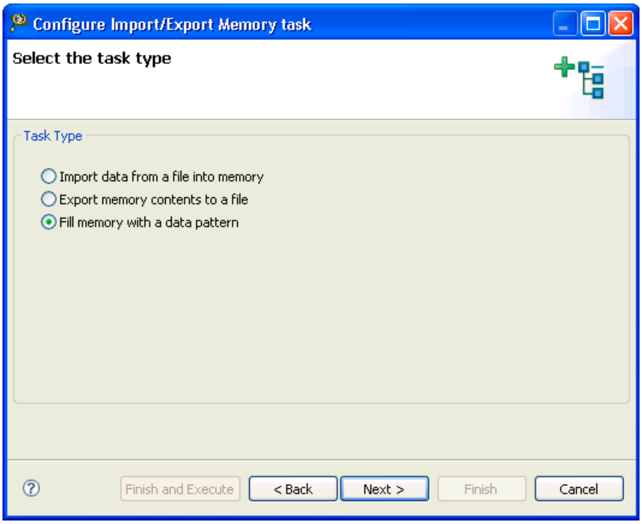


7. Click **Next**.

   The **Select the task type** page (Figure 10.50) appears.

8. Select **Fill memory with a data pattern** task type option.

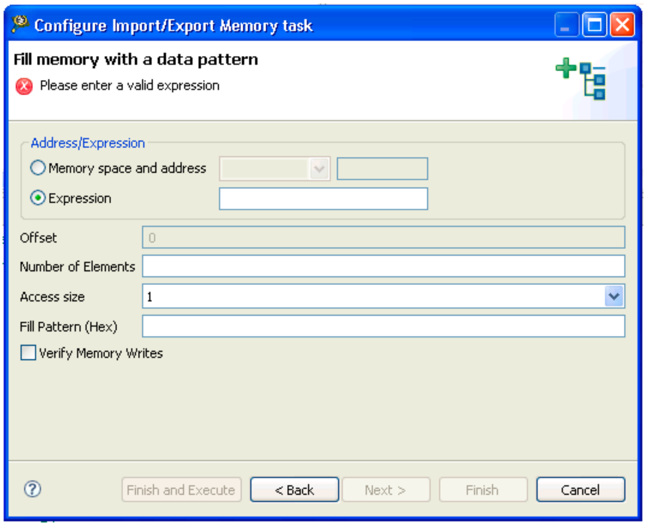
Figure 10.50 Create New Target Task Wizard — Select Task Type



9. Click **Next**.

   The **Fill memory with a data pattern** page (Figure 10.51) appears. This page lets you fill a user specified memory range with a user specified data pattern.

Figure 10.51 Fill memory with a data pattern Page



10. Specify options as explained in Table 10.8.

NOTE CodeWarrior IDE validates information as you enter it. If there are errors, a message appears near the page title.

Table 10.8 Fill memory with a data pattern Page Options

Item	Description
Memory space and address	Enter the literal address and memory space on which the fill operation is performed. The Literal address field allows only decimal and hexadecimal values.
Expression	Enter the memory address or expression at which the fill operation starts.

Table 10.8 Fill memory with a data pattern Page Options

Item	Description
Offset	Enter a value to offset addresses contained in Motorola S-Record and Annotated Hex Text data formats. The field remains disabled for all other data formats.
Number of Elements	Enter the total number of elements to be modified.
Access Size	Denotes the number of addressable units of memory that the debugger accesses in modifying one data element. The default values shown are 1, 2, 4, and 8 units. When target information is available, this list shall be filtered to display the access sizes that are supported by the target.
Fill Pattern	Denotes the sequence of bytes, ordered from low to high memory, the wizard mirrors in the target. The field accept only hexadecimal values. If the width of the pattern exceeds the access size, the wizard displays an error message.
Verify Memory Writes	Check the option to verify success of each data write to the memory.

11. Click **Finish**.

    CodeWarrior IDE saves your changes, closes the **Configure Import/Export Memory task** wizard, and displays the newly created fill task in the **Tasks** list of the **Target Tasks** view.

NOTE Alternatively, click **Finish and Execute** to save your changes and execute the newly created fill task immediately.

Index

Numerics

K

L

M

N

O

U

V

W

X